International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Sahota R et al. Int J Reprod Contracept Obstet Gynecol. 2024 Feb;13(2):307-312
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20240125

Original Research Article

The breastfeeding support practices, related barriers and facilitators in the neonatal intensive care unit, Uttarakhand, India

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Received: 24 December 2023
Revised: 15 January 2024
Accepted: 16 January 2024

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ABSTRACT

Background: Within the bustling and stressful neonatal intensive care unit (NICU) environment, implementing Baby-friendly practices presents numerous challenges. Breastfeeding initiation and duration rates among NICU infants are lower compared to healthy full-term infants. Objectives were to explore breastfeeding support practices and related barriers and facilitators in the NICU.
Methods: A retrospective study of 496 babies admitted to NICU of Sahota Superspeciality Hospital Kashipur, Uttarakhand during the time period March 2018 to February 2020 and examined maternal and infant factors. The 496 infants divided in two groups: group A: breast milk use at discharge (n=398) and group B: no breast milk use at discharge (n=98).
Results: The incidence of morbidity factors like sepsis, chronic lung disease, retinopathy of prematurity, intraventricular hemorrhage, gastrostomy tube feeds at discharge, gavage feeds at discharge noted more among the babies of group of 'no breast milk use at discharge' compared to other group ($p<0.05$). The usage of donor milk and formula milk is significantly very less in babies of group 'breast milk use at discharge' compared to other group ($p<0.05$). Duration of hospital stay was very less in the group A compare to group B ($p<0.05$). Respiratory distress was the most common diagnosis among the babies of group A and apnea was the most common among babies of group B.
Conclusions: Obstacles to maintaining breastfeeding in the NICU, which warrant focused efforts for enhancing practices, encompassed inadequate resources for facilitating parental involvement, impediments to expressing and providing maternal breast milk, and a notable prevalence of bottle-feeding supplemented with formula.

Keywords: Barriers, Breast feeding, Facilitators, Neonates, NICU

INTRODUCTION

Breastfeeding stands as the optimal source of nutrition for infant growth and development. It brings forth a range of demonstrated health advantages for infants, encompassing a reduced risk of conditions such as asthma, obesity, hypertension, type 1 and type 2 diabetes, severe lower respiratory disease, acute otitis media, sudden infant death syndrome, and gastrointestinal infections.[1] Furthermore, consistent evidence from studies by Bernard et al, Kramer et al, and Lee et al indicates that extended breastfeeding duration correlates with enhanced cognitive development in children.[2-4] Mothers, too, reap benefits from breastfeeding, which include a decreased risk of severe postpartum bleeding, breast and ovarian cancer, high blood pressure, and type 2 diabetes.

However, it is crucial to note that these benefits can be fully realized only when breastfeeding is initiated early and exclusively maintained, particularly during the initial months. Despite longstanding efforts to promote breastfeeding, a substantial gap still exists.[5]

According to data from the National Family and Health Survey-5, only 42% of newborns in India and 41.3% in Uttarakhand experienced early initiation of breastfeeding within an hour of birth. Exclusive breastfeeding for six months was observed in 55% of newborns in India and 52.5% in Uttarakhand.[6] Notably, the increasing trend in institutional deliveries, facilitated by the National Rural Health Mission, plays a pivotal role in early breastfeeding initiation.[7]

Additionally, as per the SRS bulletin, the infant mortality rate decreased from 44 in 2011 to 28 in 2020 in India, with Uttarakhand reporting an infant mortality rate of 24 in 2020.[8] Moreover, challenging environments can hinder feeding with alternative milk sources or the early introduction of complementary foods due to contamination risks and potential dilution of supplemental milk. Hence, exclusive breastfeeding remains the most cost-effective intervention in such conditions to enhance infant health, reduce morbidity, and decrease mortality.[9]

Within the bustling and stressful NICU environment, implementing Baby-friendly practices presents numerous challenges. Breastfeeding initiation and duration rates among NICU infants are lower compared to healthy full-term infants. Various barriers hinder breastfeeding establishment in the NICU, including the fragility and physical challenges of infants, maternal distress related to infant hospitalization, physical separation of mothers and infants, privacy limitations, and inconsistent breastfeeding support. Mothers also face obstacles like rigid feeding schedules, strict monitoring of infant intake, delayed initiation of milk expression, difficulty in maintaining adequate milk volumes until the infant can breastfeed, and transitioning the baby from gavage to breastfeeding.[10-13] The objective of this study was to explore breastfeeding support practices and related barriers and facilitators in the NICU.

METHODS

We performed a retrospective study of all babies admitted to NICU of Sahota Superspeciality Hospital Kashipur, Uttarakhand during the time period March 2018 to February 2020. During this study period, there were a total of 496 infants admitted to the NICU. We limited our study cohort to infants, who were either inborn or infants who were outborn but transferred to our NICU on the first or second day of age. The 496 infants divided in two groups: group A: breast milk use at discharge (n=398) and group B: no breast milk use at discharge (n=98).

We examined maternal and infant factors for all the admitted infants. Maternal characteristics include demographic factors, number of previous pregnancies, medical complications during pregnancy such as preeclampsia, gestational diabetes, preterm labor, preterm premature rupture of membranes, and use of antenatal steroids, singleton versus multiple gestation and characteristics of labor and delivery. Neonatal characteristics included gestational age, gender, birth weight, on admission, neonatal morbidities such as sepsis, bronchopulmonary dysplasia, necrotizing enterocolitis, intraventricular hemorrhage, periventricular leukomalacia, retinopathy of prematurity, and need for nasogastric feeds, gastrostomy tube feeds, need for oxygen support, mortality, length of stay. We studied the effects of admission diagnosis to the NICU, such as respiratory distress, hypoglycemia, jaundice, neurological conditions (apnea, seizures), and cardiac disease in term and late preterm infants. Percentage was used to analyze data. The data were recorded in an excel sheet and descriptive analysis was performed by epi. Info. (version 7.2) Software. Data were presented in the tables.

RESULTS

Table 1 and Figure 1 shows that 1.7%, 32.2%, 59.3%, 6.8% participants of group A and 0.0%, 18.2%, 72.7%, 9.1% of group B belonged to age group <20, 20–29, 30–39, ≥40 years respectively. The distribution of participants according to age group was statistically significant ($p<0.05$). Almost 10.2%, 28.8%, 23.7%, 37.3% participants of group A and 9.1%, 18.2%, 27.3%, 44.9% of group B noted with gestational age <30, 30–33, 34–36, 37–41 weeks respectively. The distribution of participants according to gestational age group was statistically not significant ($p>0.05$). Around 30.5%, 69.5%, 13.6%, 25.4%, 27.1%, 20.3%, 39.0%, 3.4% participants of group A and 33.8%, 66.2%, 0.0%, 9.1%, 9.1%, 9.1%, 8.2%, 0.0% participants of group B noted with maternal factors like primigravida, multigravida, preeclampsia, gestational diabetes, preterm labor, PROM, antenatal steroids, chorioamnionitis respectively. The distribution of participants according to 'maternal risk factors' was statistically significant ($p<0.05$). There were 52.5% and 47.5% participants of group A and 36.4%, 63.6% of group B were male and female respectively. The distribution of participants according to 'gender of babies' was statistically significant ($p<0.05$). There were 32.2% and 67.8% babies of group A participants and 27.3%, 72.7% of group B participants had noted with birth weight <2.5 kg and ≥2.5 kg respectively. The distribution of participants according to 'birth weight' was statistically not significant ($p>0.05$).

Table 2 shows that 42.5% and 57.5% babies of group A participants and 36.7% and 63.3% babies of group B participants delivered by normal vaginal and cesarean delivery respectively. The distribution of participants according to 'mode of delivery' was statistically not significant ($p>0.05$). Around 5.0%, 0.3%, 1.8%, 8.5%, 10.1%, 6.8%, 15.3%, 3.3% participants of group A and 9.2%, 8.2%, 1.0%, 11.2%, 12.2%, 44.9%, 18.4%, 1.0% participants of group B noted with neonatal conditions sepsis, chronic lung disease, necrotizing enterocolitis, retinopathy of prematurity, intraventricular hemorrhage, gastrostomy tube feeds at discharge, gavage feeds at discharge, death respectively. The distribution of participants according to 'neonatal morbidities' was

statistically significant (p<0.05). The participants of group A and B have to stay at hospital for 32.4 days with 11.1 SD and 63.2 days with 42.8 SD respectively. The difference between 'mean length of stay at hospital' was statistically significant (p<0.05). Almost 30.4% and 1.8% participants of group A and 27.6% and 36.7% of group B were diagnosed as respiratory distress and apnea respectively. The distribution of participants according to 'diagnosis on admission' was statistically significant (p<0.05).

Table 3 shows that 70.1%, 2.8%, 7.3%, 1.8%, 18.1% participants of group A and 71.4%, 0.0%, 28.6%, 9.2%, 0.0% of group B participants started their infants' initial feed with breast milk, breastfeeding donor milk, formula milk or any combination, respectively. The difference between two groups regarding type of infant's initial feed was statistically significant (p<0.05). Almost 58.3% participants of group A and 11.2% of group B gave direct breast feeding to their infant in the NICU. The difference between two groups regarding direct breast feeding to their infant in the NICU was statistically significant (p<0.05). Almost 47.0% participants of group A mothers and 54.1% of group B mothers intend to breastfeed exclusively Post NICU discharge. The difference between two groups regarding intention of breastfeed exclusively Post NICU discharge was statistically significant (p<0.05).

Table 1: Maternal characteristics of study participants (N=496).

Maternal characteristics	Breast milk use at discharge (N=398), group A (80.2%)		No breast milk use at discharge (N=98), group B (16.1%)		P value
	n	%	n	%	
Maternal age (years)					
<20	7	1.7	0	0.0	0.02
20–29	128	32.2	18	18.2	
30–39	236	59.3	71	72.7	
≥40	27	6.8	9	9.1	
Gestational age (weeks)					
<30	40	10.2	9	9.1	0.17
30–33	115	28.8	18	18.2	
34–36	94	23.7	27	27.3	
37–41	148	37.3	44	44.9	
Maternal factors					
Primigravida	121	30.5	33	33.8	0.001
Multigravida	277	69.5	65	66.2	
Preeclampsia	54	13.6	0	0.0	
Gestational diabetes	101	25.4	9	9.1	
Preterm labor	108	27.1	9	9.1	
PROM	81	20.3	9	9.1	
Antenatal steroids	155	39.0	18	18.2	
Chorioamnionitis	13	3.4	0	0.0	
Gender					
Male	209	52.5	36	36.4	0.005
Female	189	47.5	62	63.6	
Birth weight (in kg)					
<2.5	128	32.2	27	27.3	0.38
≥2.5	270	67.8	71	72.7	

Table 2: Neonatal characteristics of study participants (N=496).

Neonatal characteristics	Breast milk use at discharge (N=398)		No breast milk use at discharge (N=98)		P value
	n	%	n	%	
Mode of delivery					
Vaginal	169	42.5	36	36.7	0.3
Cesarean	229	57.5	62	63.3	
Morbidities					
Sepsis	20	5.0	9	9.2	0.001
Chronic lung disease	1	0.3	8	8.2	
Necrotizing enterocolitis	7	1.8	1	1.0	

Continued.

Neonatal characteristics	Breast milk use at discharge (N=398)		No breast milk use at discharge (N=98)		P value
	n	%	n	%	
Retinopathy of prematurity	34	8.5	11	11.2	
Intraventricular hemorrhage	40	10.1	12	12.2	
Gastrostomy tube feeds at discharge	27	6.8	44	44.9	
Gavage feeds at discharge	61	15.3	18	18.4	
Death	13	3.3	1	1.0	
Length of stay (in days)	32.4±11.1		69.2±42.8		0.03
Diagnosis on admission					
Respiratory distress	121	30.4	27	27.6	0.001
Apnea	7	1.8	9	36.7	

Table 3: Infant feeding and lactation factors among study participants (N=496).

Infant feeding and lactation factors	Breast milk use at discharge (N=398)		No breast milk use at discharge (N=98)		P value
	n	%	n	%	
Infant's initial feed					
Breast milk	279	70.1	70	71.4	0.001
Breastfeeding	11	2.8	0	0.0	
Donor milk	29	7.3	28	28.6	
Formula	7	1.8	9	9.2	
Any combination	72	18.1	0	0.0	
Direct breastfeeding in the NICU					
Yes	232	58.3	11	11.2	0.001
No	166	41.7	87	88.8	
Mother intends to breastfeed exclusively post NICU discharge					
Yes	47	11.8	53	54.1	0.001
No	351	88.2	45	45.9	

DISCUSSION

The utilization of breast milk before discharge was observed to be high, reaching 80% in our study conducted in a NICU over a span of two years. Within this context of a NICU with elevated breast milk usage rates, disparities emerged in terms of outcomes and procedural measures.

Present study found that mother age between 20 to 39 years have statistically significantly higher incidence of 'breast milk usage at discharge 'compare to other age group. The usage of breast milk among mothers of term babies was statistically not significantly higher compare to mothers of pre-term babies, similarly association between maternal risk factors and 'breast milk usage at discharge' also not found. These findings are comparable with the study done by Sankar et al.[14]

Present study did not find any significant association between birth weight and breast milk usage at discharge. In comparison to previous investigations done Kair et al, Baley et al, Kachoria et al, and Parker et al who reported breast milk utilization rates of 28% to 60% at discharge for low birth weight (LBW) infants.[15-18] This discrepancy could be attributed to the inclusion of all NICU-admitted infants, encompassing both preterm and full-term babies, as well as the recent emphasis on breast milk employment and associated enhancements in quality. A study done by Sankar et al said that there is currently a paucity of reports in the literature on accurate breast milk use at discharge on late preterm and term babies admitted to the NICU.[14]

Present study found that there was no significant association between mode of delivery and 'breast milk usage at discharge'. Present study found that the incidence of morbidity factors like sepsis, chronic lung disease, retinopathy of prematurity, intraventricular hemorrhage, gastrostomy tube feeds at discharge, gavage feeds at discharge noted more among the babies of group of 'No breast milk use at discharge' compared to other group. This indicate that morbidity factors during NICU admission play significant supportive role in breast milk usage in NICU. Present study found that duration of hospital stay was significantly lower in the group of "breast milk usage at discharge" when compared to the group of 'no breast milk usage at discharge'. Present study found that the respiratory distress was the most common diagnosis among the babies of group 'breast milk usage at discharge' and apnea was the most common among babies of group 'no breast milk usage at discharge. These findings are comparable with the study done by Sankar et al.[14]

Present study noted that the usage of donor milk and formula milk is significantly very less in babies of group

'breast milk use at discharge' compared to other group, this indicate that the use of donor milk and formula milk caused a decrease in breast milk use at discharge. The reason for this finding is unclear. We speculate that increased availability and use of donor milk could potentially result in a delay in establishing an optimal breast milk supply. Since direct breastfeeding in the NICU is shown to have significant effects, efforts should be targeted to ensure mothers visit their infants, especially extremely preterm infants during the weeks prior to discharge to practice and get support from the nursing and lactation team on improving their breastfeeding skills. A study done by Pineda et al, Lee et al, Parker et al, Lee et al, and Brownell et al observed that opportunities for mothers to practice direct breastfeeding in the NICU were associated with increased breast milk use.[18-22]

Importantly, our study brings attention to an underrepresented subset of NICU patients: late preterm and full-term babies. The prevailing literature lacks comprehensive information on precise breast milk utilization rates during discharge for this group of infants admitted to the NICU. Therefore, our research contributes vital insights into this crucial subgroup.

Regrettably, we were unable to evaluate the significance of certain critical variables, including skin-to-skin care and timing of initial milk expression, due to incomplete data. These variables have previously been proven to positively influence increased breast milk utilization. Recent studies done by Fleurant et al, Riley et al, and Vohr et al have explored the relationship between maternal breastfeeding goals and structural neighborhood factors in enhancing breast milk utilization at discharge.[23-25]

In light of the limited available data on diagnosis categories upon NICU admission, our findings suggest that the "apnea" diagnosis was linked to reduced breast milk utilization in full-term infants. Given the unique medical demands of term infants treated for surgical disorders, complex congenital heart conditions, or neurological issues like hypoxic-ischemic encephalopathy requiring hypothermia treatment, comprehensive data collection on these infants would yield valuable insights.

CONCLUSION

The findings indicated a significant importance of breastfeeding and adopting a family-centered care approach within the NICU. Noteworthy obstacles to maintaining breastfeeding in the NICU, which warrant focused efforts for enhancing practices, encompassed inadequate resources for facilitating parental involvement, impediments to expressing and providing maternal breast milk, and a notable prevalence of bottle-feeding supplemented with formula.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sahota R, Kaur N, Gahtori B, Jain S, Rastogi R. The breastfeeding support practices, related barriers and facilitators in the neonatal intensive care unit, Uttarakhand, India. Int J Reprod Contracept Obstet Gynecol 2024;13:307-12.