Effect of Mother-Newborn Care Unit on breast-feeding practices of small and sick neonates

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KEYWORDS
Mother newborn care unit, MNCU/NICU, breast fed, small and sick babies, iKMC

ABSTRACT

Background
Breast milk is an ideal nutrition for the small and sick babies. Breast milk enhances the baby's immune system and reduces the risk of infection & other health issues. Mother Newborn Care Unit (MNCU) is a facility where sick and small babies are cared with their mothers 24 × 7 with all facilities of level II newborn care and provision for postnatal care to mothers. This may provide opportunity to improve early and effective breast milk feeding

Methodology
A prospective cohort study was conducted at Safdarjung Hospital, New Delhi from August 2020 to March 2021.

Objective
The objective of the study was to check the effect of the mother newborn care unit (MNCU) on breastfeeding practices among small and sick babies.

Result
The study outcomes show the positive effect of MNCU on breastfeeding rather than conventional care in NICU. 82.57% of babies in MNCU and 59.55% of babies in the NICU were reached on the full breastfeeding at day 7 of life. 88.63 % of babies in MNCU had exclusive breastmilk feed at the time of discharge, while in the NICU it was 69.85%, shows a significant difference between both the groups.

Conclusion
Mother newborn care unit (MNCU) is a novel approach to care for the small and sick babies with a positive impact on breastfeeding practices.

Introduction

Breastfeeding (BF) globally acknowledged as one of the most effective ways to support child health and survival (1). This is the best source of nutrition, being safe, clean, and rich in antibodies that enhance the immune system and protect from many diseases including those born prematurely or with low birth weight (2). Recent estimates indicate that optimal breastfeeding has the potential to prevent approximately 12% of deaths among children under five each year, which translates to around 800,000 lives saved in low- and middle-income countries (LMICs) (3). Early initiation and exclusive breastfeeding for the first six months give the best foundation for a healthy start in life for the infants (4).

Small and sick infants often struggle with suckling, latching, and feeding, making it challenging to initiate and maintain breastfeeding effectively at birth due to underdeveloped suckling reflexes or medical conditions that necessitate intensive care (5). Providing breast milk timely to small and sick neonates in NICU presents a significant challenge. Kangaroo Mother Care (KMC) is a proven intervention that involves the practice of skin-to-skin contact between a mother and her newborn, particularly for preterm, low-birth-weight, or sick infants (6). One of the benefits of KMC is its positive effect on breastfeeding practices for small and sick neonates (7). However, research indicates that KMC plays a crucial role in improving these challenges by enhancing the infant's ability to feed and supporting maternal confidence and milk production (8).

Currently mothers are usually discharged or stay in postnatal wards and come to NICU intermittently. The average duration of KMC per day in Indian NICUs is reported to be 3–5 h. This increases to 5–6 h with quality improvement projects [3–5]. Mothers have some access to NICU in most of the centers, but merely as a visitor and not as a caregiver.

The mother newborn care unit is the novel approach to study its effect on breast feeding practices in preterm infants. Mother–newborn care unit (MNCU) is a facility where sick and small babies are cared for with their mothers 24×7 with all facilities of level II newborn care and provision for postnatal care to mothers (9). Immediate Kangaroo Mother Care (iKMC) can be practiced for as long as 15-18 hours due to continuous presence of mother in MNCU (10). MNCU is proven better for preterm infants, as it is helpful in reducing the mortality rate by 25% in MNCU (11). This study hypothesized that iKMC in MNCU plays better role on breastfeeding rather than conventional care.
The primary objective of the study is to observe the impact of the mother newborn care unit on breastfeeding among small vulnerable babies admitted in the NICU.

Methodology
The prospective observational cohort study was carried out at the Department of paediatrics, VMMC and Safdarjung Hospital, New Delhi, from August 2020 to March 2021. Babies who were born with low birth weight (1-1.8kg), were admitted to either MNCU or NICU during this period were included in this study. Baby was admitted in the MNCU if bed was available; otherwise in the NICU. Ethical clearance was taken from the ethics committees of SJH (IEC/2019-11/90). Parents were informed about the study and a written consent was obtained from the parents before recruitment. In MNCU, mothers stayed with their small sick babies 24×7, while in NICU, mothers visited intermittently to provide breast milk feeding as these mothers stayed in post-natal wards. For NICU babies, if mothers were not able to come from post-natal wards, expressed breastmilk was brought to NICU whenever possible. Breastmilk was preferred for all the babies; if breast milk was not available due to any reason then formula milk was given. Breastfeeding initiation time (within 24 hours or later) was noted. A counselling was given to mothers on importance of breastfeeding and they were also advised to give breastmilk feeding as much as possible. At the time of discharge, mothers were asked whether they were feeding their baby with breastmilk or formula milk or mixed (both breast + formula milk). At the time of discharge, the study participants were assigned a category based on the type of milk fed—recorded as Type 1 (exclusively breast milk fed), Type 2 (more than 50% breast milk fed), Type 3 (more than 50% top milk-fed), Type 4 (exclusively top milk-fed), and later combined for ease of study into two groups Type 1+2 = predominantly breast milk-fed and Type 3+4 = predominantly top milk fed (12)

Data Analysis
The data was entered in MS Excel. Statistical analysis was done using SPSS version 21. Quantitative variables are depicted as mean or median as appropriate. Qualitative variables were depicted as or percentage or proportion as appropriate. Chi-square test was used for inter-group comparison. Pearson and Spearman correlation was done. Relative risk ratio (RR) and 95% confidence intervals were calculated for the outcomes.

Results
238 preterm infants were enrolled with a mean (+SD) gestation age (weeks) of 31.36 (+2.40) & birth weight (g) of 1291 (+219) from the MNCU (132) and gestation age (weeks) 31.98 (+2.21) & birth weight (g) 1417 (+204) from the NICU (136) group. Mean (+SD) age (yrs) of mothers was 26.09(+3.76) in MNCU and 25.11(+3.39) in NICU. 46.96% babies in MNCU & 49.26% in NICU were born via Caesarean section. There was no significant difference in baseline characteristics as shown in Table 1.
In our study, among 67.42% of babies in MNCU and 52.94% in NICU (relative risk ratio, 1.27; 95% CI, 1.04 to 1.55), the breast milk feeding was initiated within 24 hrs after delivery. Infants put to breast first time before 48 hrs of life were 56.06% in MNCU & 37.5% in NICU (relative risk ratio, 1.49; 95% CI, 1.14 to 1.94). 82.57% of babies in MNCU and 59.55% of babies in NICU (relative risk ratio, 1.38; 95% CI, 1.18 to 1.62) were reached on full breastmilk feed within 7 days (Table 2). At the time of discharge, 88.63% of babies were on exclusively breastmilk feed in MNCU & 69.85% in NICU (relative risk ratio, 1.26; 95% CI, 1.11 to 1.43), 90.15% of babies in MNCU & 72.79% in NICU (relative risk ratio, 1.23; 95% CI, 1.10 to 1.39) were on predominantly breastmilk feed. 9.84% in MNCU & 27.20% in NICU (relative risk ratio, 0.36; 95% CI, 0.20 to 0.64) were on predominantly top feed and 3.78% in MNCU & 15.44% in NICU were on exclusively top milk fed (relative risk ratio, 0.24; 95% CI, 0.09 to 0.63) (Table 3).

Characteristics	**MNCU (132)**	**NICU (136)**
Maternal Demographics		
Maternal age (years)	26.09 (+3.76)	25.11 (+3.39)
Mother education Illiterate Below secondary school Secondary school Senior secondary school Graduate Postgraduate	 0 (0%) 3 (2.2%) 75 (56.81%) 36 (27.27%) 15 (11.36%) 2 (1.51 %)	 3 (2.2%) 14 (10.2%) 82 (60.29%) 20 (14.70%) 17 (12.5%) 0 (0%)
Father education Secondary school Senior secondary school Graduate Postgraduate	 43 (32.58%) 39 (29.54%) 42 (31.81%) 5 (3.78%)	 25 (18.38%) 78 (57.35%) 23 (16.91%) 7 (5.14%)
Residence Rural Urban	 (94) 71.21% (38) 28.7%	 (101) 74.26% (35) 25.73%
Mode of delivery Vaginal Caesarean	 (70) 53.03% (62) 46.96%	 (69) 50.73% (67) 49.26%
Married life 1-5 years 5-10 years More than 10	 (101) 76.51% (28) 21.21% (3) 2.27%	 (109) 80.14% (22) 16.17% (5) 3.67%
Antenatal steroid coverage (any dose)	76 (57.57%)	50 (36.76%)
Occupation (Housewife)	(128) 97%	(126) 93%
Socioeconomic background (Modified Kuppuswamy scale) Lower Middle	 40% 60%	 41% 59%
Neonatal parameters		
Gestation age (weeks)	31.36(+2.40)	31.98(+2.21)
Birth weight (g)	1291(+219)	1417(+204)
Number of neonates admitted with respiratory distress	62 (46.97%)	54 (39.70%)
Number of neonates who received CPAP as respiratory support	51 (38.64%)	49 (36.02%)
Number of neonates who required surfactant administration	13 (9.84%)	9 (6.61%)

Table 1- Baseline characteristics of babies admitted in MNCU and NICU

Table 2:.Breastfeeding outcomes of study babies

S. No	Feeding parameters	MNCU (n=132)	NICU (n=136)	RR (95% CI)
1	Initiation of breast milk fed within 24 hrs	89 (67.42%)	72 (52.94%)	1.27 (1.04-1.55)
2	Infants put to breast first time before 48 hrs	74 (56.06%)	51 (37.5%)	1.49 (1.14-1.94)
3	Reached full breastmilk feeds within 7 days	109 (82.57%)	81 (59.55%)	1.38 (1.18-1.62)
4	Discharge on exclusive breast milk feeding (Either suckle on breast or expressed breast milk)	117 (88.63%)	95 (69.85%)	1.26 (1.11-1.43)

Table 3: Feeding pattern at discharge

S. No	Type of feed	MNCU (n=132)	NICU (n=136)	RR (95% CI)
1	Exclusively breast fed	117 (88.63%)	95 (69.85%)	1.26 (1.11-1.43)
2	Predominantly breast fed	119 (90.15%)	99 (72.79%)	1.23 (1.10-1.39)
3	Predominantly top fed	13 (9.84%)	37 (27.20%)	0.36 (0.20-0.64)
4	Exclusively top milk fed	5 (3.78%)	21 (15.44%)	0.24 (0.09-0.63)

Discussion

In this study, it was found that Immediate kangaroo mother care in the mother-newborn care unit was associated with better breastfeeding practices. Analysis of different feeding types at discharge suggested a potentially higher rate of breastfeeding among MNCU babies as compared to NICU babies.

This study shows that iKMC in the MNCU has the positive effects on early breastfeeding initiation. The rate of initiation of breastmilk feeding within 24 hours in the MNCU babies was significantly greater than that of NICU babies. The previous research shows that KMC is linked to higher rates of breastfeeding initiation within the first hour of life in stable neonates (13). In the present study, our findings are similar to those of sick babies in MNCU. There are various mechanisms, which explain the early initiation of BF in the MNCU. Kangaroo mother care stimulates the infant's natural rooting reflex, essential for initiating breastfeeding (14). Immediate KMC promotes early breastfeeding by encouraging skin-to-skin contact immediately after birth, which stimulates the newborn's natural feeding instincts (15). This close contact enables the newborn to latch on to the breasts more effectively, allowing breastfeeding to begin soon after birth, ensuring that infant receives colostrum (16), which is rich in antibodies and essential nutrients, vital for infant survival and optimal health, especially for sick and low birth weight infants (17, 18). A review by Ludington-Hoe et al. found that preterm infants exposed to KMC showed improvements in suckling efficiency and better coordination during breastfeeding (19).

Our findings show that continuous presence of mothers in mother newborn care unit is also helpful in sustaining maternal milk production. 82.6% of babies in MNCU and 59.55% of babies in NICU were on exclusive breast milk feeding (either direct breast feeding or expressed breast milk) on day 7 of life. 88.63% of babies were on exclusive breastmilk feeding, 90.15% were on predominantly breastmilk feeding, 9.84% were on predominantly formula milk feeding and 3.78% were on total formula milk feeding in the MNCU at the time of discharge. While, in the NICU, 69.85% of babies were on exclusive breastfeeding, 72.79% were on predominantly breastmilk feeding, 27.20% were on predominantly formula milk feeding & 15.44% were on total formula milk feeding at the time of discharge. Ramnathan et al. in their findings show that exclusive breastfeeding rate was double at the 6 weeks follow up in KMC group than the control group (20). Studies given by Thukral et al. & Perez et al. found that mothers who practiced KMC were more likely to exclusively breastfed their infants at both one month and six months postpartum compared to those who did not practice KMC (13, 21). Heidarzadeh et al. demonstrated that in extremely low birth weight infants, the rate of exclusive breastfeeding was significantly higher in the KMC group (72.4%) compared to the conventional mother care group (53%) ($p = 0.00$) (22). The findings of the present study in small & sick babies in MNCU remains persistent in accordance with the previous research. There are different mechanisms, by which Immediate KMC/SSC improves lactation. A regular skin-to-skin contact of mothers with their babies is helpful in stimulation of release of oxytocin, a hormone that aids milk ejection and supports breastfeeding. Oxytocin not only promotes milk production but also strengthens the bond between mother and infant, which is crucial for

sustaining breastfeeding (23). Mothers being with their babies 24×7 ensures that mothers respond to the baby's feeding cues, leading to more frequent and effective breastfeeding sessions. This increased frequency of feeding helps boost milk supply by promoting production of prolactin hormone. According to a study by Nimbalkar et al., mothers who practiced KMC strengthened the emotional bond between mother and infant, leading to greater satisfaction and self-assurance in their ability to breastfeed (24). A key emotional benefit of Kangaroo Mother Care (KMC) is the improvement in the maternal confidence regarding breastfeeding due to enhancement of maternal milk production (25). Jamali et al. have shown that early initiation of breastfeeding is associated with improved breastfeeding success and increased milk production (26). A study by Charpak et al. found that mothers who practiced KMC experienced a significant increase in milk production compared to those who did not, as the close contact encouraged the mothers for more frequent breastfeeding sessions (8). Additionally, the warmth and comfort offered by KMC, support longer and more consistent feeding sessions, allowing infants to gain strength and refine their breastfeeding technique over time (19, 27).
However, all the published data was focused on KMC of stable babies. Our findings uniquely present the effect of Immediate kangaroo mother care in Mother-Newborn Care Unit on breast feeding practices among sick babies.

Conclusion

This study shows that immediate KMC in Mother Newborn Care Unit (MNCU) plays a crucial role in improving the breastfeeding outcomes in small and sick babies compared to NICU group. Therefore, making MNCU a norm for ICU care of small and sick babies can significantly support breastfeeding and promote overall infant well-being.

NOTE

The authors declare no competing interest.

ACKNOWLEDGMENTS

We thank the research physicians and clinical staff. We appreciate the continuous support from the RCB, Faridabad. Leena Kaushik thank the Department of Science and Technology for fellowship.

FUNDING

This work was funded by the Department of Science and Technology, New Delhi, Government of India (DST/WOS-B/HN-30/2021).

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