

Original Article

Encouraging the Use of Mother's Own Milk as First Feed for Preterm and Very Low Birth Weight Neonate Admitted to the Neonatal Intensive Care Unit: A Quality Improvement Initiative

Ravi Sachan, Sonia Thomas, Bobby Varghese, Aaradhana Singh

Department of Pediatrics,
Division of Neonatal,
UCMS and GTB Hospital,
New Delhi, India

ABSTRACT

Objectives: Benefits of mother's only milk (MOM) for preterm infants are numerous. We realized that usage of MOM in our unit is less and often delayed for days. The proportion of MOM usage as the first feed after birth of total feed, was only 19%. In view of this existing evidence and identified problem, we decided to start quality improvement (QI) initiative in our unit with the primary objective "To encourage the use of MOM as first feed in preterm (PT) and very low birth weight (VLBW) neonate from existing 19% to >50% over a period of 3 month." **Materials and Methods:** This QI study involved the systematic implementation of evidence-based practices using Point of Care QI methodology developed by the WHO-SEARO. **Results:** After several Plan, Do, Study, Act, during the intervention phase, usage of MOM increases from baseline 19% to 91.3%. Postintervention, sustained usage of MOM after 6 months is at close to 80%. **Conclusions:** Effective implementation of comprehensive communication bundles (CCB) is feasible in resource-constraint setting and resulted in sustained increase in the usage of MOM in PT and VLBW neonates.

KEYWORDS: Communication bundle, mother's own milk, Plan, Do, Study Act, quality improvement

INTRODUCTION

Exclusive human milk for all newborns, and in particular, preterm infants is recommended by numerous professional organizations, including the American Academy of Pediatrics and World Health Organization (WHO).^[1,2] "Human milk" refers to a combination of mother's own milk (MOM) and pasteurized human donor milk. Use of donor milk is recommended when mother's own milk is unavailable.^[1,2] Benefits of MOM for very low birth weight (VLBW) infants are numerous, including reduced risk of late-onset sepsis, necrotizing enterocolitis (NEC), decrease feed intolerance, and better long-term neurodevelopmental outcome. Several studies have shown that exclusive human milk use is cost-effective, as the cost associated with prolonged hospitalization due to complications are reduced.^[3-5]

Mothers of preterm infants face biological difficulties and stress related to neonatal intensive care unit (NICU) admission that can lead to decreased

production of MOM. Neonates admitted in NICU are separated from mother for various reasons, mothers of these neonates face multiple challenges in establishing and maintaining an adequate supply of milk.^[6,7] Furthermore, lack of effective communication, counseling, and lactational support contribute to significant delay in availability of MOM for these neonates. Early and sustained availability of MOM will not only decrease over all morbidity and mortality but may also ensure adequate weight gain to prevent extra uterine growth retardation and lesser duration of hospitalization.

Address for correspondence: Dr. Aaradhana Singh,
Department of Pediatrics, Division of Neonatal, MCH Private
Block, 6th Floor, UCMS and GTB Hospital,
New Delhi - 110 095, India.
E-mail: draaradhanasingh@gmail.com

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Public sector hospitals in low- and middle-income countries face significant challenges in ensuring the early usage of MOM for the sick neonate. In India, most of the public sector teaching hospital face huge workload where providing quality care is a major challenge. The inequitable distribution of resource for removing these hurdles is another challenge.

Currently, evidence-based practices to support human milk for VLBW infants in the hospital setting have been summarized by Nyqvist *et al.*^[8] in 2013, Meier *et al.*^[9] in 2010, and by Spatz^[10] in 2004, was focused on education for families and staff, early initiation, continuation of mother's own milk production, and successful transition to direct breastfeeding.

Keeping these facts in mind, we realized that usage of MOM in our unit is also less and often delayed for days. The proportion of MOM usage as first feed after birth was only 19%. In view of this existing evidence and identified problem, we decided to start QI initiative in our unit with the primary objective "To encourage the use of MOM as first feed in preterm and VLBW neonate from existing 19% to >50% over a period of 3 month" with a secondary objectives "To develop a unit protocol to ensure the sustained availability of MOM in NICU."

MATERIALS AND METHODS

The study was conducted in a public sector tertiary care teaching hospital (Level III NICU), catering on an average of more than 1800 deliveries per month in Delhi. Our hospital does not have human milk bank and NICU does not have breast pump; therefore, we are totally dependent on MOM. In case of unavailability of MOM, we use preterm formula milk (FM). This QI study involved the systematic implementation of evidence-based practices using Point of Care Quality Improvement (POCQI) methodology developed by the WHO-SEARO.^[11] As per the institutional protocol, ethical clearance was obtained from the Institute Ethics Committee-Human Research, UCMS, Delhi.

A QI team was formed in the month of November 2017, comprising three neonatal faculties, two senior nursing officer in charge, eight senior neonatal nursing staffs with extensive feeding experience, and one dedicated infant and young child feeding (IYCF)-trained senior nurse educator.

Inclusion criteria

Preterm (<34 weeks) and VLBW baby (<1500 g) neonate admitted to the NICU who were hemodynamically stable or with mild respiratory distress (Downe's score <3).

Exclusion criteria

Neonate with moderate and severe respiratory distress (Downe's score >3), major congenital malformations, hemodynamically unstable abdominal distention (suspected or confirmed intestinal obstruction), feed intolerance (recurrent episodes of vomiting and increase in abdominal girth by 2 cm from baseline), and nonavailability of MOM because of maternal indication.

Decision to start feeding in a sick and VLBW neonates, once they got stabilized hemodynamically was taken by the consultant on round.

Balancing measure

It was an anticipated reduced sleep time for the mothers because of frequent milk expression.

Outcome measure

The percentage of PT and VLBW neonates receiving MOM as first feed out of total number of PT and VLBW neonate.

Preintervention data were collected in the month of November 2017 by the QI members, and it was found that the usage of MOM as first feed in the study group was 19.4%.

Thereafter, the aim statement was generated to encourage the usage of MOM. A process flow analysis was done to identify "gaps" in the quality of care in labor room and NICU [Figure 1]. Fishbone analysis was done to analyze the less usage of MOM in NICU [Figure 2].

Comprehensive communication bundles (CCB)

They were developed with an objective to improve overall effective communication between nursing staff involve in newborn care with emphasis was given on usage of MOM, and its advantages during counseling to the mother at various areas.

These were developed based on facility-based newborn care module MOF and FW, GOI; 2014^[12] and was modified as per local need. These comprehensive communication bundles (CCB) was then tested using multiple Plan, Do, Study, Act (PDSA) to check the feasibility and replicability of its implementations. Results of each PDSA were used to further modify the CCB and the final CCB was formulated after four such cycles of PDSA over a period of 1 week [Table 1].

Fifth Plan, Do, Study, Act (PDSA)

It was done in the month of December 2018. It was decided to implement these CCBs to the family members (preferably mothers) regarding the use of MOM at three places of contact, i.e., at the time of admission in NICU, during routine visiting hours in NICU in the evening

by neonatal nursing staff to the visitors (we encouraged mother to see the baby if possible) and in postnatal ward [Figure 3].

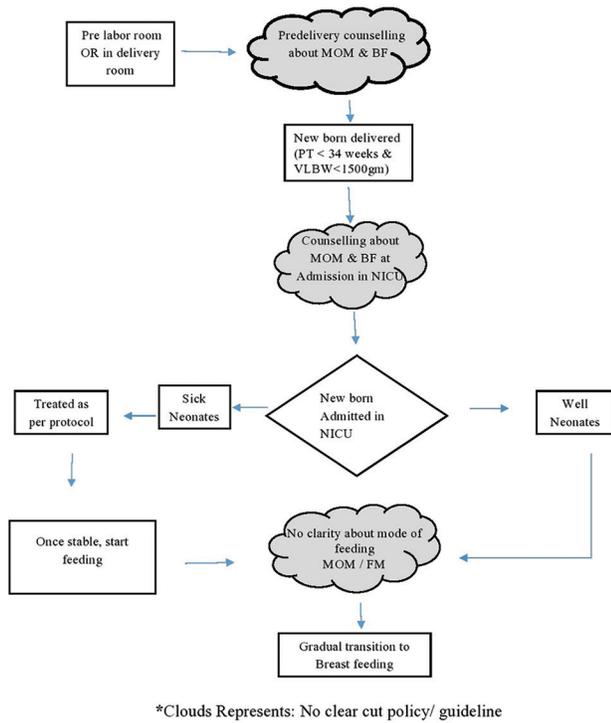
Sixth Plan, Do, Study, Act (PDSA)

It was done in the month of January 2018. Meeting of QI members was called to analyze the data collected. Feedbacks were invited from all members to suggest

any other change ideas to improve the usage of MOM. One of the team members suggested that there are still some areas left where we can communicate and counsel the mother/attendant regarding the same such as labor room and operation theatre, during routine counseling session done by doctor on duty after clinical round is over and to orientation postgraduate posted in labor room to do the counseling. Therefore, our next plan was to implement CCB to all the place of contact and emphasize about MOM [Figure 3].

Seventh Plan, Do, Study, Act

In process flow analysis, we identify that there is no clarity about type of feeding whether to use MOM/FM once baby is hemodynamically stable. Thereafter, we changed our documentation policy. It was made mandatory to document clearly MOM only or FM in the feeding order for nursing staff [Figure 3].



*Clouds Represents: No clear cut policy/ guideline

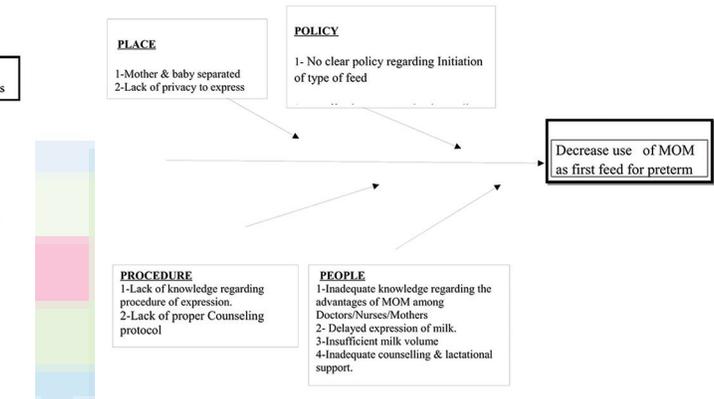


Figure 2: Fishbone analysis

Figure 1: Process flow analysis

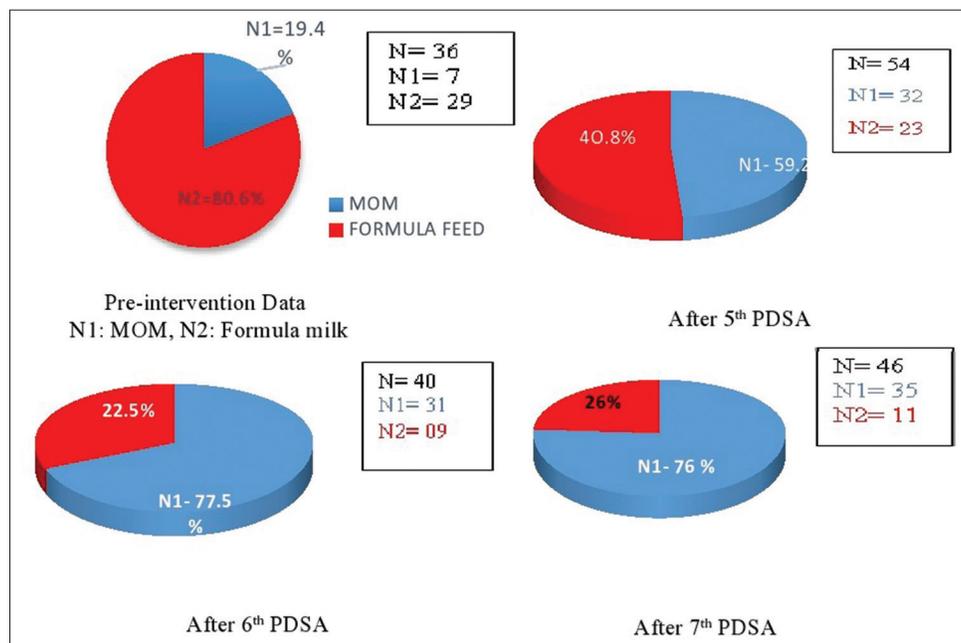


Figure 3: Percentage of usage of MOM after various Plan Do Study Act (PDSA) Cycle

Table 1: Comprehensive Communication Bundle (CCB)

Place of contact	Structured counseling points
In Delivery Room (DR) (Done by Pediatric Resident/Nursing staff)	Express breast milk within one hour after birth and thereafter (If Baby admitted in NICU). Send MOM to NICU as soon as possible and it will be given to baby (If baby stable)
At NICU Admission (Done by Pediatric Resident/Nursing staff)	Parent (mother if possible) must explain about early expression of breast milk within 1 h and their advantages. Bring MOM to NICU as soon as possible
Routine Counselling hours (Done by Senior Resident/Resident doctor)	Emphasize about early expression of breast milk & advantages of MOM. Encourage the mother to visit the baby during visiting time. Documentation of counseling as per unit protocol.
Routine Visiting hours (Done by nursing staff)	Explain unit protocol (Washing/cap/mask/gown) to mother before entering to the baby care area. Encourage the mother to touch the baby. Supervise and help mother in caring out NNS/Breast feeding/KMC (As per clinical condition of the baby or as advised by consultant).
Post Natal Ward (done by IYCF trained nurse educator)	Talk to the mother regarding EBM to provide at regular interval (If baby allowed orally.) Express breast milk within one hour after birth and thereafter at regular interval day and night (If Baby admitted in NICU). Help and explain about expression of milk and Send to NICU as soon as possible. Keeping baby warm (Clothing & KMC.)
Orientation for shift Doctors/Intern/ Nursing staff (Done by Consultant)	Pre delivery counseling regarding BF/MOM. Start breast feeding soon after the delivery (If baby is normal) Send MOM to NICU as soon as possible (If baby stable)

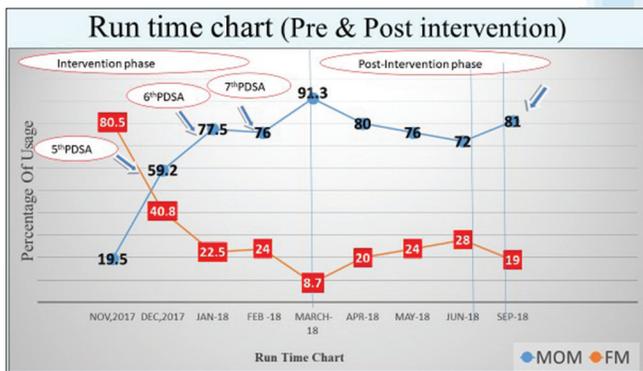


Figure 4: Run-time chart

RESULTS

A total of 288 eligible neonates were admitted in the NICU during this study period. The study was conducted in two phases; first intervention phase lasted for 3 month (from December 2017 to March 2018) and postintervention phase for 6 months (from April 2018 to September 2018). Before implementation of any comprehensive communication bundles (CCB), the percentage of VLBW neonates received MOM as first feed was 19%. After the fifth PDSA, usage of MOM increases to 59.2% from baseline 19% [Figure 3]. After the sixth PDSA, it increases to 77.5%, and finally, after the seventh PDSA, it further increases to 76% [Figure 3]. After 3 months of implementation of CCB, this improved to 91.3% [Figure 4]. Our team celebrated the success of achieved goals with in time frame and congratulated each other.

DISCUSSION

The present QI study suggests that a simple and feasible comprehensive communication bundles (CCB) can lead to increase use of MOM in preterm neonates in NICU. The primary outcome measure that improved significantly was the usage of MOM, and therefore, the percentage of neonates received first feed as MOM increases. This is a quality improvement (QI) initiative utilizing the existing infrastructure with no additional human resource.

The balancing measure that was anticipated was reduced sleep time for mother, we managed by expression of milk from both breasts simultaneously and timing of milk expression so that she gets at least 4 h of continuous sleep in the night. Extra milk so produced kept in storage near the baby area to consume within 6 h (for two to three feeds).

Our results are consistent with other studies that had used similar and slightly different care bundles.^[13-17] Spatz^[10] recommended ten steps for promoting and protecting breastfeeding in sick and VLBW neonates. These steps involved various aspects of lactation support to the mother in providing skin-to-skin care (Kangaroo mother care) and for nonnutritive sucking at the breast, which helped in establishment and maintenance supply of MOM. Murphy *et al.*^[13] implemented similar interventions and physician education. The median time of first expressed breast milk decreased significantly, and there was

significant improvement in the usage of MOM at 28 days and at discharge. Sisk *et al.*^[14] evaluated the impact of lactation counseling on initiation of milk expression and found that counseling mothers of VLBW infants increase the incidence of lactation initiation and breastmilk feeding without increasing maternal stress and anxiety. Fugate *et al.*^[17] implemented the ten steps in a continuous QI initiative and achieved significant improvements in the percentages of mothers expressing their milk within 6 h of delivery, infants receiving mother's own milk at the initiation of feeds, and mothers with a hospital-grade pump at discharge.

To see the sustainability of the increased usage of MOM and CCB, we decided to continue to collect data for the next few months which reveal drop in usage of MOM. This drop was attributed due to two of the lead members of the QI team were on leave, and there was increase in workload. Due to the shortage of nursing personnel to collect the data, we decided to stop collecting data (July and August), but we continued our effort and ensured CCB implementation to sustain the usage of MOM. In September 2018, the data were suggestive of 81%. Therefore, usage of MOM after 6-month postintervention is at close to 80%. Pre- and post-intervention data were analyzed on time run chart [Figure 3]. Hence, formulation of unit protocol for effective and coordinated communication between nursing staff in delivery room and neonatal nursing staff is utmost important. Later, these CCB were adopted as unit policy for effective communication between all nursing staff which ensures early availability of MOM.

The strength of the study is that intervention can be implemented at any neonatal health facility at any level. This study showed that without change in infrastructure, increase in human resource, and any additional cost (for the hospital and to the mothers) has lead to increase in the usage of MOM in preterm neonates.

The QI study has some limitations. First, it is a single-center study, and with small sample size, therefore, similar intervention needs replication in multicenter with different level of neonatal health facility. Second, we could have evaluated the impact of increasing usage of MOM on short term clinical outcome such as feed intolerance, sepsis, NEC, and long-term neurodevelopmental outcome. Further research is needed to evaluate the impact of increased usage of MOM on the clinical outcomes.

CONCLUSIONS

Effective implementation of CCB is feasible in resource-constraint setting and resulted in sustained increase in the usage of MOM in PT and VLBW neonates.

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Conflicts of interest

There are no conflicts of interest.

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