PERSPECTIVE

Mother-Neonatal Intensive Care Unit (M-NICU): A Novel Concept in Newborn Care

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Health facilities in India are faced with the challenge of providing quality newborn care in the face of major skilled human resource shortage. A possible solution is the concept of Mother-Neonatal ICU (M-NICU), where the mother has her bed inside the neonatal intensive care unit (NICU) by the side of baby's warmer. Our observations in M-NICU of a public sector hospital in New Delhi, India, indicate that mothers can be easily trained to follow asepsis routines and monitor the neonates, and are better prepared for their post-discharge care. Incorporating space for both mothers and their newborns in level-II NICUs may provide quality and developmentally supportive newborn care in coming years.

Keywords: *Baby friendly health initiative, Essential newborn care, Family-centered care.*

As India strives towards achieving its commitments to the SDG 2030 goals of reducing neonatal mortality to at least 12 per 1000 live births, there is a need to rethink our strategies to deliver accessible and quality newborn care, especially in secondary- and tertiary-care health facilities. While there have been increased financial commitments for physical infrastructure, health facilities in India, especially in the public sector, are faced with the challenge of providing quality maternal and newborn care in the face of major skilled human resource shortage. In the over 700 Special care newborn units (SCNU) established in the country at the district level by the government, the low nurse-baby ratio is a barrier to providing quality neonatal care to sick newborns. Unlike neonatal intensive care units (NICU) in the developed regions of the world, where mothers and families have access to their newborn to stay with them and participate in care provision, in India, access by families and mothers into the neonatal units is limited. Mothers do visit the NICU in most of the centres in India, but merely as a visitor and not as a caregiver.

A way forward to fill the gaps identified above, is the concept of Mother-Neonatal ICU (M-NICU), where the mother is not a mere visitor, but she has her bed inside the NICU by the side of baby's warmer/incubator. Mother as a resident of M-NICU becomes an active caregiver, and is involved in continuum of neonatal care. Mothers can contribute towards neonatal care in numerous ways – routine baby hygiene, feeding the baby, monitoring the babies on intravenous fluids, phototherapy, and providing skin-to-skin contact for longer duration (***Web Fig.* 1**).

There is sufficient evidence from developed countries to show that neonatal outcome improves as a result of increased parent-infant interaction in NICU [1-3]. Moreover, mother-infant separation also leads to significant psychological stress in mothers and has substantial negative impact on mother-infant bonding [4]. Providing facilities for parents to stay in the neonatal unit has the potential of shortening duration of incubator care, early initiation of breastfeeding and skin-to-skin care, improving weight gain, reducing length of hospital stay, and possibly better neurodevelopmental outcomes [3,5-7]. The Stockholm Neonatal Family Centered Care Study comparing outcomes of prematurely born infants assigned to the family wards or to standard NICU care (both level II units) showed that parents staying in the NICU from admission to discharge may reduce the total length of stay for infants born prematurely [5]. In another study, mothers in the Parent Empowerment program reported significantly less stress in the NICU, and less depression and anxiety in comparison to control group at 2 months' corrected infant age [7].

There is hardly any evidence from developing countries about the concept of M-NICU. Family-participatory care has been a strategy that has recently been initiated [8], but its reach is still limited to few

centers, and family's role as caregivers is intermittent and sporadic. A pilot initiative of a 12-bedded M-NICU at our hospital was initiated in 2017. This unit has all facilities for a level II neonatal care and provides a defined minimal care package for mothers. It has sufficient space for maternal beds, and toilet and bathing facilities for mothers. It also has a separate dining space for mothers. Observations during the early months of its implementation indicate that mothers can be easily trained in M-NICU to follow asepsis routines, monitor the neonates, and are better prepared for post-discharge care of neonates.

Presence of mother in NICU provides an opportunity to start Kangaroo mother care (KMC) as soon as baby is stable. Presently, in NICUs, short sessions of KMC are started for low birth weight (LBW) neonates when the baby is considered to be recovering. The mother comes to NICU to provide brief sessions of KMC a few times a day. Presence of mother in M-NICU will facilitate continuous or longer sessions of KMC for these babies. The role of KMC in reducing mortality and morbidity of LBW babies is well proven [1]. Presence of mother in M-NICU gives ample opportunity to healthcare personnel to teach the mother healthy practices of neonatal care; benefits of educating mothers in neonatal care cannot be undermined [6]. By educating mother during their stay in M-NICU, they will be better prepared for discharge and for identifying danger signs. This will go a long way in reducing post-discharge mortality and morbidity. Early mother-infant contacts also strengthen the mothers' care-giving ability and confidence. Presence of mother in M-NICU shall also bring accountability on the health services to improve quality of the neonatal care.

A genuine concern in M-NICU is the mothers' health. Some of these women might have delivered few hours or few days back and may have obstetric or medical complications requiring attention. To ensure that mothers get the appropriate obstetric and medical care inside M-NICU, Pediatrics and Obstetrics departments need to collaborate in this venture. A minimal care package has been developed for the mothers, in which nurses have been trained, so that mothers receive same post-partum care in M-NICU as they would have received in post-natal or post-operative wards. It would also require the Obstetric team to see and care for the mothers in the M-NICU unit. In the pilot project, we have set up strong support, cooperation and coordination with the obstetricians who provide maternal care within the M-NICU, thus making this area a joint ownership of the pediatric and obstetric departments.

If this concept yields dividends, separate KMC wards would become redundant and the designs of NICUs would incorporate space for both mothers and their newborns. It will, in fact, harmonize several interventions such as KMC, and Family participatory care, which are targeted to improve neonatal survival. In the coming years, we as pediatricians should work actively in collaboration with Obstetric colleagues for this paradigm shift from NICUs to M-NICUs. It will need support from administrators and policy makers to make it happen. Further research is needed on the scalability, long-term impact on neurodevelopmental outcomes, maternal psychological status, and quality of healthcare and professional practices. The establishment of such M-NICUs and practices at teaching hospitals would allow propagation of these practices to other health facilities.

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REFERENCES

1. Conde-Agudelo A, Diaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. Cochrane Database Syst Rev. 2014;4:CD002771.
2. O'Brien K, Bracht M, MacDonell K. A pilot cohort analytic study of Family Integrated Care in a Canadian neonatal intensive care unit. BMC Pregnancy Childbirth. 2013;13:S12.
3. Raiskila S, Axelin A, Rapeli S, Vasko I, Lehtonen L. Trends in care practices reflecting parental involvement in neonatal care. Early Hum Dev. 2014;90: 863-7.
4. Bouet KM, Claudio N, Ramirez V, Gracia-Fragoso L. Loss of parental role as a cause of stress in neonatal intensive care unit. Bol Asoc Med PR. 2012;104:8-11.
5. Ortenstrand A, Westrup B, Brostrom EB, Sarman I, Akerstrom S, Brune T, *et al*. The Stockholm Neonatal Family Centred Care Study: effects on length of stay and infant morbidity. Pediatrics. 2010;125:e278-85.
6. Melnyk BM, Feinstein NF, Alpert-Gillis L. Reducing premature infants' length of stay and improving parents' mental health outcomes with the Creating Opportunities for Parent Empowerment (COPE) neonatal intensive care unit program: a randomized, controlled trial. Pediatrics. 2006;118:e1414-27.
7. O'Brien K, Bracht M, Robson K. Evaluation of the family integrated care model of neonatal intensive care: A cluster randomized controlled trial in Canada and Australia. BMC Pediatr. 2015;15:210.
8. Verma A, Maria A, Pandey RM, Hans C, Verma A, Sherwani F. Family-centered care to complement care of sick newborns: A randomized controlled trial. Indian Pediatr. 2017;54:455-9.