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Klemming Stina, Lilliesköld Siri and Westrup Björn
Mother-Newborn Couplet Care from theory to practice to ensure zero separation for all newborns - Klemming - 2021 - Acta Paediatrica - Wiley Online Library

Julie de Salaberry[1], Valoria Hait[1], Kimberly Thornton[1], Megan Bolton[1], Maria Abrams[1], Sandesh Shivananda[1,2], Maryam Kiarash[1], Horacio Osiovich[1,3]
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Parents and newborn "togetherness" after birth - PubMed (nih.gov)

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World Health Organization

Kangaroo mother care started immediately after birth critical for saving lives, new research shows

26 May 2021 | Departmental news | Reading time: 4 min (1058 words)

Immediate kangaroo mother care for preterm and low birthweight babies requires dedicated Mother-Newborn Intensive Care Units

GENEVA, 27 May 2021

- *Kangaroo mother care, which involves skin-to-skin contact and exclusive breastfeeding, significantly improves a premature or low birthweight baby's chances of survival*
- *Starting kangaroo mother care immediately after birth has the potential to save up to 150,000 more lives each year, compared with the current recommendation of starting it only once a baby is stable*
- *Mother-Newborn Intensive Care Units (ICUs) will be critical to support the mother, or a surrogate, in providing this immediate, ongoing skin-to-skin contact from birth.*

The results of a new clinical trial published today in the New England Journal of Medicine, show that immediate kangaroo mother care, which involves skin-to-skin contact with the mother and exclusive breastfeeding, **started as soon as a preterm or low birthweight baby is born,** dramatically improves survival.

Current World Health Organization (WHO) recommendations indicate starting kangaroo mother care only after the baby is stabilized in an incubator or warmer, which can take on average 3-7 days. This new study suggests that, when compared with the existing practice,

starting kangaroo mother care immediately after birth can **save up to 150,000 more lives each year**.

“Keeping the mother and baby together right from birth with zero separation will revolutionize the way neonatal intensive care is practiced for babies born early or small,” said **Dr Rajiv Bahl, Head of the Newborn Unit at WHO**, and the coordinator of the study. “When started at the soonest possible time, kangaroo mother care can save more lives, improve health outcomes for babies and ensures the constant presence of the mother with her sick baby.”

The results of the immediate kangaroo mother care study indicate the need for a global paradigm shift in the care of small babies with zero separation of babies from their mothers by having dedicated **Mother-Newborn ICUs**. “The best way to nurture the newly born low birthweight baby, including in high-income countries, is through ongoing skin-to-skin contact with the mother, in a mother-newborn couplet care unit that provides care and medical treatment for both,” said **Dr Bjorn Westrup, of the Karolinska Institute, Sweden,** and a technical expert for the study.

Kangaroo mother care is already known to be effective, reducing mortality by 40% among hospitalized infants with a birth weight less than 2.0 kg when started once they are clinically stable. However, this important new study provides new evidence to show a further **25% reduction when it is initiated immediately after birth,** either with the mother or a surrogate.

Dr Queen Dube, one of the study investigators, and Director of Health Services in Malawi said, *“Separating mothers from small and sick newborns adds stress for both mum and baby, at a time when they often both need close contact - immediate Kangaroo Mother Care overcomes this barrier. Keeping the mother and the baby together helps the baby to survive and thrive.*

Mother-Newborn ICUs have been established in some countries so that mothers can always be with their babies to provide continuous kangaroo care. Mothers receive their own post-birth care in these wards without being separated from their baby. If a mother is unwell, the selection of a surrogate ensures that the provision of kangaroo care continues until the mother recovers.

During the clinical trial, which was conducted across five countries in Africa and Asia, mothers or surrogates provided approximately 17 hours of skin-to-skin contact per day while in a Mother-Newborn ICU. Delivery of the intervention required close collaboration between

obstetric and neonatal departments. It is crucial to note that quality care for all newborns and mothers was provided in the trial which included provision of respiratory support if required, thermal care, breastfeeding support and prevention and management of infections.

Immediate kangaroo mother care had several other benefits in addition to improved survival. It reduced infections and hypothermia, which are two big killers of small babies. The babies also had more opportunity to breastfeed.

Dr Harish Chellani, one of the study investigators, from Vardhman Mahavir Medical College and Safdarjung Hospital, India, observed, "Health care providers have been separating small and sick babies from their mothers for decades believing that was best for them. The new evidence from this study means we must establish the practice of immediate kangaroo mother care globally".

WHO is in the process of reviewing its current recommendations on kangaroo mother care, published in 2015, in light of the new evidence that has become available .

About the study

This study was a two arm, randomised controlled trial set in high volume, public tertiary care units in Ghana, India, Malawi, Nigeria and Tanzania. The babies in the immediate kangaroo mother care group started the intervention as soon as possible after birth and got an average of 17 hours per day in the Mother-Newborn ICU in the first three days. In the control group, kangaroo mother care was started only after the baby was stable and the babies got about 1.5 hours per day in the neonatal ICU; both the study groups got kangaroo mother care thereafter (about 19 hours / day). The study planned to include 4200 infants but was stopped early due to clear evidence of benefit on survival.

Kangaroo mother care and COVID-19:

The COVID-19 pandemic is affecting the quality of care provided to babies in all regions of the world and threatening implementation of life-saving interventions like breastfeeding and kangaroo mother care. A recent analysis showed that there is an increased risk of death among preterm or low birth weight babies if kangaroo mother care is not practiced, and this risk is 65-fold higher than the risk of death due to COVID-19 infection among newborns.

Dr Suman P N Rao, St. John's Medical College, Bangalore, India, co-author of both papers said, "Kangaroo mother care is one of our most cost-effective ways to protect small and sick newborns. Now it is more critical than ever to ensure mothers are supported to do kangaroo

mother care and that healthcare professionals feel safe and comfortable to support this lifesaving intervention."

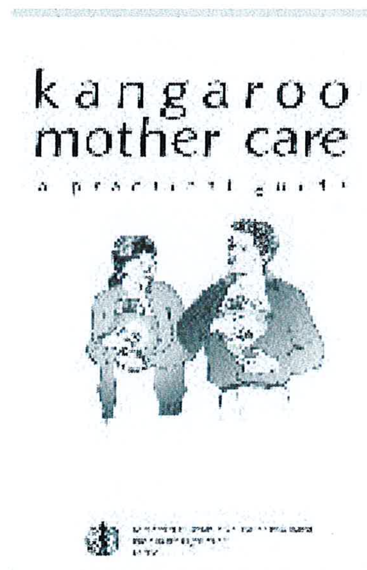
Study sites

- Vardhman Mahavir Medical College & Safdarjung Hospital, New Delhi, India
- Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania
- University of Malawi, College of Medicine, Blantyre, Malawi
- Obafemi Awolowo University, Ilfe-Ife, Nigeria
- Kwame Nkrumah University of Science and Technology and Komfo ANokye Teaching Hospital, Kumasi, Ghana

World Health Organization

Kangaroo mother care: a practical guide

1 January 2003 | Guidance (normative)



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Overview

Kangaroo mother care is a method of care of preterm infants. The method involves infants being carried, usually by the mother, with skin-to-skin contact. This guide is intended for health professionals responsible for the care of low-birth-weight and preterm infants. Designed to be

adapted to local conditions, it provides guidance on how to organize services at the referral level and on what is needed to provide effective kangaroo mother care. The guide includes practical advice on when and how the kangaroo-mother-care method can best be applied.

WHO TEAM

Maternal, Newborn, Child & Adolescent Health & Ageing (MCA), Newborn Health (NBH), Sexual and Reproductive Health and Research (SRH)

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World Health Organization | South-East Asia

Mother Newborn Care Unit: An innovation in care of small and sick newborns

17 November 2022

Low birth weight infants, i.e., infants with a birth weight less than 2.5 kg constitute approximately 15% of all newborns worldwide but account for 70% of all newborn deaths. Most of these babies are born in low and middle-income countries (LMIC) in Asia and sub-Saharan Africa, and die within the first days of life. Reducing mortality among these infants is the key to achieving the United Nations Sustainable Development Goals target of reducing newborn mortality to as low as 12 deaths per 1000 live births by 2030.

Additionally, these newborns are at higher risk of developing various illnesses requiring care inside the newborn care unit. Those who survive are more likely to develop growth-related and neurodevelopment problems than babies born with normal birth weight.

Maternal and child health was identified as a Flagship Priority in 2014 in World Health Organization's South-East Asia Region under the leadership of Regional Director Dr Poonam Khetrapal Singh.

In India for example, it is worth noting that current mother and newborn care services are organised in such a way that if the baby is normal, the mother and baby stay together in the postnatal ward. But if the baby is sick or has low birth weight, they are separated from the mother and kept inside the special newborn care unit (SNCU) while the mother stays in the postnatal ward and visits the baby in SNCU only on the advice of the healthcare providers. However, it has been felt by the medical fraternity that this model of service delivery is not in the best interest of either the baby or the mother.

Involvement of mothers and families in the routine care of their newborns is essential not only for improving baby's short and long-term health and development outcomes, but also to improve the overall experience of care by families. It is here that the concept of 'zero separation' of the mothers with their small and sick babies after birth, and mother-newborn care unit (MNCU), comes in.

Mother–newborn care unit (MNCU) is an area inside the hospital/health facility wherein sick and small newborns are taken care of by their mothers on a 24×7 basis. Such an area can be created in hospitals/health facilities that provide special newborn care, i.e. care to babies who are not critically sick but do require oxygen support and intravenous fluids for a few days. Most babies requiring special newborn care can be managed with mothers in MNCU, and 80-85% of babies requiring care in these units who are not critically sick, can be managed with mothers in MNCU.

How Mother Newborn Care Unit evolved

Before looking at how MNCU came into being, it is important to understand a life-saving intervention called Kangaroo Mother Care (KMC). KMC refers to the process wherein the mother keeps her low birth weight baby in continuous skin-to-skin contact against her chest for a long period of time, and receives support for feeding the baby exclusively with breast milk. KMC is among the most effective interventions for low birth weight infants that not only reduces the risk of death by 40%, but also improves their growth and development along with mental health of the mother.

Currently, WHO recommends KMC when the infant's clinical condition has stabilized, which is normally achieved 3 days after birth. However, approximately 45% of newborn deaths occur within 24 hours of birth and 80% during the first week of life. Thus, majority of deaths among infants with low birth weight typically occur before Kangaroo Mother Care can be initiated.

Recently, new research has suggested that KMC initiated immediately within two hours of birth followed by continuous KMC, aiming for more than 20 hr/day (Immediate KMC) compared to the current guidelines (KMC after baby is clinically stable), improves newborn survival by 25%.

This multicountry research was coordinated by the World Health Organization in five countries; Ghana, India, Malawi, Nigeria, and Tanzania. In India, the study was conducted at Safdarjung Hospital, New Delhi

The implementation of Immediate KMC (iKMC) intervention required mothers to be with their small and sick newborns on a 24x7 basis in Newborn Intensive Care Unit to provide continuous KMC, against the present norm of separating sick newborns from their mothers. This lead to a

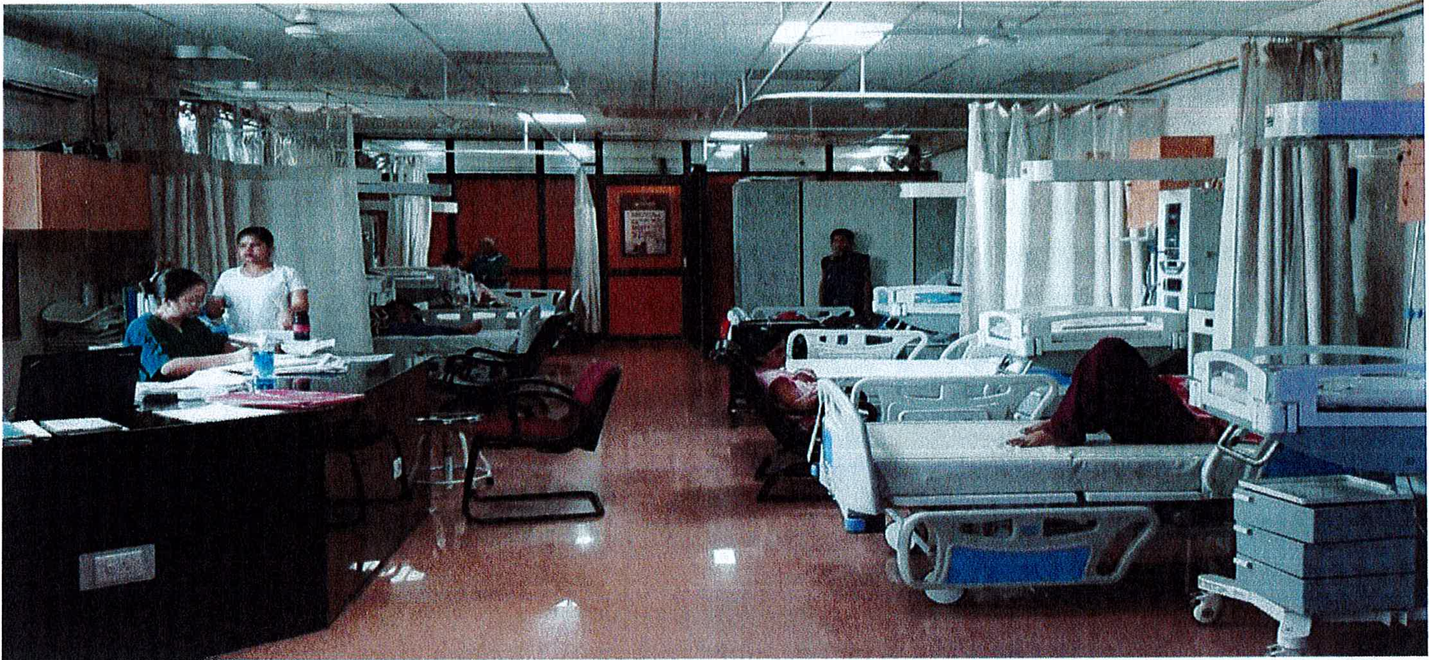
restructuring of the existing newborn intensive care unit to accommodate the mother allowing her to stay with the baby, and hence the intervention of iKMC led to the innovation of "mother–newborn care unit (MNCU)". Thus, the first MNCU in India was born.

Dr Neena Raina, Regional Advisor, Child and Adoloscent Health, WHO-SEARO, said: *'Keeping mothers and babies together is the natural order. Achieving zero separation and ensuring optimal and respectful care for both the mother and the baby together as a unit is important for implementing life-saving interventions like immediate KMC. I urge all the Member States to explore how to convert newborn units to mother-newborn care units with universal KMC for all preterm or low birth weight newborns.'*

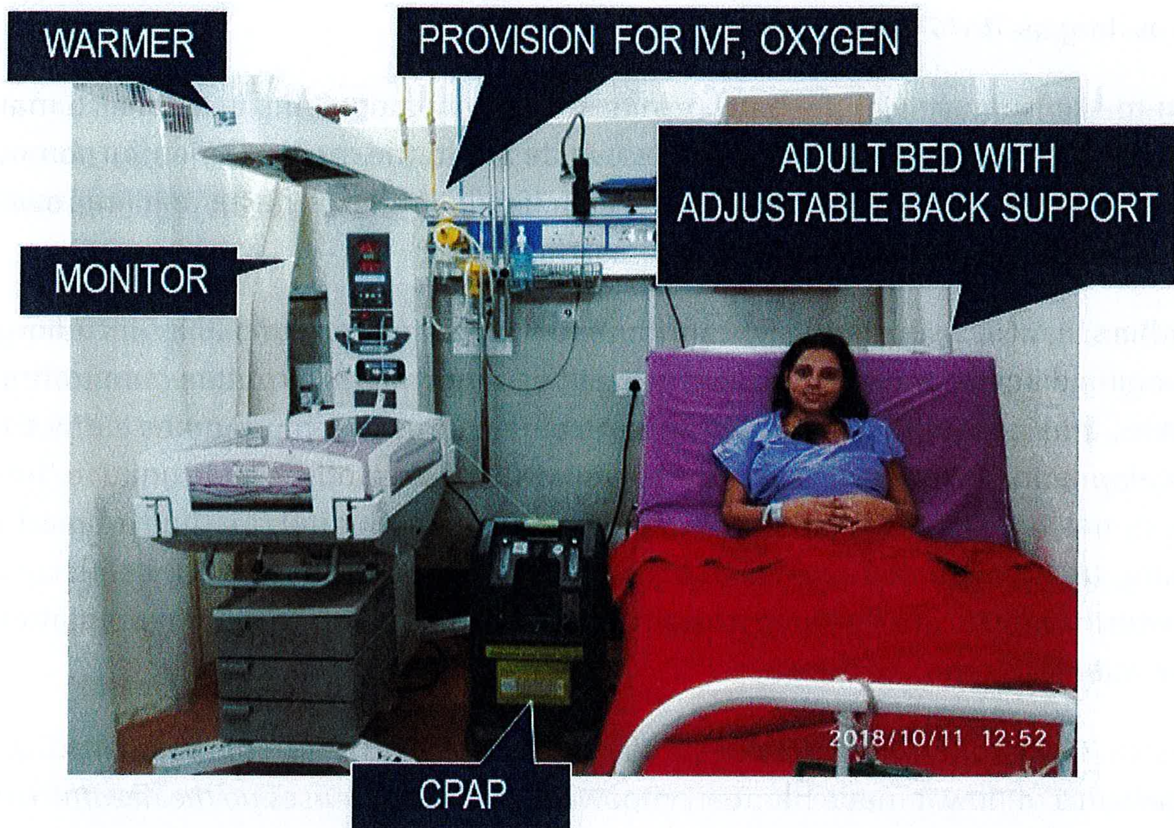
Setting up of MNCU in India

Implementation of immediate KMC required the mother or surrogate (family member to provide KMC when the mother is not available) to be with their baby soon after birth and continue to be together 24×7 till being discharged, i.e. zero-separation. Since there was not enough space in the existing NICU to have mothers' beds inside, a new newborn care unit was designed with enough space to accommodate mother's bed with each baby. This new NICU was named as "Mother Newborn Care Unit (MNCU)" *(Fig. 1).* The infrastructure of MNCU included a toilet, bathing area, food and water, and a clinical examination cubicle for mothers, which are imperative to ensure respectful maternal care.

Like conventional NICU, all equipment for level II intensive care including radiant warmer (required during the time the mother/surrogate can not provide KMC), continuous positive airway pressure (CPAP) machine, oxygen and suction facilities, vital monitor, phototherapy unit, etc. are available *(Fig. 2).* Mothers are provided post-childbirth care inside the MNCU by obstetricians and neonatal nurses who are trained to provide essential postnatal care to mothers. *"Mother as a resident of MNCU becomes an active caregiver and is involved in continuum of neonatal care,"* said Dr. Sugandha Arya, clinical investigator, for iKMC study. This is the first such model of care in the developing country settings that sets forth an example where mother and baby are cared for together from birth till discharge providing the concept of Zero separation.



Mother in NICU is Level II NICU where Mother and baby cared together 24X7



All provisions for level II newborn care

Platform to improve overall care of mothers and their small and sick newborns

The presence of mother with her baby 24X7 in MNCU provides her an opportunity to play a central role in her baby's care. Mothers in MNCU have less anxiety and stress as compared to mothers staying away from their babies in postnatal ward.

Delhi-based Pooja, a 25-year-old mother, who provided Immediate KMC in MNCU, said: "*When baby is on my bare chest, I can feel his little fingers, feel him breathing and moving—a feeling I can't express in words.*

MNCU also provides several opportunities to improve newborn care. A very important opportunity that MNCU provides is early exclusive breastmilk feeding and breastfeeding. Since the mother is with her baby in MNCU, expressed breast milk (EBM) is readily available as a first feed for initiation soon after birth. Mothers can provide prolonged, continuous, effective KMC for as long as 16-17 hours per day.

Skin-to-skin contact with the baby results in better lactation and it is easier to maintain babies on exclusive breastmilk feeding. Babies can be put to the breast earlier for non-nutritive sucking (NNS) which helps babies to develop feeding reflexes faster and improves the milk output of the mother by stimulating prolactin reflex.

Mothers in MNCU substantially contribute to the routine care of babies including feeding, changing diapers, and supporting the healthcare providers in routine monitoring of the babies, thus providing family-centred care to newborns which promotes early childhood development. The presence of mothers in MNCU gives ample opportunity to healthcare personnel to teach the mothers, healthy practices of neonatal care thus preparing them for taking care of neonates after discharge. Last but not the least, MNCU results in mother-newborn couplet care by Paediatrician and Obstetrician with better co-ordination of neonatal and maternal care.

Roshni, 22-years-old, who provided Immediate Kangaroo Mother Care in MNCU, shared her experience of how it made her feel empowered. *"Usually, nurses do the needful in a NICU, however, MNCU, enables us to feel more connected to our newborns." Roshni further said that she has also taken it upon herself to counsel new mothers to help them understand how to provide KMC in MNCU*. Nursing officer Ms Veena involved in Mother Newborn Care Unit feels mothers are less stressed here and babies' weight gain is better.

MNCU thus provides a platform to deliver holistic respectful care to both the mother and the newborn while maintaining the 'nature's norm' of zero separation and thus promoting Early Childhood Development.

Over 1.5 lakh newborn deaths can be prevented

Immediate KMC, delivered using the MNCU platform has been shown to reduce newborn mortality by 25% compared to conventional KMC implemented using the routine service delivery mechanism. This implies that at least 1,50,000 newborn deaths can be prevented globally every year if this model of care is adopted. The study results also show that babies in MNCU had 35% less incidence of low temperature and 18% less infections as compared to babies cared in conventional NICU.

There are several possible mechanisms by which Immediate KMC might have reduced newborn infections and thus better survival. Since the mother and baby are in close contact from birth, the baby is more likely to be colonized by the mother's protective microbiome and more likely to receive early breastfeeding. With fewer people needing to handle the baby, the risk of newborn infections is also reduced.

The results were published in May 2021 in the New England Journal of Medicine.

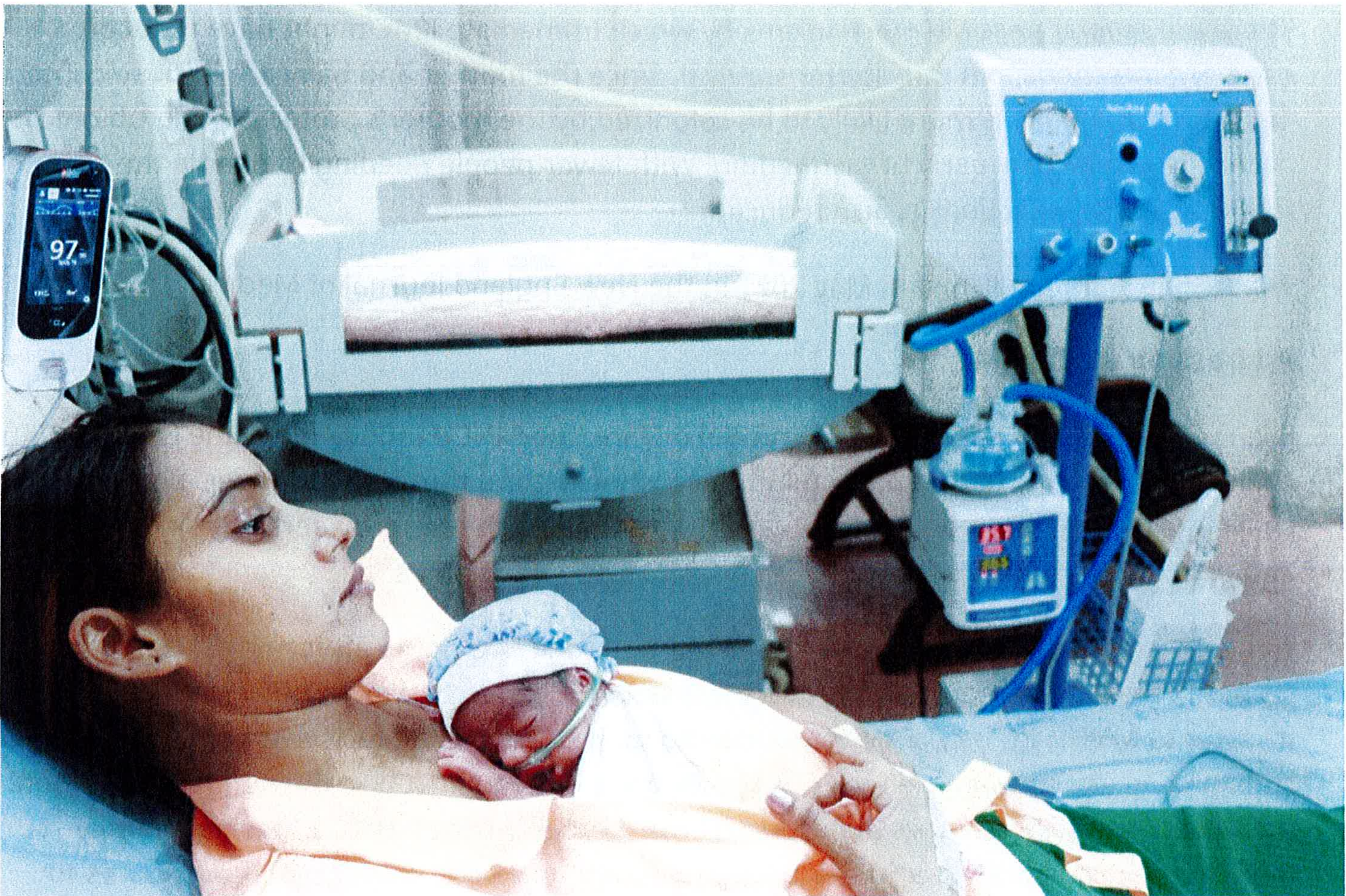
Addressing challenges

Even with all the advantages of this model of care, the MNCU innovation came with its set of challenges, that any unit/country might face when setting these up. However, all these challenges can be overcome by discussing with the health care providers (nursing colleagues and doctors) from the department of Obstetrics and Paediatrics.

To begin with, mothers need to be observed for about two hours after normal childbirth and six hours after caesarean section, and most sick and low birth weight babies need early transfer to MNCU for monitoring and management. This challenge is overcome by having a surrogate in the delivery area for transporting the baby to MNCU in the Kangaroo position. In the MNCU, the surrogate provides KMC till the mother reaches MNCU. Having a family member next to the mother in the labour room and in MNCU additionally contributes to support and respectful care for the mother.

Another major concern among Pediatricians and Policymakers has been that the presence of mothers in NICU will bring more infections. However, the iKMC study has shown that the presence of the mother next to the baby in MNCU reduces the risk of newborn infections. Experience of MNCU suggests mothers can be easily trained to follow infection control practices.

Thirdly, the majority of the babies who weigh less than 1.8 kg are preterm and many of them develop early difficult breathing requiring respiratory support in the form of continuous positive airway pressure (CPAP). Learning to provide CPAP in KMC position is an important challenge. The nasal Interface for CPAP is secured, and standard operating procedures for fixing it appropriately have been developed and implemented. A binder is used to maintain the baby's neck in a slightly extended position. A pulse oximeter is constantly used when the baby is in KMC position to monitor heart rate and oxygen saturation so that any sudden changes in vitals can be detected.



Providing CPAP in KMC position

Next, providing care to mothers from a few hours after birth is also a major concern in MNCU. An essential maternal–postnatal care package has been developed, and neonatal nurses are trained in implementing this package. Obstetricians take daily rounds for mothers and attend immediately to their urgent needs. "A strong co-operation, co-ordination, and collaboration between pediatricians and obstetricians is the cornerstone of MNCU," said Dr Pratima Mittal, study investigator from the Department of Obstetrics and Gynaecology, Safdarjung Hospital

Providing continuous Kangaroo Mother Care in MNCU, is also a challenge in itself. The most common reason for separation is the mother being not available due to medical reasons or for daily routines like bathing, using the toilet, etc. This challenge is overcome with the help of a surrogate who provides KMC in MNCU when the mother is not available. Another common reason for separation during iKMC is medical procedures and treatment of the baby including phototherapy. Some procedures like glucose monitoring, tube feeding, giving Intravenous (IV) injections can be done even while the baby is in KMC position. However, other procedures like

inserting IV cannula, fixing CPAP cannula, putting an orogastric tube, phototherapy, etc. require separation, but the baby is immediately placed in KMC position following the procedure.

Also, initially, there were apprehensions among the health professionals and parents regarding the spread of COVID-19 infection in MNCU. However, with the use of COVID appropriate behaviour including strict use of mask, hand hygiene and respiratory hygiene, Safdarjung Hospital in Delhi has been running this facility successfully throughout the ongoing pandemic with 100% occupancy of 12 mothers with 12 to 18 babies, as many of these mothers have twin babies.

Making zero separation a reality

The World Health Organization is in the process of reviewing the current recommendations on the care of preterm or LBW newborns considering new evidence that has become available. However, it would require a change in the national policies to permit mother and surrogate in NICU 24×7, making the concept of zero-separation a reality.

"Keeping the mother and baby together right from birth with zero separation will revolutionize the way neonatal intensive care is practised for babies born early or small," said Dr Rajiv Bahl, Head of the newborn unit at WHO, Geneva, and the coordinator of the study. "*When started at the soonest possible time, kangaroo mother care can save more lives, improve health outcomes and ensures the constant presence of the mother with her sick baby.*"

Till now most healthcare providers have been typically separating small and/or sick babies from their mothers and keeping them in specialised care in the newborn care units believing, that is best for them. This notion is now in question and well set to change.

Dr Harish Chellani, one of the study investigators, from Vardhman Mahavir Medical College and Safdarjung Hospital, India, said "*New evidence suggests that zero separation of small and sick babies starting immediately after birth till discharge is a step towards early child development and this practice must be actively promoted.*". He added that "to make zero separation a reality, we need change in policy, infrastructure, processes and most importantly mindset of health professionals". The presence of the mother in NICU 24 × 7 is a paradigm shift in the care of small and sick babies.

New special newborn care units (SNCUs) in district hospitals and NICUs in tertiary care hospitals should be designed with all the provisions for a mother to stay 24 × 7 as a caregiver to make them MNCU. Similarly, there is a need to adopt a new design when renovating already functional NICUs and SNCUs. This will also need certain policy changes, i.e., allowing

mothers/surrogates in MNCU (same as that for family-centred care), shifting small babies from delivery areas to MNCU in KMC position, obstetric rounds inside MNCU, and giving essential care to mothers in MNCU by neonatal nurses. Pediatricians, Obsreticians and Policymakers need to be taken into confidence and convinced of the benefits of the presence of mothers in NICU 24x7 for the care of their small and sick babies. At the same time, the continuity of care from health facility to home must be strengthened and all babies must receive the benefits of KMC and responsive care through home visits.

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MINI REVIEW | Open Access

Mother-Newborn Couplet Care from theory to practice to ensure zero separation for all newborns

Stina Klemming, Siri Lillieskold, Björn Westrup

First published: 19 June 2021
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Citations: 16

Klemming Stina, Lillieskold Siri and Westrup Björn contributed equally to this work.

Abstract

With an increasing awareness of the importance of nurturing care and within a framework of Infant- and Family-Centred Developmental Care (IFCDC), zero separation, keeping parent and infant in continuous close physical and psychological proximity to each other, is key. In modern neonatology, high technological and pharmaceutical treatments are consistently integrated with caregiving considerations. Mother-Newborn Couplet Care is a concept of care where the dyad of the ill or prematurely born infant and the mother, needing medical care of her own, are cared for together, from the birth of the baby to its discharge. Mother-Newborn Couplet Care requires systems changes in both obstetrics and paediatrics considering planning and organisation of care, equipment and design of units. Accordingly, strong leadership setting clear goals and changing the professional mindset by providing targeted education and training is crucial to ensure the warranted high quality of care of all mother-baby dyads.

Abbreviations

CPAP
: Continuous Positive Airway Pressure

IFCDC
: Infant- and Family Centred Developmental Care

MNCC
: Mother-Newborn Couplet Care

NICU
: Neonatal Intensive Care Unit

RCT

United Nations

WHO

World Health Organization

Key notes

Zero separation should be provided for all newborns—healthy, ill or preterm—and their parents from delivery to discharge

The care of an ill or prematurely born infant is coupled with the postpartum and medical care of the newly delivered mother in the same ward

It is essential with systems change in planning and organisation of care, facilities and design of units as well as special education and training of staff for new competences and change of mindset

1 INTRODUCTION

1.1 Zero separation, an emerging paradigm for all newborns

> “There is no such thing as a baby, there is a baby and someone (D. Winnicott)”

Winnicott, a paediatrician and child psychoanalyst, made this famous statement of the nursing couple already in 1947.[1] In essence, he implied that the infant cannot exist outside of a relationship, and where there is a newborn baby, there is also maternal care. Although this is the natural condition for the human species, in the early twentieth century when birthing practice moved into hospitals, ward routines separated newborns from their mothers directly after birth. In time, the negative aspects of this change of practice became apparent and a desire emerged of returning to keeping mother and newborn in close proximity to each other, for example rooming-in. Avoiding separation of the infant from the mother at birth, and engaging the parents as primary caregivers from the very start is of upmost importance. Although this has become clear over the years, separation is still the norm when the infant is born ill or preterm. Thus, it is crucial for medical units caring for ill or preterm newborn infants to organise and plan the care of both mothers and infants in a way that minimises separation—

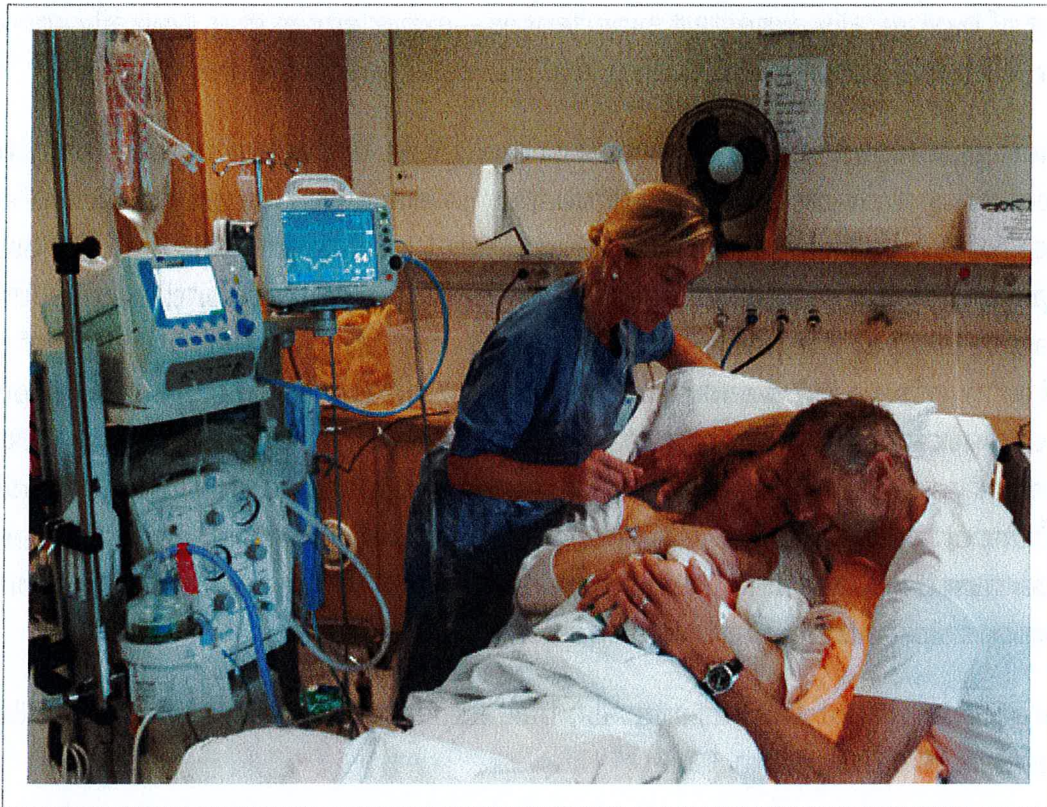

FIGURE 1

Open in figure viewer | PowerPoint

Zero separation and Mother-Newborn Couplet Care in delivery room for an unstable preterm infant with neonatal thyrotoxicosis in need of respiratory support. Note the intact family triad

1.2 Nurturing care of the newborn

Nurturing care is a recent concept suggesting that parents, caregivers and families need to be supported in providing sensitive care and protection in order for young children to achieve their developmental potential.[3] In short, what we do matters, but how we do it matters more. *The Nurturing care framework*[4] calls for support to begin already in pregnancy and the thematic brief on *Nurturing care for every newborn*[5] provides operational details, highlighting sensitive caregiving for small, ill or preterm infants from birth throughout childhood.

The development of the newborn brain is governed to a large extent by sensory input, negative experiences can affect the development of both anatomy and function of the brain, impose a negative influence on the individual's stress regulation and consequently, in a long-term perspective negatively impact future health.[6, 7]

with its physiology, interrupting developmentally important moments of rest and sleep and the processing of biologically expected experiences—experiences that typically come from interaction with the parents and during the first days, primarily the mother.[2, 8-12]

The psychological bonding of the parents to the infant, the infant's attachment to the parents and subsequently their capability to adequately interact with each other are of equal importance for future health and well-being of both infants and parents.[13] These delicate and sensitive psychological processes start already during pregnancy and may be interrupted by the premature birth or the unexpected illness of an infant. Behavioural cues of prematurely born or ill term infants are weaker and often more difficult to interpret and adequately respond to, which complicates bonding and attachment, as do crisis reactions of parents and unnatural separations of parents and newborns that occur as infants are admitted to traditional neonatal units.[14, 15] Important research by pioneers such as Klaus & Kennel[16] has also recognised the first postpartum days as a unique and sensitive period laying the foundation for the mother-infant relationship—bonding and attachment.

Non-separation of infant and parents also has ethical and legal support in the UN Convention on the Rights of the Child from 1989.[17]

1.3 Infant- and Family-Centred Developmental Care—IFCDC

The concept of Infant- and Family-Centred Developmental Care (IFCDC) has developed to address the issues described above.[18] IFCDC is a descriptive term for a framework of systems change in newborn care. With adaptations of hospital systems and care practices, it aims to increase well-being of infants and parents, optimise calmness and healthy sleep, reduce stress and pain, support parent-infant co-regulation, promote parental presence and support bonding and attachment, decrease strain on parents; and by all the above, improve brain development[7] and positively affect long-term child development.[19] Within such a framework, keeping parent and infant in close proximity to each other from birth is key. Mother-Newborn Couplet Care is a crucial component of needed systems change in order to equitably provide IFCDC and nurturing care to all newborns directly after birth.

2 MOTHER-NEWBORN COUPLET CARE

Mother-Newborn Couplet Care is a concept where the care of the ill or prematurely born infant is provided, coupled with the care of the newly delivered mother in the same ward and uninterrupted from the birth of the child to discharge. The maternal care includes not only

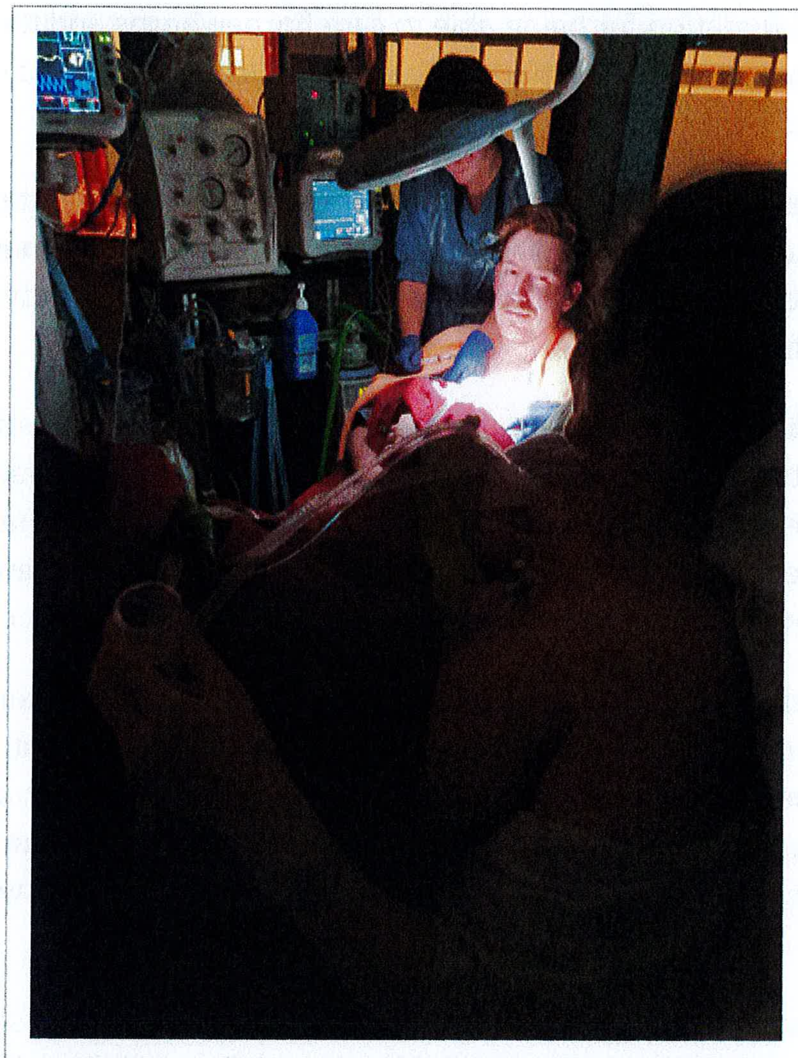

FIGURE 2

Open in figure viewer | PowerPoint

Zero separation and Mother-Newborn Couplet Care in the NICU for a family with very preterm twins on CPAP for respiratory distress and iv-treatment for hypoglycaemia. Note mother's iv therapy, the cup for early milk expression, skin-to-skin contact also for the second twin with the father and the visual connection between the parents

Many mothers to infants born ill or prematurely have extended need of medical care and would otherwise be separated from their infants during the often most critical medical period for their infant, and the very important first days of bonding and attachment.

2.1 Organisation and collaboration between the obstetrical and paediatric departments

important, since financial investments might be needed. Staff attitudes and professional approach lay the foundation for being able to care for newborns and their mothers as a unity, a dyad. This can only be reached with a strong and firm leadership and a clear goal for staff in both departments.

It is easier to achieve needed systems change in hospitals with integrated obstetrics and neonatology in a common department of perinatology as well as in smaller units with flexible organisations. Mother-Newborn Couplet Care should be adjusted to the local context and can be structured in different ways.

For infants in need of specialised care, Mother-Newborn Couplet Care of the infant and the mother is most often provided in the neonatal unit. However, it might as well be in a paediatric cardiac, surgical or intensive care unit—depending on the organisational structure of the hospital and the condition of the infant. On the other hand, Mother-Newborn Couplet Care can also be provided in the maternity unit when the infant has only minor conditions.

Clinical care of both the infant and the mother by one primary care team can be thought of as the gold standard of Mother-Newborn Couplet Care, achieving the best possible continuity when caring for the dyad. The nursing teams have to be competent in caring for both patients. In many countries, nurses are scarce and nurses with extraordinary competencies like this, being comfortable in caring for an ill or prematurely born newborn as well as the newly delivered mother, are rare to find.

An alternative solution is to collaborate within an existing structure of separate obstetric and neonatal departments. Care is still provided for the mother and the infant, physically in the same unit. However, maternity nurses from the obstetric department care for the mother and neonatal nurses care for the infant. The thought of a primary care team for the dyad is lost in favour for a system that is possibly more feasible to implement.

2.2 Mother-Newborn Couplet Care in clinical practice

Mother-Newborn Couplet Care starts as soon as the infant is born. To be able to keep the infant and the mother together from the start, the neonatal team has to start the care of the premature or ill newborn at the mother's bedside, in the delivery room or operating theatre. Depending on gestational age and medical condition of the infant, different caregiving is needed, most of which is possible to plan for without separating the infant from the mother. For the neonatal team to care for the newborn at the mother's bedside, the delivery room needs to be spacious and all needed equipment have to be readily available and preferably prepared well in advance—the more complex the expected situation, the more preparation is

Infants in need of specialised neonatal care are stabilised, and continued care is planned for, again in close collaboration and communication with the obstetrical team. If possible, transfer to the neonatal unit is postponed until the mother is judged to be safely moved from the delivery ward, together with her infant. Many infants can be transferred in a skin-to-skin position with the mother, or if that is not possible, with the father or partner. Specifically made transport equipment for transfer of infants in an uninterrupted skin-to-skin-position with a parent has been developed in many units.

The postpartum care of the mother continues in the neonatal unit under the responsibility and close supervision of staff from the department of obstetrics. To guarantee patient safety, it is important that the neonatal and maternity units appropriately adjust the design and structure of the unit and implement guidelines and checklists for both infant and mother.

2.2.1 Maternal eligibility criteria for Mother-Newborn Couplet Care

Most mothers are eligible for Mother-Newborn Couplet Care in the unit their infant is being cared for, only a few hours after giving birth. The obstetrician needs to assess the appropriate level of care for the newly delivered woman and have trust in the system of this model of care. However, some women still need to be cared for at the adult intensive care unit for conditions like eclampsia and severe pre-eclampsia, large bleeding or haemodynamic instability for a period of time, before they safely can be reunited with their infant in the neonatal unit. Other conditions that may hinder Mother-Newborn Couplet Care for the mother are severe contagious disease or severe psychiatric illness.

Guidelines often recommend continuous observation of a newly delivered woman during the first 1–2 h. In a flexible system, even this thorough initial observation of the woman can be performed in the neonatal unit if the infant is in a critical condition that requires immediate transfer.

In the neonatal unit, doctors and nurses from the obstetric department continue to have the medical responsibility for the mother, including postpartum caregiving, medical rounds, prescriptions and monitoring of medications.

When the mother is fully recovered, she is discharged from obstetric care, but continuous to stay with her infant in the neonatal unit during its entire hospital stay.

2.2.2 Infant eligibility criteria for care in the maternity ward

mother. Typically, infants cared for at the maternity ward have mild and transient medical conditions in need of extra care or observations. This might be infants born late preterm, having mild hypoglycaemia, feeding difficulties, being in need of phototherapy for uncomplicated neonatal jaundice or observation for mild transient tachypnoea, or having risk factors for neonatal infection.

Criteria that can be used might be cardio-respiratory stability, temperature stability, feeding by mouth, being above 34 full weeks or having a weight above 1800 grams. Guidelines and checklists are needed, but may vary between hospitals.

Whenever an infant in need of special care is in the maternal ward, the paediatric team need to be responsible, assess the medical situation and do medical rounds and examinations. This is often easy to implement since there is already an organisation for healthy newborns, who nowadays always stay with their mothers at the maternity ward until they are discharged together.

2.2.3 Adequate training of the medical and nursing staff

To gain the necessary competencies to care for both the mother in the postpartum period and the infant with medical needs, substantial education and training is required by staff. Although the Mother-Newborn Couplet Care model of care often requires a clear division between the obstetric and neonatal departments in terms of responsibilities when caring for the two patients, a cross-over in terms of knowledge will be needed among staff who will be working together in the best interest of the dyad. Development of education plans and curriculum is vital both when planning for and implementing Mother-Newborn Couplet Care, as well as in offering continuous education for new staff. This can involve education and training in early bonding and attachment processes and how to support early skin-to-skin contact, breastfeeding and caregiving skills, as well as maternal or paediatric emergency situations and other hands-on training and practical skills that might be needed. For example, when the mother is cared for in the neonatal unit by staff from the obstetric department, all neonatal staff will still need basic knowledge of, and practical skills in handling, postpartum medical complications such as haemorrhages, seizures and signs of acute infections. Postpartum skills may, or may not, be part of the core programme curriculum required for licensure for nurses in a country; however, the majority of nurses working in the neonatal unit may not have practiced in this area before. Likewise, when the infants medical condition permits Mother-Newborn Couplet Care to be provided in the obstetric department, new knowledge and skills might be needed by the maternity nurse, enabling an integrated and seamless care for the dyad. The local context will need to determine the educational plan needed for successful Mother-

important feedback to make improvements to ensure optimal care of the dyad and family.[20] With increased knowledge and training follows a heightened understanding of the needs of both the mother and the infant forming the dyad. This awareness is ultimately very rewarding, not only for the patients, but also for the staff providing Mother-Newborn Couplet Care.

2.3 Unit design with focus on maternal care and safety

In addition to systems change in the organisation of care practices and in training and education, substantial adjustments of the design of the units are needed to ensure effective and safe Mother-Newborn Couplet Care. The units involved must not only provide facilities enabling mother and partner to stay with their baby throughout 24 h but also provide safe care for both patients. When providing Mother-Newborn Couplet Care in a neonatal or paediatric unit, specific challenges arise to ensure safe care for the newly delivered mother with sometimes complex medical conditions. Both the American NICU Design Standards and the European Standards of Care for Newborn Health for NICU Design provide comprehensive and detailed design recommendations.[21, 22]

The mother and the baby are not only cared for in the same ward, they should, if possible, be cared for within a shared space, having their bed and cot/warmer/incubator in close proximity to each other. If this cannot be provided by a single room, arrangements could be made to increase the privacy around a shared bed space, for example with screens.

Equipment for emergency situations for newly delivered women is essential (Table 1). Obstetricians and maternity nurses have to be easily reached by phone or direct call, or by alarm systems and readily available for potentially rapid deterioration of a woman's medical condition.

TABLE 1. Important design & equipment issues specific for Mother-Newborn Couplet Care when implemented in the neonatal unit

Equipment, supplies and storage of medicine for treating the mother.
Specific surveillance and alarm system for the mother
Well-equipped movable emergency cart for treating unexpected maternal emergencies
Enough space around the infant and mother's care space for individual bed for mother (preferably also for father/partner) and wide doorways enabling safe and rapid transfer of the mother to the operating theatre or adult intensive care unit if needed

but also on wheels, enabling safe and rapid transfer for added flexibility, provide adult hospital and interchangeable beds for both parents

Bath/shower rooms en suite or adjacent to the family room big enough and equipped for mothers that need assistance.

2.4 The Swedish experience of Mother-Newborn Couplet Care

The development of Mother-Newborn Couplet Care began in Sweden in the late 1990s. It started in smaller district hospitals but has gradually been more widely implemented also in the larger academic centres. However, currently approximately only one third of the Swedish neonatal units provide this model of care. From an international perspective, the interest is rapidly growing, but Mother-Newborn Couplet Care has been implemented in a relatively small portion of hospitals despite adopted by international standards.[22, 23] This gradual development is reflected in, and probably dependent of, the lack of solid scientific evidence on the specific effect of Mother-Newborn Couplet Care on infant, mother and health economics. Another reason of slow progress in implementation is the required systems change. This is always challenging and even more so when engaging separate departments of a hospital. Accordingly, strong leadership setting clear goals and promoting change in the professional attitudes and mindset is crucial.

There are not many structured or randomised studies on zero separation. The Stockholm Neonatal Family Centered Care Study was a relatively large two-site RCT on preterm infants that reported reduced infant pulmonary morbidity and significant reduction of length of stay at the hospital, thus cost saving.[24] It was essentially a study on zero separation with 24/7 parental presence in the intervention group by providing single family rooms. Even if one of the two sites also provided Mother-Newborn Couplet Care, the numbers were too small to discern any statistically significant benefits for this model. Even so, at this site, the experience of Mother-Newborn Couplet Care was very positive. The staff was convinced and reported rewarding working conditions. Even more important, the parents were very positive—especially evident with the families that had previous experiences of a more traditional family-centred care unit with older siblings.

After many years of clinical practice, we have experienced positive effects for mothers regarding early breastmilk production, faster recovery with lower blood pressure for women with pre-eclampsia and less reported pain. Parents appear calmer and more confident and bond earlier to their infants. Parents are also appreciated as the most important persons in the