CHAPTER

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Kangaroo Mother Care

Kangaroo mother care (KMC) is a method of care for preterm or low birth weight (LBW) infants by placing them in skin-to-skin (STS) contact with the mother or other caregiver to ensure their optimum growth and development.[1,2] Initially devised as an alternative to conventional technology-based care, KMC is now considered the standard of care for LBW infants in all settings.

COMPONENTS[2]

The four components of KMC are

1. Kangaroo position (skin-to-skin contact) between the mother and the infant in a vertical position, between the mother's breasts, and under her clothes. The provider must keep herself in a semi-reclining position to avoid gastric reflux in the infant. The mother can share this responsibility with the father and other relatives.
2. Exclusive or nearly exclusive breastfeeding.
3. Early discharge from health facilities.
4. Continued follow-up: Mothers at home require adequate support and follow-up; hence, a follow-up program and access to emergency services must be ensured.

BENEFITS

KMC is a simple, cost-effective intervention with numerous benefits for the infant and the community.[3] A recent systematic review[4] that included studies done both in health facilities and in community settings (27 studies and 12,000 neonates) shows that KMC when compared with conventional neonatal care:

- Reduces the risk of death during birth hospitalization or 28 days of age (RR 0.68; 95% CI 0.53–0.86). This reduction in mortality is noted irrespective of gestational age or weight at enrolment, time of initiation, and setting (hospital or community).
- Reduces severe infection till the latest follow-up.

- Reduces the risk of hypothermia by 68%.
- Results in better gain in anthropometric parameters, namely weight gain per day and length and head circumference gains per week.
- Results in higher exclusive breastfeeding rates at discharge and 28 days of life.

KMC of at least 8 hours per day was found to have greater mortality benefits than shorter-duration of KMC. Long-term benefits of KMC are difficult to ascertain due to additional influences from parental nurturing, optimal home environment, and external factors on development. Follow-up studies from a single RCT showed that the risk of cerebral palsy, Griffith Quotients at 12 months of corrected age, or IQ scores at 20 years of age were not different between KMC and conventional care infants.[5] The most vulnerable infants (birth weight <1800 g) who received KMC demonstrated significantly reduced school absenteeism and reduced hyperactivity, aggressiveness, and externalization at 20 years of age.

WHEN TO INITIATE KMC?

Most units wait until infants become clinically stable and are weaned from respiratory support and parenteral nutrition to initiate KMC. Four recent studies explored the benefits of early initiation of KMC before 24 hours of age compared to later initiation until neonates were deemed hemodynamically stable. Three of these studies, including the large immediate KMC (iKMC) multi-country study,[6] were conducted in low- and middle-income countries. In all the studies, neonates in the early KMC group received KMC within 24 hours of birth, even when on noninvasive respiratory support. The only exclusions were inability to breathe at birth, invasive ventilation, shock, seizures, severe jaundice, or major congenital malformations requiring immediate management. The meta-analysis of these studies showed that early-initiated KMC, compared to later initiation:

- Reduces neonatal mortality by 22% (RR 0.78, 95% CI 0.66–0.92).
- Reduces the incidence of hypothermia and clinical sepsis till 28-days of life.
- Results in higher rates of the exclusive breastfeeding at discharge.

Post-hoc analysis of the iKMC study data further showed that the babies immediately initiated on KMC have no significant difference in heart rate, respiratory rate, oxygen saturation as compared to babies in control arm further demonstrating the safety of immediate KMC initiation.[7]

Based on recent evidence, the WHO recommendations for the care of preterm or low-birthweight infants advocate the following:

- Kangaroo mother care (KMC) is recommended as routine care for all preterm or LBW infants. KMC can be initiated in the healthcare facility or at home and should be given 8–24 hours per day (as many hours as possible). (Strong recommendation, high-certainty evidence).
- KMC should be started as soon as possible after birth. (Strong recommendation, high-certainty evidence).

REQUIREMENTS FOR KMC IMPLEMENTATION

KMC is feasible everywhere because it does not require any equipment to implement. Also, it is advantageous for the organization of health services provided the following requirements are met:

1. Health facility or home setting.
    a. The health facility should always allow entry of the parents to the neonatal unit.
    b. Mother-neonatal intensive care unit (Mother-NICUs), wherein the bed of mother is beside the incubator/warmer of preterm baby, wherever feasible can further help to promote early KMC (as done in an Indian centre for iKMC study). Such an undertaking will require interdepartmental coordination.
    c. Reclining chairs in the nursery and postnatal wards and beds with adjustable backrests (Fig. 52.1) help mothers to practice KMC for long hours.
    d. Mother can also provide KMC at home, sitting on an ordinary chair or in a semi-reclining posture on a bed with the help of pillows.

Fig. 52.1: Mother practicing KMC in reclining posture (a) and KMC chair (b)

2. Supporting staff and family members.
   a. In hospital settings, a trained nurse is indispensable in assisting mothers with KMC.
   b. Staff should receive adequate training on KMC, including the nutrition of LBW infants. Additional training is needed on the expression and storage of breast milk, using alternate feeding methods, and daily monitoring of the growth of LBW infants. The training could be done by exposing them to units already practicing KMC.
   c. Educational material such as information sheets, posters, and video films on KMC in the local language should be available to mothers, families, and the community.
   d. At home, a supportive family who can also share the responsibility of providing KMC is essential.
3. Follow-up.
   a. Ensure continued KMC at home. Arrange follow-up to track growth and development.
4. Institutional, social, and community support
   a. The requirement for a successful KMC program can be summarized in three words: Communication, sensitivity, and education.
   b. Apart from supporting the mother, family members should also be encouraged to provide KMC when the mother wishes to rest.
   c. The mother would need her family's cooperation to handle her conventional household chores and responsibilities until the baby requires KMC.
   d. Community awareness about the benefits should be created. This is particularly important when there are social, economic, or family constraints.

CRITERIA FOR ELIGIBILITY OF KMC

1. **Neonate**
   - All preterm and LBW neonates are eligible for KMC.
   - KMC can be initiated as soon after birth in spontaneously breathing infants, even if they are on respiratory support (i.e. non-invasive ventilation).
   - KMC can be provided while the baby receives intravenous fluids or is fed via an orogastric tube.
   - Apnea is not a contraindication for KMC. On the contrary, KMC helps decrease apneic episodes, probably related

to the prone position of the infant that is associated with better ventilatory mechanics and the rhythmic kinaesthetic stimulation from the mother. A systematic review showed that KMC resulted in a 60% reduction in apnoea episodes (RR 0.41; 95% CI 0.22, 0.78).[8]

- Contraindications: hemodynamic instability (shock), severe respiratory distress, seizures, asphyxia, or other medical conditions that need priority management of airway, breathing, or circulation.

2. **Caregivers:** Mothers and close family members can provide KMC, irrespective of age, parity, education, culture, and religion. The following points must be taken into consideration when counseling for KMC:
   a. **Willingness:** The mother must be willing to provide KMC. Healthcare providers should counsel and motivate her. Once the mother realizes the benefits of KMC for her baby, she will learn and undertake KMC.
   b. **General health and nutrition:** The mother should be free from serious illness to be able to provide KMC. She should receive an adequate diet and supplements recommended by her physician.
   c. **Hygiene:** The mother should maintain good hygiene: daily bath/sponge, change of clothes, hand washing, and short and clean fingernails.

INITIATION OF KMC

1. **Counseling:** When the neonate is ready for KMC, arrange a convenient time for the mother and her baby. Demonstrate to her the KMC procedure in a caring and gentle manner and with patience. Answer her queries and allay her anxieties. Encourage her to bring her mother/mother-in-law, husband, or any other family member. It helps build a positive attitude in the family and ensures family support to the mother, which is particularly crucial for post-discharge home-based KMC.[9] It is helpful that the mother starting KMC interacts with someone already practicing KMC for her baby.
2. **Mother's clothing:** The mother can wear any front-open dress per local culture. This may include a sari, a blouse, a front open gown, a suit, or a simple shirt (Fig. 52.2). KMC can be done

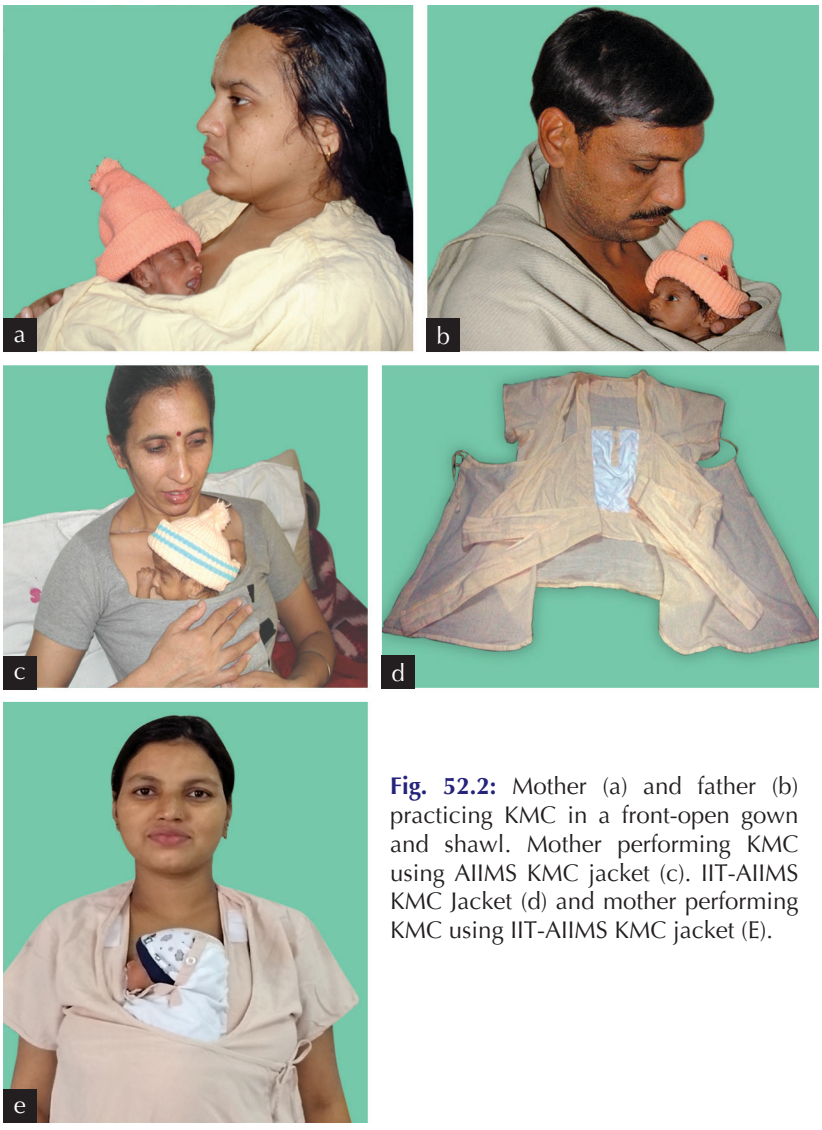

Fig. 52.2: Mother (a) and father (b) practicing KMC in a front-open gown and shawl. Mother performing KMC using AIIMS KMC jacket (c). IIT-AIIMS KMC Jacket (d) and mother performing KMC using IIT-AIIMS KMC jacket (E).

with special apparel (such as the KEM bag or AIIMS KMC jacket) designed to suit the needs of mothers. Any other suitable clothing that can retain the baby for an extended period can be adapted locally.

3. **Neonate's clothing:** Neonate is dressed in a cap, socks, nappy, and front-open sleeveless shirt.

KMC PROCEDURE

1. **Kangaroo positioning**
   a. The neonate should be placed between the mother's breasts in an upright position.
   b. The head should be turned to one side and slightly extended. This extended position keeps the airway open and allows eye-to-eye contact between the mother and her baby.
   c. The hips should be flexed and abducted in a "frog" position; the arms should also be flexed. The baby's abdomen should be at the level of the mother's epigastrium.
   d. Support the baby's bottom with a sling/binder.
2. **Monitoring**
   a. Neonates receiving KMC should be monitored carefully, especially during the initial few days.
   b. Nursing staff should make sure that the baby's neck position is neither too flexed nor too extended, the airway is clear, breathing is regular, the color is pink, and the baby is maintaining temperature.
   c. The mother should observe the baby during KMC so that she can continue monitoring at home.
3. **Feeding**
   a. The mother should be explained how to breastfeed while the baby is in the KMC position.
   b. Holding the baby near the breast stimulates milk production.[5,6]
   c. She may express milk while the baby is still in the KMC position. Depending on the baby's condition, the baby could be fed with a paladai, spoon, or orogastric tube.
4. **Duration**
   a. Skin-to-skin contact should start gradually in the nursery.
   b. The length of skin-to-skin contact should be gradually increased up to 24 hours a day, interrupted only for changing diapers.

Discharge Criteria

The unit's standard policy for hospital discharge should be followed. Generally, the following criteria are accepted at most centers:[9]

- The baby's general health is good.

- Gaining weight (at least 15–20 g/kg/day for three consecutive days).
- Able to maintain body temperature satisfactorily for at least three consecutive days at room temperature.
- Feeding well and receiving exclusively or predominantly breast milk.
- The mother and family members are confident in taking care of the baby.

WHEN TO DISCONTINUE KMC?

If the mother and baby are comfortable, KMC is continued at the hospital and at home for as long as possible. Often this is desirable until the baby's gestation reaches term or the weight is around 2500 g. Once the neonate starts wriggling to show that she is uncomfortable, pulls her limbs out, cries, and fusses whenever put in skin-to-skin contact, the mother can wean the baby from KMC.

POST-DISCHARGE FOLLOW-UP

Close follow-up is a fundamental prerequisite of KMC practice. Baby is followed once or twice a week till 37–40 weeks of gestation or until the baby reaches 2.5–3 kg. After that, a follow-up once in 2–4 weeks may be enough till 3 months of postmenstrual age. The baby should gain adequate weight (15–20 g/kg/day up to 40 weeks of postmenstrual age and 10 g/kg/ day subsequently). More frequent visits should be made if the baby is not growing well or his/her condition demands.

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