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Evaluation of Kangaroo Mother Care (KMC) on success of Breastfeeding in Low Birth Weight Neonates

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Abstract
Kangaroo mother care is recommended for the routine care of newborns weighing 2000 g or less at birth, and should be initiated in health-care facilities as soon as the newborns are clinically stable. Newborns weighing 2000 g or less at birth should be provided as close to continuous Kangaroo mother care as possible. Intermittent Kangaroo mother care, rather than conventional care, is recommended for newborns weighing 2000 g or less at birth, if continuous Kangaroo mother care is not possible. Based on above reported findings the present study was planned to know the effectiveness of KMC on success of Breastfeeding in Preterm low birth weight (LBW) neonate.
The present study was planned in the Upgraded Department of Paediatrics (Neonatology) in Patna Medical College and Hospital, Patna from Dec 2017 to Jun 2018. Total 50 cases of new borns delivered and referred to Department were enrolled in the present study. The enrolled cases were divided in the two study groups as Kangaroo mother care group and normal care group.
The data generated from the present study concludes that the KMC is protective against a wide variety of adverse neonatal outcomes and has not shown evidence of harm. This safe, low-cost intervention has the potential to prevent many complications associated with preterm birth and may also provide benefits to full-term newborns. Therefore, capacity training for health professionals and provision of space infrastructure constitute the basic needs which could be funded by International Aid Agencies in order to scale up the program in these settings.

Keywords: kangaroo mother care, KMC, LBW

Introduction
Kangaroo mother care is recommended for the routine care of newborns weighing 2000 g or less at birth, and should be initiated in health-care facilities as soon as the newborns are clinically stable. Newborns weighing 2000 g or less at birth should be provided as close to continuous Kangaroo mother care as possible. Intermittent Kangaroo mother care, rather than conventional care, is recommended for newborns weighing 2000 g or less at birth, if continuous Kangaroo mother care is not possible [1].
Kangaroo care or kangaroo mother care (KMC), sometimes called skin-to-skin contact care, is a technique of newborn care where babies are kept chest-to-chest and skin-to-skin contact with a parent, typically their mother. It is most commonly used for low birth-weight preterm babies, who are more likely to suffer from hypothermia, while admitted to a neonatal unit to keep the baby warm and support early breastfeeding. Kangaroo care, named for the similarity to how certain marsupials carry their young ones, was initially developed in the 1970s to care for preterm infants in countries where incubators were either unavailable or unreliable. There is evidence that it is effective in reducing both infant mortality and the risk of hospital-acquired infection, and increasing rates of breastfeeding and weight gain. Skin-to-skin care is also used to describe the technique of placing full-term newborns very soon after birth on the bare chest of their mother or father. This also improves rates of breastfeeding and can lead to improved stability of the heart and breathing rate of the baby.
Kangaroo care seeks to provide restored closeness of the newborn with family members by placing the infant in direct skin-to-skin contact with one of them. This ensures physiological and psychological warmth and bonding. The parent's stable body temperature helps to regulate the neonate's temperature more smoothly than an incubator, and allows for readily accessible breastfeeding when the mother holds the baby this way [2]. While this model of infant care is substantially different from the typical Western neonatal intensive-care unit (NICU) procedures, the two are not mutually contradictory, and it is estimated that more than 200 neonatal intensive care units practice kangaroo care today. One recent survey found that 82 percent of neonatal intensive care units use kangaroo care in the United States today.
In primates, early skin-to-skin contact is part of a universal reproductive behaviour, and early separation is used as a research modality to test the harmful effects on early development. Research suggests that for all mammals, the maternal environment (or place of care) is the primary requirement for regulation of all physiological needs (homeostasis), maternal absence leads to dysregulation and dysadaptation to adversity [3]. In mainstream clinical medicine, Kangaroo Mother Care is used as an adjunct to advanced technology that requires maternal infant separation. However, skin-to-skin contact may have a better scientific rationale than the incubator. All other supportive technology can be provided as part of care to extremely low birth weight babies during skin-to-skin contact, and appears

to produce a better effect [4].

Based on the scientific rationale, it has been suggested that skin-to-skin contact should be initiated immediately, to avoid the harmful effects of separation (Bergman Curationis). In terms of classification and proper defining for research purposes, the following aspects that categorise and define skin-to-skin contact have been proposed:

1. Initiation time, (minutes, hours from birth), ideal is zero separation.
2. Dose of skin-to-skin contact, (hours per day, or as percentage of day), ideal >90%.
3. Duration, (measured in days or weeks from birth), ideally until infant refuses.

Safe technique should ensure that obstructive apnoea cannot occur. Since the mother must be able to sleep to provide adequate dose, this requires keeping the airway safely open, and close containment to mother's bare chest using a garment, various of these are described in the WHO guidelines [5]. Mother should be the primary provider of skin-to-skin contact, as only she can breastfeed. However, it is almost always necessary that father should also provide skin-to-skin contact to achieve adequate dose; other family members can also be used. Since skin-to-skin contact is basic to early bonding and attachment, it should probably not be done by hospital staff and other surrogates.

In kangaroo care, the baby wears only a small diaper and a head cap and is placed in a flexed (fetal position) with maximum skin-to-skin contact on parent's chest. The baby is secured with a wrap that goes around the naked torso of the adult, providing the baby with proper support and positioning (maintain flexion), constant containment without pressure points or creases, and protecting from air draughts (thermoregulation). If it is cold, the parent may wear a shirt or hospital gown with an opening to the front and a blanket over the wrap for the baby [6]. The tight bundling is enough to stimulate the baby: vestibular stimulation from the parent's breathing and chest movement, auditory stimulation from the parent's voice and natural sounds of breathing and the heartbeat, touch by the skin of the parent, the wrap, and the natural tendency to hold the baby. All these stimulations are important for the baby's development.

"Birth Kangaroo Care" places the baby in kangaroo care with the mother within one minute after birth and up to the first feeding. The American Academy of Pediatrics recommends this practice, with minimal disruption for babies that don't require life support. The baby's head must be dried immediately after birth and then the baby is placed with a head cap on the mother's chest. Measurements, etc. are performed after the first feeding. According to the US Institute of Kangaroo Care, healthy babies should maintain skin-to-skin contact method for about 3 months so that both baby and mother are established in breastfeeding and have achieved physiological recovery from the birth process. For premature babies, this method can be used continuously around the clock or for sessions of no less than one hour in duration (the length of one full sleep cycle.) It can be started as soon as the baby is stabilized, so it may be at birth or within hours, days, or weeks after birth.

Kangaroo care is different from the practice of babywearing. In kangaroo care, the adult and the baby are skin-to-skin and chest-to-chest, securing the position of the baby with a stretchy wrap, and it is practiced to provide developmental care to premature babies for 6 months and full-term newborns for 3 months. In babywearing the adult and the child are fully clothed, the child may be in the front or back of the adult, can be done with many different types of carriers and slings, and is commonly practiced with infants and toddlers.

Based on above reported findings the present study was planned to know the effectiveness of KMC on success of Breastfeeding in Preterm low birth weight (LBW) neonate.

Methodology

The present study was planned in the Upgraded Department of Paediatrics (Neonatology) in Patna Medical College and Hospital, Patna from Dec 2017 to Jun 2018. Total 50 cases of new borns delivered and referred to Department were enrolled in the present study. The enrolled cases were divided in the two study groups as Kangaroo mother care group and normal care group.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

Following was the inclusion and exclusion criteria for the present study.

Inclusion Criteria: All preterm, neonates with birth weight 1250 gm to 2000 gm., gestational age > 30 weeks to < 35 weeks (Gestational age determined by New Ballard Score), haemodynamically stable.

Exclusion criteria: Babies having major life threatening congenital malformation, perinatal asphyxia and required ventilator or ionotropic support and babies with critically ill mother.

Results & Discussion

The data from the two study groups were collected and presented as below. The data also compared with the already reported literatures. When compared with conventional care, KMC is associated with decreased mortality among newborns who survive to receive it, particularly among LBW infants. KMC also increases likelihood of exclusive breastfeeding up to 6 months of age and decreases risk of newborn sepsis, hypothermia, hypoglycemia, and hospital readmission. Additionally, infants receiving KMC have improved vital signs, greater head circumference growth, and lower pain scores.

Low birth weight/ preterm babies are associated with high neonatal /infant mortality and morbidity [7]. Of the estimated 4 million neonatal deaths, LBW/preterm infants account for more than 20%. KMC is an effective way to meet baby's need for warmth, growth, well being, breast feeding, and protection from infection, stimulation, safety and love [8].

Table 1: Comparison of Age, Sex and Birth weight

Variable	Group A	Group B
Group	**Kangaroo mother**	**Normal care**
Total No. of Cases	**25**	**25**
Age at admission days	1- 3 days	1 – 3 days
Sex		
Male	15	18
Female	10	7
Birth weight (gm)		
1250-1500	18	20
>1500-1800	7	5

Table 2: Feeding Outcome

Feeding Outcome	Group A	Group B
Group	**Kangaroo mother**	**Normal care**
Total No. of Cases	**25**	**25**
First feed on		
1st day	9	5
2-3 days	12	14
4-5 days	4	6
Feed intolerance		
Yes	5	8
No	20	17
Time of achieving full enteral feeding in days	6 -12 days	8 -19 days
Exclusive breast feeding		
Yes	22	15
No	3	10

Table 3: Complications Observed

Complications	Group A	Group B
Group	**Kangaroo mother**	**Normal care**
Total No. of Cases	**25**	**25**
Occurrences of apnoea		
Yes	6	8
No	19	17
Observations of sepsis		
Yes	8	16
No	17	9
Culture Positive sepsis		
Yes	4	5
No	21	20
Episodes of hypothermia		
Yes	6	10
No	19	15

Table 4: Weight gain observed

Weight gain observed	Group A	Group B
Group	**Kangaroo mother**	**Normal care**
Total No. of Cases	**25**	**25**
Weight gain started in days	4 – 9 days	6 – 11 days
Birth weight regained	8 -12 days	11 – 16 days
Rate of weight gain per day	15 – 30 gm	10- 15 gm

Some evidence exists that a close contact between the mother and the preterm baby may have a positive influence on the relationship of this baby with the world. The skin, the human body's largest organ, receives sensory stimuli of different intensity and the skin-to-skin contact, which in KMC implies the skin contact of body/chest between the preterm baby and his mother, may cause several changes in the bodies of both baby and mother. The well-known effect of the skin-to-skin contact as a stimulus to the release of oxytocin apparently plays a crucial role in the mother's behavior and seems to positively affect her mood, thus facilitating her contact with the baby [9]. In 1989, Affonso *et al*., [10] in a study involving 33 mothers who had skin-to-skin contact with their preterm babies and a control group, observed a greater tendency towards emotional stability in mothers submitted to this method. They also reported a more intense feeling of reliability and competence in these mothers compared with those mothers whose babies received conventional care. Signs of establishment of an early mother and child bonding and greater involvement of parents in baby care and in the growth and development of their children was reported by Charpak *et al*. [11] and Reichert *et al*. [12] in other studies.

According to the results obtained by Ramanathan *et al*. [13], the mothers who nursed their neonates by the KMC method could breastfeed for a longer period, and the frequency of breastfeeding was also enhanced in these subjects compared to the control group. In another research, Udani *et al*. [14] reported increased breastfeeding in the KMC group compared to the control group.

During KMC, the intense and continuous skin-toskin contact between the mother and neonate increases the responsiveness of the mother to the neonate's hunger. Increased breastfeeding in KMC is due to the release of oxytocin, which enhances the self-confidence of the mother [14]. According to the present study, the mothers who used KMC expressed high levels of satisfaction and comfort, and their self-confidence in the management of their LBW infants significantly increased compared to the normal group.

Although the improvements in respiratory rate, oxygenation, and temperature that we found associated with KMC exposure may each be of modest clinical significance, when taken together they support the hypothesis that KMC improves overall physiologic regulation in the neonate, which could have important effects on other longer-term outcomes. Lower pain perceptions among infants receiving KMC may also provide additional benefits for LBW infants who experience numerous injections during hospitalization.

It was observed that infants who were exposed to KMC showed significantly better emotion regulation than infants who were exposed to the usual standard care which again initiated early breastfeeding in KMC group [15-16]. Furthermore, KMC has a significant role in starting breastfeeding among preterm and LBW infants [17-19]. Sloan NL *et al*. also reported that women in the community kangaroo mother care group initiated to breastfeed earlier than the control group [20]. This confirms the conclusion that KMC promotes early initiation of breastfeeding as compared to conventional care methods.

Conclusion

The data generated from the present study concludes that the KMC is protective against a wide variety of adverse neonatal outcomes and has not shown evidence of harm. This safe, low-cost intervention has the potential to prevent many complications associated with preterm birth and may also provide benefits to full-term newborns. Therefore, capacity training for health professionals and provision of space infrastructure constitute the basic needs which could be funded by International Aid Agencies in order to scale up the program in these settings.

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