



## KANGAROO MOTHER CARE: KNOWLEDGE, ATTITUDES AND PRACTICES AMONG NURSING MOTHERS AND ITS IMPACT ON WEIGHT GAIN IN LOW BIRTH WEIGHT BABIES

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**ABSTRACT** **Aims and Objectives:** To study the impact of Kangaroo Mother Care in increasing weight gain in Low Birth Weight babies and to analyze the Knowledge Attitude Practices of nursing mothers regarding Kangaroo Mother Care.

**Materials and Methods:**

**Study Design:** A Prospective Study.

**Study Population:** A total of 254 low birth weight babies <2000 g were taken.

**Setting:** Level III NICU & SNCU of a teaching institution in South India.

**Data analysis:** Data is recorded on a pre designed pro forma. Collected data is entered in MS Excel sheet. Subsequently data is analyzed using SPSS statistical software. Tests of significance like chi-square test are applied accordingly. Intervention: Babies were given KMC as per mothers convenience for a duration of 4, 8, 12 hours. Outcome measures: Growth, as measured by average daily weight gain and by other anthropometrical parameters and Knowledge, attitudes, and practices of the nursing mothers were assessed by LIKERT scale.

**Results:** The babies who were given KMC for the duration of 4 hours had a mean weight gain of 9.93 grams/day. The babies who were given KMC for the duration of 8 hours had a mean weight gain of 14.7 grams/day, and the babies were given KMC for the duration of 12 hours had a mean weight gain of 17 grams/day. The mean weight gain of the babies with the gestational age between 28-32 weeks was 13.88 grams/day and the mean weight gain of the babies with the gestational age between 33-37 weeks was 12.31 grams/day 71% strongly agreed that KMC provides warmth, 56.69% strongly agreed that KMC reduces hospital stay, 39.37% strongly agreed that KMC increases the weight of the baby, 31.1% strongly agreed that KMC increases the duration of sleep. 68% strongly agreed that KMC increases the confidence of mothers and decreases the separation of the baby, 56.29% strongly felt that KMC gave self satisfaction, 70% strongly agreed that KMC was a costless practice, 63.38% agreed that KMC improves lactation.

**Conclusion:** It concludes that the mean weight gain per day of the babies was increased when the duration of KMC was given the maximum and the babies with the gestational age between 28-32 weeks had more weight gain than that of the babies with gestational age 33-37 weeks. Most of the mothers in the study mentioned that the main barriers of KMC utilization were due to lack of knowledge regarding KMC practice.

### KEYWORDS : Kangaroo Mother Care, Low Birth Weight, Preterm, Breast Feeding

Kangaroo mother care (KMC) adapted from kangaroos. It involves placing the newborn infant in close skin to skin contact with mother. It is most commonly used for Low Birth Weight preterm babies. It is an effective method to meet baby needs for warmth following birth and immediate postnatal period and support early breastfeeding. The stable body temperature of the parents helps to regulate the neonate's temperature better than an incubator and allows for readily accessible breastfeeding in this position [1]. Knowledge on the effectiveness and safety of KMC in the community/home settings and its effects on growth are still incomplete [2]. There is evidence that kangaroo mother care [KMC], when compared to conventional neonatal care in resource-limited settings, significantly reduces the risk of mortality in infants born in facilities who are clinically stable and weighing less than 2000 g[3]. However, despite its known benefits, the adoption and implementation of KMC has been low. Even at the places where KMC is being practiced in the facility, the number of hours of KMC remains low. Average duration of KMC varies from 3 to 5 h/day in previous Indian studies [4, 5].

#### MATERIALS AND METHODS:

It is a Prospective study with a total of 254 low birth weight babies less than 2000 g and more than 1500 g were taken from NICU, SNCU and KMC unit of a teaching institution in South India from Jan 2017- Dec 2018.

Our hospital has a 10-bedded level III NICU and a 20-bedded level II SNCU in addition to 9 Kangaroo mother care and rooming-in beds. Each eligible mother-infant dyad was a single participant in the present study. All eligible preterm neonates admitted in NICU whose birth weight is between 1500-2000 grams with stable hemodynamic status and after taking consent from mother were included and those who need assisted ventilation or shock, and babies with major congenital anomalies, HIE, Critically ill babies and birth weight more than 2000 grams and less than 1500 grams were excluded. All term and Post term babies also excluded.

Before starting KMC, a method of care and its benefits will be explained to participating mothers and at least one other member in the family. Official formal consent was obtained. A pamphlet about KMC was distributed, and the procedures, preparation and timings for KMC care explained to mother. Mothers were educated regarding maintenance of basic standards of hygiene (hand washing, short and clean fingernails), daily bath and clean clothes. Mothers were taught how to hold the infant after dressing the baby.

Based on duration of KMC as per mothers convenience babies are grouped into three groups of 4, 8, 12 hours either continuously or intermittently. Mother will wear a dress of her choice which can be opened from front and babies will be covered with cap, gloves, socks and mittens with front open shirt. Baby is held in upright position with head slightly turned to one side to have eye to eye contact with skin to skin contact established between chest and abdomen of baby and mother duo with one hand to hold the baby placing behind the neck and other hand placed under baby's buttocks. Excessive flexion and hyper extension are avoided to prevent airway blockade. Mother carrying a baby in KMC position was advised to walk, sit, stand or engage in recreational activities.

Mothers were counseled regarding importance and benefits of breast feeding and difference between fore milk and hind milk. Infants with weak suck were fed EBM by paladai and spoon. Mothers were also instructed to give mineral, vitamin supplementations as required. Mothers were encouraged to share concerns and fears.

Baby's weight is monitored daily before feeding at the same time using an electronic weighing scale. The outcome is assessed by average weight gain of the baby per day.

*Knowledge of the mothers:* It was being checked by the components such as the warmth of the baby, feeding and frequency of the feeding of the child, KMC positioning, duration of the KMC practice and clothing

of the baby. Most of the mothers in the study mentioned that the main barriers of KMC utilization were due to lack of knowledge regarding KMC practice.

**Attitude of the mothers:** Attitudes of the mothers regarding the implementation of KMC and positive effect of KMC on breastfeeding was studied.

**Practices of the mothers:** Practicing of KMC in hospitals and willingness of the mothers to continue KMC at home and exclusively breastfeeding their baby as frequent as possible were studied.

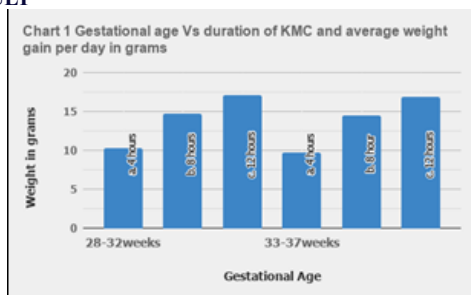
Knowledge, Attitude, Practicing (KAP) of the nursing mothers was evaluated by using a questionnaire incorporating a five-point LIKERT Scale. Main components of the scale are, a) Perception of mothers regarding the effect of KMC b) Perception of mothers regarding the benefits of KMC for mothers c) Perception of mothers regarding requirements to implement KMC d) Perception of mothers regarding the continuation of KMC at home.

Each component in LIKERT scale has five more subcomponents in it with options ranging from strongly agree, agree, undecided, disagree and strongly disagree.

**Data analysis:** Data is recorded on a predesigned pro forma. Collected data is entered in MS Excel sheet. Subsequently data is analysed using SPSS statistical software. Tests of significance like chi-square test are applied accordingly.

**Ethical considerations:** Ethical considerations are taken into account for the purpose of study. Each client was informed about the purpose of the study and confidentiality was promised and ensured. The client had freedom to leave the study at her will without assigning any reason.

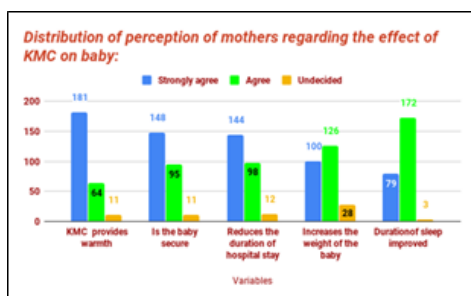
**RESULT**



Total of 254 babies was included in the study, and the study was conducted in KMC Unit. Out of 254 babies taken for the study male babies were 128 (50.3%), and female babies were 126 (49.7%). The Gestational age of the babies included in the study was estimated by Modified Ballard scoring system. The gestational age of the babies fell in between 28 – 37 weeks of gestation. Babies between 28 -32 weeks gestational age were 119 (46.85%) and between 33-37 weeks were 135 (53.14%). The number of babies delivered by NVD was 175 (68.9%), and 79 were delivered by LSCS (31.3%).

Out of 254 mothers in the study, 72 (28.35%) were educated. Some of them were with educational status of primary education to some degree. And remaining 182(71.65%) were uneducated. While the majority of them were housewives and some of them were working.

Out of 254 Babies KMC was started on day 1 for 32 (12.59%) babies, on day 2 for 59 (23.22%) babies, on day 3 for 26(10.23%) babies, on day 4 for 56 (22%) babies, on day 5 for 54 (21.2%) babies, and on day 6 for 27 (12.59%) babies.



112 babies out of 254 were given KMC for a duration of 4 hours as per mothers convenience with 44.09%, 88 were given KMC for a duration of 8 hours with 34.64%, and 54 babies were given KMC for a duration of 12 hours with 21.25% and Observed that babies given KMC for 4 hours had a mean weight gain of 9.93 grams/day, and for 8 hours had a mean weight gain of 14.7 grams/day, for 12 hours had a mean weight gain of 17 grams/day and also noted that babies between 28-32 weeks had a mean weight gain of 13.88 grams per day and those babies between 33-37 weeks had a mean weight gain of 12.31 grams per day, compared gestational age with the duration of KMC and average weight gain per day (Table 1 and chart 1).

Gestational age	Duration of KMC	Weight gain per day in grams
28-32weeks	a. 4 hours	10.36
	b. 8 hours	14.69
	c. 12 hours	17.12
33-37weeks	a. 4 hours	9.69
	b. 8 hour	14.53
	c. 12 hours	16.94

Table 1. Gestational age v/s duration of KMC and average weight gain per day

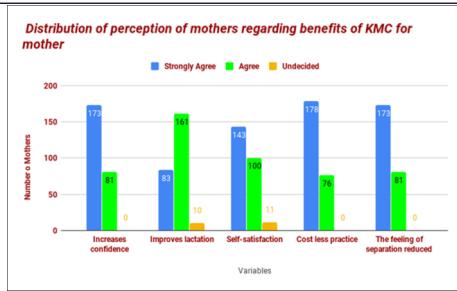
The secondary outcome in the present study was to assess the Knowledge Attitude and Practices of nursing mothers.

**Perception of mothers regarding the effect of KMC:** 181 (71.26%) strongly agreed, 64 (25.19%) agreed that KMC provides warmth to the LBW babies. 148 (58.2%) strongly agreed, 95 (37.4%) agreed that the mother feels that the baby is secure. 144 (56.69%) strongly agreed, and 98 (38.58%) agreed that KMC reduces the duration of hospital stay. 100 (39.37%) strongly agreed, and 126 (49.6%) agreed that KMC increases the weight of the baby. 79 (31.1%) and 172 (67.7%) strongly agreed and agreed respectively that duration of sleep was increased. Remaining mothers were undecided. (Chart 2)

**Perception of mothers regarding the benefits of KMC for mothers:** 173 mothers (68.1%) out of 254 strongly agreed that KMC increased the confidence of the mother to take care of their baby. And 81 (31.88%) were undecided. 83 mothers (32.67%) were strongly agreeing that the lactation was improved and the volume of milk was also increased. 161 (63.38%) were agreeing on this, and only 10 (3.93%) were undecided. 143 (56.29%) mothers strongly agreed that KMC gave self-satisfaction, 100 agreed and 11 mothers undecided. 178 mothers (70%) strongly agreed that KMC was a costless practice. 173 (68.1%) mothers strongly agreed that the feeling of separation of the baby was minimized and that they were able to bond with the baby better. It implies that the mothers had good perception regarding benefits of KMC to their babies. (Chart 3)

**Perception of mothers regarding requirements to implement KMC:** If KMC has to be implemented the basic requirements successfully have to be met. It does not require any sophisticated equipment of skills. But if mothers were motivated and were given right kind of support, they would be able to provide KMC. 135 (53.14%) mothers strongly felt that the comfortable position should be present for the baby while receiving KMC. 81 mothers agreed, and 38 were undecided. 148 (58.26%) mothers agreed that willingness of mother is necessary to provide KMC 152 (59.8%) strongly felt that privacy has an important role in providing KMC while 34 (13.38%) were undecided about the privacy role. 68 mothers (26.77%) strongly agreed that the baby must be stable before the initiation of KMC. 17 (6.69%) undecided.

**Perception of mothers regarding the continuation of KMC at home:** The continuation of KMC is necessary for the promotion of growth and development of Low Birth Weight babies. So assessment of KMC adaptation at home was studied. In the present study 168 (66.14%) mothers out of 254 strongly agreed that they would continue KMC at home. 86 (33.85%) just agreed. 204 (80.3%) mothers strongly agreed that they would encourage others to implement KMC and that they were happy to implement KMC and no mother undecided. 139 (54.7%) mothers strongly agreed that KMC was a safe and easy practice. 159 (62.5%) mothers strongly agreed that KMC was time-consuming. The analysis of all components showed that mother's acceptability and confidence in the handling of the Low Birth Weight babies was good.



**DISCUSSION:**

LBW (Low Birth Weight) is either caused by preterm birth (commonly defined as younger than 37 weeks of gestation) or the infant being small for gestational age (a slow prenatal growth rate), or a combination of both. Four different pathways have been identified that result in preterm. They are precocious fetal endocrine activation, uterine over distension, decidual bleeding, and intrauterine inflammation/infection [6].

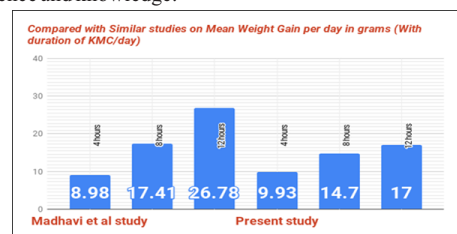
Kangaroo mother care (KMC) is an effective way to meet baby's needs for warmth, growth, and breastfeeding, wellbeing, and stimulation, protection from infection, safety and love. The main component skin to skin contact of the mother with her preterm / low birth weight infant provided multisensory stimulation including emotional, tactile, proprioceptive, vestibular, olfactory, auditory, visual stimulation in unique style and also it promotes beneficial physiological conditions such as increased quiet sleep rate, more stable thermoregulation, heart rate, respiratory rate and oxygen saturation [7].

The present study was aimed to know the impact of Kangaroo Mother Care on weight gain in Low Birth Weight babies. Knowledge Attitude and Practices of nursing mothers were studied as the secondary outcome.

The mean day of initiation of KMC was comparable with other similar studies Ramanathan et al. study [8] shows it is three days, in the present study it is 3.48 days. The Average weight gain per day on the duration of KMC in present study is compared with Madhavi et al [9] study (Chart 4). It implies from the study that the gaining in weight was directly proportional to the duration of KMC. Mean weight gain per day in present study is 13.876 grams while in other studies like Ramanathan et al. it is 15.9 grams, Suman Rao et al[10] it is 21.3 grams/day. Average Hospital stay is 17.48 days in the present study, in Ramanathan et al study it is 27.2±7 days, in Cattaneo et al study [11, 12] it is 13.4 days.

Bogota studies showed that infection was milder in children receiving KMC [13]. In the present study, low birth weight / preterm babies who were in KMC had no evidence of infection, and one of the main problems was jaundice which could be due to prematurity itself. In two twin delivery cases of the current study, the husband or the maternal or the paternal grandmothers participated in giving KMC care to infant along with the mother and found good results regarding weight gain and acceptability was good among them.

Cultural and educational differences can affect the level of trust, communication, and the ability to carry out newborn care especially in implementing KMC involves a lot of commitment from mothers. The focus of this study was to assess attitude and practices and maternal perceptions of the value of KMC through assessing views of mothers of the NICU babies for care partnership [14]. KMC and maternal care provision have become an important aspect of care in the NICU associated with improved short and long-term neonatal care health outcome [15]. Mothers giving birth to preterm babies (LBWs) have less confidence in caring for their babies due to lack of experience and knowledge.



The analysis of all components showed that mother's acceptability and confidence in the handling of the Low Birth Weight babies was good. Ramanathan et al. showed better acceptability of mothers in handling the babies in KMC [8]. Tessier et al. showed that bonding in KMC mothers was significantly higher when compared to conventional care [16]. Bogale Worku et al. reported that more than 95% of mothers were happier to take care of their Low Birth Weight babies using KMC method [17]. According to Victoria and Rubens barriers still, exist to its implementation. Barriers that need to be addressed include the misconception that KMC is only for the poor, exposure of the mother's body to medical staff, increases the nursing staff workload, cultural protestations, opposition to exclusive breastfeeding, hospital staff's objections to early discharge of the infants, and lack of written policies[18].

Pattinson et al. found that the most effective training tool for KMC implementation was a combination of face-to-face facilitation and an audio-visual package [19]. It was possible to implement safe KMC at the primary healthcare level, provided guidelines for safe kangaroo care are followed [20]. Implications of the study results are that special attention should be given to the KMC training of all healthcare staff involved in antenatal and neonatal care.

There are limitations with the use of the questionnaire provided as was discussed in previous studies. It was assumed that mothers who practiced KMC would have broadly positive perceptions towards it and that they infer that this is evident from the responses provided. But in reality, although mothers were certainly positive about the maternal benefits of KMC, it appears that the same cannot be said about their perceptions on infant benefits of KMC.

**Apprehensions of mothers:** In the present study, it was observed that some mothers were anxious that the baby might fall, some mothers felt shy for social reasons and some experienced backache during KMC and cumbersome to do routine work. These apprehensions were alleviated with frequent counseling and reassurance during the hospital stay to the nursing mother. And also the support from the family was good to the mother encouraging her to practice KMC.

**Limitations of the study:** The study was confined only to the babies with gestational age between 28-37 weeks, included only babies with birth weight of 1500 grams to 2000 grams. The physiological parameters of the baby such as heart rate, respiratory rate, RBS monitoring were not studied. Discharge weight was taken, but babies were not followed up following KMC, so the continuation of KMC at home was not assessed. The questionnaire used to elicit the perception of mothers by LIKERT scale has less number of items. Hence it may not be reflective of all their perceptions regarding KMC.

**CONCLUSION:**

We concludes that the mean weight gain per day of the babies was increased when the duration of KMC was given the maximum and the babies with the gestational age between 28-32 weeks had more weight gain than that of the babies with gestational age 33-37 weeks. Most of the mothers in the study mentioned that the main barriers of KMC utilization were due to lack of knowledge regarding KMC practice. Educating the mothers and improving their knowledge about benefits, counseling the mothers preferably with the family members, increasing the confidence in mothers, giving appropriate privacy during KMC, advice regarding continuation of KMC at home, implementation of proper policies, protocols and finally regular follow up may yield better outcome.

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**Competing interest:** None.

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