



ISSN Print: 2394-7500  
ISSN Online: 2394-5869  
Impact Factor: 8.4  
IJAR 2021; 7(5): 393-397  
[www.allresearchjournal.com](http://www.allresearchjournal.com)  
Received: 06-03-2021  
Accepted: 17-04-2021

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## Effect of kangaroo mother care on the weight gain of the low birth weight preterm infants

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DOI: <https://doi.org/10.22271/allresearch.2021.v7.i5f.8611>

### Abstract

A premature birth is one that occurs before the start of the 37<sup>th</sup> week of pregnancy. Preterm birth is commonly associated with Low birth weight (LBW), often have complicated medical problems. They may need extra care. Kangaroo mother care (KMC), care with skin to skin contact with mother or care giver has now become the standard of care either as an alternative to or an adjunct to technology based care. Objective of the study was to Effect of Kangaroo Mother Care on the weight gain of the Low birth Preterm Infants. 51 infants were included for the study; KMC was given for special neonatal care. LBW infants between 1000-1500 grams of birth weight & of gestational age 27-35.6 weeks were included in the study. Initial weight of the child as well as the KMC hours for the day were recorded for seven consecutive days. The Infants showed significant difference in weight gain between baseline & final assessment, with a *P* value of 0.00481. Thus, the study resulted with a positive outcome with a significant weight gain as well as with development of a strong mother-child bond through long hours of protective skin to skin contact.

**Keywords:** Preterm, LBW, KMC

### Introduction

A preterm birth is the birth of a baby of less than 37 weeks gestational age. Over the past 20-30 years, the incidence of preterm birth in developing countries has been about 5-7% of live births. They may have problem breathing and can also suffer from other complications including infections <sup>[1]</sup>. Therefore, preterm babies need extra care, such as protected environment, vestibular stimulation like in uterus, protection from high auditory and visual stimulation, preterm infants are protected in incubators or a cradle <sup>[2]</sup>. Preterm birth is commonly associated with Low birth weight (LBW).

LBW is defined as weight at birth of less than 2500 grams irrespective of gestational age, has an effect on a child survival and development, needs special care <sup>[3]</sup>. The Neonatal Integrative Developmental Care Model, which outlines seven core measures for neuroprotective family-centered developmental care of premature infants, guides clinical practice in many neonatal intensive care units <sup>[4]</sup>. Thus, need for alternative care had raised. Kangaroo Mother Care (KMC) was initially conceived as an alternative to the usual minimal care in-hospital for stable low birth weight infants. Skin to Skin Contact given in KMC perceived as simulated "normal environment" and recommended as the ideal place of care <sup>[4]</sup>. KMC is care of preterm or low birth weight infants is beneficial for satisfying feeding needs & extra uterine care in those places where resources are scarce. Respiratory, thermal, and feeding stabilization are mainly considered during this intervention <sup>[3]</sup>. Good mother child bonding, early feeding facilitation, weight gain, etc. are the benefits of KMC. The study was conducted to analyze the effect of Kangaroo Mother Care on weight gain of the LBW preterm infants.

### Methods

It is Prospective quasi-experimental study, on low birth weight (LBW) preterm infants from Premature care unit of a Tertiary Care Hospital. LBW infants between 1000 grams to 1500 grams of birth weight & of gestational age 27 weeks to 36 weeks were included in the study.

The mother's age was between 19-35 years. Following Helsinki guidelines, informed consent was obtained from the caregivers of infants included in the study. Medically stable infants with birth weight less than 2000 grams, with more than 8% weight loss within first 5 days were included in the study from 6<sup>th</sup> day of life. Infants requiring the respiratory support on inotrope /dexapram infusion, GI infections were excluded from the study. KMC bag & reclined seat which is been exclusively design for the mothers giving KMC in the hospital was used during the protocol. The convenient time for mothers and baby was considered. Initially extensive counseling & support was provided to mothers. Mother or other immediate care-givers from family were preferred <sup>[5]</sup>. Appropriate clothing was advised to mother as shown in the Photograph 1.



**Photograph 1:** Clothing for mother



Babies were dressed in sleeveless dress <sup>[5]</sup>. (Photograph 2)

**Photograph 2:** Baby's clothing

The infants were place in Kangaroo position, with skin to skin contact between the mother and the infant strictly in vertical position, between the mother's breast and under her clothes. Mothers were advised to sit in semi-reclined or upright position & give KMC at least 6 hours per day, not less than 2 hours at a time <sup>[5]</sup>. (Photograph 3)



**Photograph 3:** Skin to skin contact

KMC was started as soon as baby was stable <sup>[4]</sup>. The length of skin-to-skin contacts was gradually increased up to 10 to 12 hours a day.

The weight of the infants was taken at the Initial Day & then was recorded on each morning (till infants achieved desired weight i.e.2000mg) before taking the baby in KMC bag. Also the duration of KMC on the last 24 hours i.e. for the previous day was recorded each day. This record was taken for 7 days. The day of discharge was noted.

**Data analysis**

Fifty-one preterm LBW infants were included in the study. Demographic was as follows.

**Table 1:** Shows the total Male & Female infants average Gestational age

Infants	Total	Average Gestational age at birth in weeks
Male	24	33.3
Female	27	32.5

Average age of Mothers- 23.7 years.

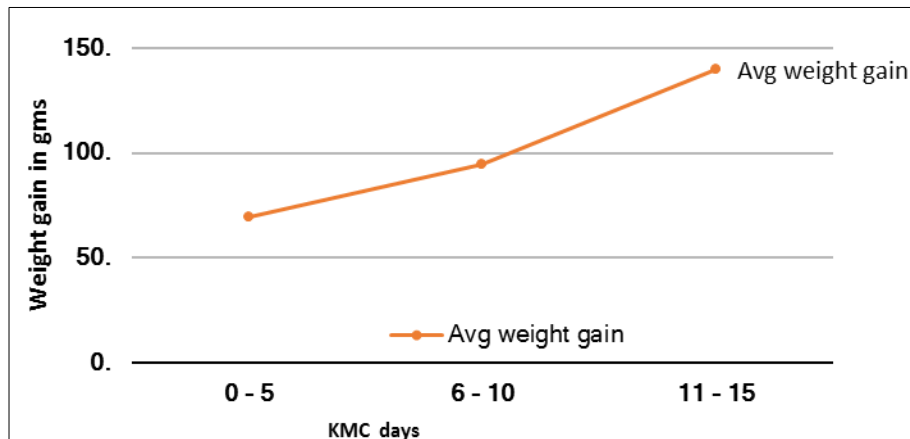
The data was compared to find the significance in weight gain till the KMC advised. As per institute guidelines KMC is discontinued as infant achieved weight up to 2000 grams.

**Table 2:** Shows the Mean, difference in weight from baseline to termination of KMC, Std deviation, Std Error & *p* value on student t test.

	Paired differences					t	dt	Sig. (2-tailed)
	Mean difference	SD	SE of mean	95% confidence interval				
				Upper	Lower			
Difference between the weight at baseline & at the end of intervention	18.863	50.028	7.005	-32.933	-4.792	-2.693	50	0.004

The Infants showed significant difference in weight gain in Initial & final reading.  $P=0.00481$ . More number of hours of KMC better the weight gain.

Then data was analyzed to find average weight gain on each day of KMC.



**Graph 1:** Average Weight Gain as per days of KMC

The KMC hours per day were increased after few days. It was observed that infants who received KMC for more hours, had steep rise in the weight gain.

The number of hours of KMC was increased after an interval. As noted in the graph 1, there was more weight gain, when mothers were motivated to use KMC for longer period, there was steep rise of weight gain from day 6 to day 15 of 110.5 gm.

When analysed the duration of discharge after intervention 22 infants were discharged on 5<sup>th</sup> day, 21 infants on 8<sup>th</sup> day & 8 infants were discharged between 9-13 days after intervention. This may be due to KMC, maximum number of infants gained appropriate weight earlier.

**Discussion**

51 infants were included for the study; KMC was given for special neonatal care. While in KMC care preterm LBW infants are held skin to skin, similar to Kangaroo caring its baby, known to get physiological benefits such as maintenance of O<sub>2</sub> saturation, maintaining heart rate, early weight gain, enhanced mother infant bonding etc. This study was done to analyze weight gain in LBW infants. Also observed duration of Hospitalization.

It was observed that a greater number of hours infant received KMC, better was the weight gain. The similar results were observed in the study done by Ramanathan K. *et al.* that better weight gain in LBW infants at the termination of the study [6]. Literature evidence suggest ideal weight gain of 10-30 grams/day in LBW infants. In this study many infants gain, approximately 20-50 grams in 5 days. In another study by Suman Rao *et al.* also observed that the KMC babies had better average weight gain per day [7]. The study in intermittent use of KMC observed that the average daily weight gain was significantly higher (22.09 vs. 10.39 g,  $p < .001$ ) than controls [8]. Later the effect was

analyzed by studying correlation in number of days of KMC & weight gain during each day in LBW Infants. In the study, initially mothers were anxious in spite of counseling. But were comfortable after few days of experience in KMC so became more compliant in using KMC for a greater number of hours. So this may have led to increased weight. In KMC the infants had got the easy access for breastfeeding, which may have resulted in weight gain. In a study on “Effect of intermittent kangaroo mother care on weight gain of low-birth-weight neonates with delayed weight gain”, KMC with additional opportunities to breastfeed was found to be an effective intervention for LBWs with delayed weight gain and should be considered to be an effective strategy [8].

The mothers also reported confidence & feeling of responsibility towards infant. In the A prospective Observational Study by Subedi & others on benefits of Kangaroo Mother Care for Low Birth Weight Babies, they concluded that this technique is low cost, promotes exclusive Breast feeding practice and increases mothers confidence in handling small babies and builds good mother and infant bonding, more beneficial for SGA (Small for Gestational Age) babies [9]. In the article & Review on KMC, Shrivastava *et al.* on Utility of kangaroo mother care in preterm and low birth weight infants have recommended Preterm and low birth weight infants should be regarded as extero-gestational fetuses who need skin-to-skin contact and KMC may be used as an intervention to promote maturation. Intranatal and postnatal care in all settings should adhere to a paradigm of non-separation of infants and their mothers, and families [5].

In the meta-analysis by Dr Thukral *et al.* Kangaroo Mother Care an alternative to conventional care; they have recommended 14 hour/day KMC for LBW, but due to care giving schedules & intervention schedule by the team

members, willingness of mother, social problems etc. KMC could not be continued for longer time<sup>[3]</sup>. In our study, the infants who received KMC more than 8 hours, had shown more average weight gain per day. More the number of KMC hours, infant is cared in safer environment. The similar observation was stated, in their article by Dr. Shrivastava *et al.* that KMC is effective in reducing the adverse outcomes in preterm infants, including mortality and nosocomial infection on hospital discharge and severe infection or sepsis at the most up-to-date follow-up. In their RCT, it was found that infants receiving KMC showed improved growth, higher daily weight gain, better physiological stability, improved sleep pattern etc.<sup>[5]</sup> The study conducted at Iran on preterm low birth infants admitted in NICU, when neonates were given KMC for half an hour after each feed showed increased weight gain, so study recommended KMC as necessary intervention to be given in NICU<sup>[10]</sup>. Operational guidelines proposed by National health committee of India have also recommended minimum KMC duration as 4 hours per day & maximum as 12 hours per day for benefits as early weight gain, exclusive breast feeding & for family involvement in care. They have recommended that in our country newborn infants weighing less than 2000 grams should be started on KMC on priority in view of the high burden of LBW infants. It is added in recommendation that KMC is associated with reduced incidence of severe illness including pneumonia during infancy<sup>[11]</sup>.

When observed for number of days of hospitalization after receiving KMC in LBW infants, the infants in this study were discharged with more stable conditions & had achieved full breast feeding. In a meta-analysis, Preterm and low birth-weight infants receiving kangaroo mother care intervention-initiated breastfeeding in 2 days 14 h 24 min earlier than conventional care of radiant warmer/incubator method<sup>[12]</sup>. In another study conducted at Malawi, it was observed that early discharge in resource poor settings with KMC has resulted in good follow-up & improved health in LBW infants<sup>[13]</sup>.

Infants were discharged 5 days after KMC, i.e. after their clinical status was stable, which as per the hospital record 2-3 days earlier. This goes in favor with the various randomized controlled studies conducted by Suman RP *et al.*, at the end of trial, KMC managed babies had better weight gain, earlier hospital discharge and more impressively, higher exclusive breast-feeding rates<sup>[7]</sup>. In the present study, control group was not included, so the results could not be compared. A future study with large sample size and comparative study between KMC and Conventional Method of Care of LBW infants, is necessary to observe more reliable effect on weight gain & duration of Hospital Stay.

The mothers in study also shown interest in continuing KMC at home, it was allowed after the proper counseling, as the timely follow-up is important for better outcomes. In some of the countries early discharge with KMC is recommended. The benefits of KMC for early discharges also supported in a review alerting that the early discharge policy is dependent upon a systematic, operational outpatient follow-up program. In such cases they recommend, the program coordinator to devise appropriate measures to ensure survival and safety of the LBW infant in KMC<sup>[14]</sup>.

In this study most of the mothers were comfortable using KMC after hands on training. In another study on analyzing the attitudes of mothers to continue KMC, the mothers needed counseling on KMC. Once initiated mothers continued practicing KMC even at with their infants as they realized the benefit of gaining optimal weight. The KMC practice was not affected by perceived community attitudes<sup>[15]</sup>.

### Conclusion

The study was conducted on 51 LBW infants. Most of the mothers reported the feeling of confidence & self-worth after using KMC. One of the twins participated in the study grandmother took equally responsible role in providing KMC. Thus, the effective counseling can be motivating to families. KMC gives postnatal care with non-separation of infants and their mothers, and families. Thus KMC has enhanced the weight gain & facilitated early discharge. Also the mothers in this study reported to acquire a better sense of parenting in mothers with regard to their babies' needs.

### Acknowledgement

We hereby Thank Dr Suleman Merchant, Ex Dean, L.T.M.M.C & G.Hospital, Sion, Mumbai for permitting us to conduct the study. We would like to extend our gratitude towards Dr Jayashree Mondkar, Ex Head Of the Department & professor in neonatology, LT M M College & G. Hospital, Sion, Mumbai for her valuable guidance. We also thank Dr Rashmi Yeradkar, Incharge & Associate professor Occupational Therapy Department, LTMCM & G.H, Sion, Mumbai for her constant support. Last but not the least we thank all the participants in our study.

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