e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(2); 2057-2062

Original Research Article

Kangaroo Mother Care and its Effect on Weight Gain in Preterm Babies

Suraboina Satish Kumar[1], Jyothirmai Mallela[2], Aparna Shukla Das[3]

[1]Assistant Professor, Department of Paediatrics, Rajalakshmi medical college and hospital, Pennalur, Tamilnadu, India

[2]Assistant Professor, Department of Paediatrics, Rajalakshmi medical college and hospital, Pennalur, Tamilnadu, India

[3]Assistant Professor, Department of Paediatrics, Rajalakshmi medical college and hospital, Pennalur, Tamilnadu, India

Received: 24-12-2025 / Revised: 23-01-2026 / Accepted: 25-02-2026

Corresponding Author: Dr. Aparna Shukla Das

Conflict of interest: Nil

Abstract:

Background: Preterm babies are at increased risk of poor weight gain, hypothermia, feeding difficulty and prolonged hospital stay. Kangaroo Mother Care (KMC) is a simple and low-cost intervention involving skin-to-skin contact and breastfeeding support, which may improve growth and clinical outcomes in preterm infants.

Aim: To assess the effect of Kangaroo Mother Care on weight gain in preterm babies.

Materials and Methods: This hospital-based prospective comparative study was conducted among 80 preterm babies admitted to a neonatal care unit, with 40 babies in the KMC group and 40 babies in the control group. Hemodynamically stable preterm babies with birth weight less than 2500 grams were included. Babies in the KMC group received skin-to-skin care along with routine neonatal care, while the control group received conventional care. Daily weight gain, feeding pattern, hypothermia episodes and duration of hospital stay were recorded and compared between the groups.

Results: The mean average weight gain was significantly higher in the KMC group compared to the control group, 24.85 ± 5.42 g/day versus 16.72 ± 4.96 g/day, respectively. Average weight gain in g/kg/day was also higher in the KMC group, 13.92 ± 2.84 compared to 9.48 ± 2.51 in the control group. Babies receiving KMC had better breastfeeding rates, fewer hypothermia episodes and shorter hospital stay. Longer duration of KMC was associated with greater weight gain.

Conclusion: Kangaroo Mother Care is an effective, safe and low-cost intervention for improving weight gain and clinical outcomes in preterm babies.

Keywords: Kangaroo Mother Care, Preterm Babies, Weight Gain, Low Birth Weight, Breastfeeding, Hypothermia.

DOI: 10.25258/ijcpr.18.2.340

Introduction

Preterm birth is one of the major contributors to neonatal morbidity and mortality worldwide, particularly in low- and middle-income countries where access to advanced neonatal intensive care may be limited. Preterm babies are physiologically immature and are more prone to hypothermia, feeding difficulty, sepsis, poor weight gain and prolonged hospital stay. Adequate postnatal growth, especially steady weight gain, is an important indicator of neonatal recovery and survival in preterm infants. Therefore, simple, low-cost and effective interventions that improve thermoregulation, breastfeeding and growth are essential in the care of preterm babies [1,2].

Kangaroo Mother Care (KMC) is a newborn care method that involves early, continuous and prolonged skin-to-skin contact between the mother or caregiver and the baby, along with exclusive or nearly exclusive breastfeeding and early discharge with appropriate follow-up. KMC provides warmth, improves physiological stability, promotes breastfeeding, strengthens maternal–infant bonding and reduces the risk of infection. The World Health Organization recommends KMC as routine care for preterm or low-birth-weight newborns, preferably initiated as early as possible and continued for as many hours per day as feasible [3].

Several studies have shown that KMC has a beneficial effect on growth outcomes among preterm and low-birth-weight babies. Ramanathan et al. reported that very low birth weight infants receiving KMC had better weight gain after the first week of life compared with babies receiving conventional care [4]. A systematic review by

Charpak et al. also suggested that KMC has a positive effect on growth, including weight gain, particularly when provided for longer duration [5]. Recent evidence further supports that KMC improves daily weight gain and breastfeeding outcomes in preterm and low-birth-weight infants [6]. The improvement in weight gain may be explained by better thermal control, reduced energy expenditure, improved sleep, early and frequent breastfeeding, and decreased episodes of infection.

Thus, Kangaroo Mother Care is an effective, affordable and family-centred intervention for improving the clinical outcome of preterm babies. Since weight gain is one of the most important markers of neonatal growth and readiness for discharge, studying the effect of KMC on weight gain in preterm babies is important for strengthening neonatal care practices, especially in resource-limited settings.

Materials and Method

The present study was conducted as a hospital-based prospective comparative study to assess the effect of Kangaroo Mother Care on weight gain in preterm babies, carried out in the Neonatal Intensive Care Unit/Special Newborn Care Unit and postnatal ward of a tertiary care hospital, over a period of 6 months after obtaining approval from the Institutional Ethics Committee.

The study population included preterm neonates admitted to the neonatal care unit who fulfilled the inclusion criteria. Preterm babies receiving Kangaroo Mother Care were considered as the KMC group, while preterm babies receiving conventional care as per routine hospital protocol was considered as the control group.

Inclusion Criteria

1. Preterm babies born before 37 completed weeks of gestation.
2. Birth weight less than 2500 grams.
3. Hemodynamically stable neonates.
4. Babies able to tolerate enteral feeds.
5. Mothers willing to provide Kangaroo Mother Care and give informed consent.

Exclusion Criteria

1. Critically ill neonates requiring ventilator support.
2. Babies with major congenital anomalies.
3. Neonates with severe birth asphyxia.
4. Neonates with sepsis or serious medical illness at enrolment.
5. Mothers unwilling or unable to provide Kangaroo Mother Care.

Sample Size Calculation

The sample size was calculated based on the study by Rehman et al., in which the mean weight gain was 10.22 ± 1.65 g/kg/day in the Kangaroo Mother Care group and 7.87 ± 1.71 g/kg/day in the conventional care group [7].

The formula used for comparison of two means was:

$$n = \frac{(Z_{\frac{\alpha}{2}} + Z_{\beta})^2 \ (SD_1^2 + SD_2^2)}{(\text{Mean Difference})^2}$$

Thus, the minimum sample size required is approximately 9 babies in each group. However, to improve the validity and reliability of the study and considering possible dropouts, the sample size was increased. Therefore, the final sample size was taken as 40 preterm babies in each group.

Total sample size = 80 preterm babies
KMC group = 40 babies
Control group = 40 babies

Sampling Method: Eligible preterm babies were selected by purposive sampling method until the required sample size is achieved.

Study Groups: The study participants will be divided into two groups:

- **Group A: (Kangaroo Mother Care group)** Preterm babies receiving Kangaroo Mother Care along with routine neonatal care.
- **Group B: (Control group)** Preterm babies receiving conventional neonatal care as per hospital protocol.

Kangaroo Mother Care Procedure: In the KMC group, the baby were placed in an upright position on the mother's bare chest, between the breasts, with skin-to-skin contact. The baby were covered with a cap, socks and warm cloth to prevent heat loss. Mothers were encouraged to provide KMC for the maximum possible duration per day, preferably for at least 6 hours daily in intermittent sessions. Breastfeeding or expressed breast milk feeding was encouraged during the KMC period.

Data Collection: Data were collected using a predesigned and pretested proforma. The following information will be recorded:

1. Maternal details: age, parity, mode of delivery and antenatal history.
2. Neonatal details: sex, gestational age, birth weight, admission weight and clinical condition.
3. Feeding details: breastfeeding, expressed breast milk or other feeding method.
4. Duration of Kangaroo Mother Care per day.
5. Daily weight of the baby.
6. Weight gain during the study period.
7. Duration of hospital stay.

Measurement of Weight: The weight of each baby was measured using a calibrated electronic weighing scale. Weight was recorded daily at the same time,

preferably before feeding, with minimum clothing. Weight gain was calculated in grams per day and grams/kg/day.

Ethical Consideration: Approval was obtained from the Institutional Ethics Committee before starting the study. Written informed consent were obtained from the mothers or guardians of each baby. Confidentiality of the collected data were maintained. Kangaroo Mother Care were provided only after ensuring the clinical stability of the baby.

Statistical Analysis: Data were entered in Microsoft Excel and analysed using appropriate statistical software. Continuous variables such as gestational age, birth weight and daily weight gain were expressed as mean and standard deviation. Categorical variables such as sex and mode of delivery were expressed as frequency and percentage. The mean weight gain between the KMC group and control group were compared using an unpaired t-test. A p-value of less than 0.05 was considered statistically significant.

Observation and Results

Table 1: Distribution of Socio-demographic profile according to study groups.

Parameter	Group		Total
	KMC, n(%)	Control, n(%)	
Gender			
Male	22 (55.0%)	21 (52.5%)	43 (53.8%)
Female	18 (45.0%)	19 (47.5%)	37 (46.2%)
Gestational age			
28–31 weeks	6 (15.0%)	7 (17.5%)	13 (16.3%)
32–34 weeks	18 (45.0%)	17 (42.5%)	35 (43.7%)
35–36 weeks	16 (40.0%)	16 (40.0%)	32 (40.0%)
Birth weight category			
<1500 grams	8 (20.0%)	9 (22.5%)	17 (21.3%)
1500–1999 grams	22 (55.0%)	21 (52.5%)	43 (53.7%)
2000–2499 grams	10 (25.0%)	10 (25.0%)	20 (25.0%)

Table 2: Baseline Characteristics of Study Participants

Baseline variable	Groups (Mean ± SD)		t-test	p-value
	KMC, n(%)	Control, n(%)		
Gestational age, weeks	33.82 ± 1.64	33.65 ± 1.71	0.454	0.651
Birth weight, grams	1785.50 ± 265.40	1762.75 ± 278.65	0.374	0.71
Admission weight, grams	1718.25 ± 252.36	1704.50 ± 261.18	0.239	0.812

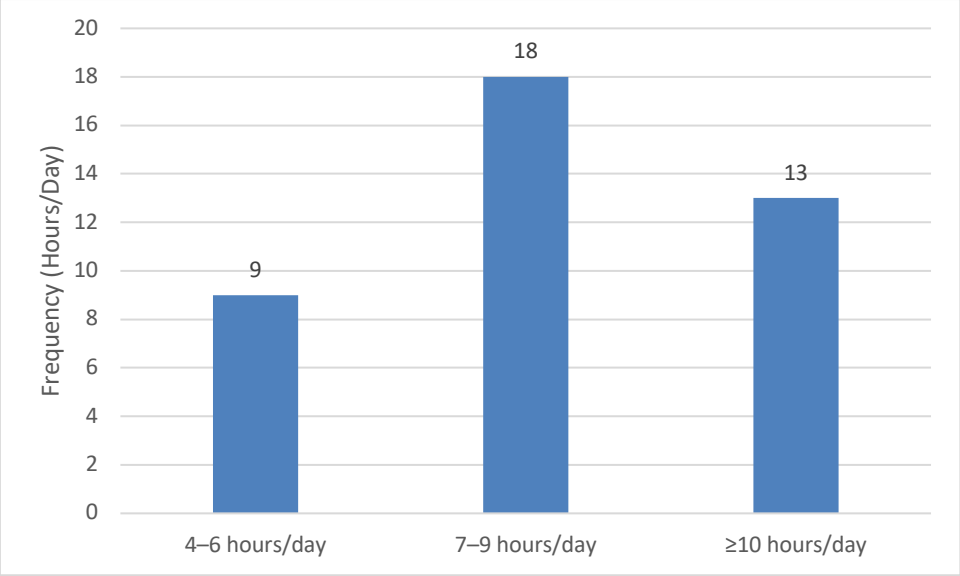

Figure 1: Duration of Kangaroo Mother Care Per Day in KMC Group

Table 3: Comparison of Weight Gain Between KMC and Control Group

Weight gain parameter	Groups (Mean ± SD)		t-test	p-value
	KMC, n(%)	Control, n(%)		
Average weight gain, g/day	24.85 ± 5.42	16.72 ± 4.96	6.99	<0.001
Average weight gain, g/kg/day	13.92 ± 2.84	9.48 ± 2.51	7.409	<0.001
Weight gain after 7 days, grams	173.95 ± 37.94	117.04 ± 34.72	6.99	<0.001

Table 4: Comparison of Feeding Pattern Between KMC and Control Group

Feeding pattern	Group		Chi-square	p-value
	KMC, n(%)	Control, n(%)		
Exclusive breastfeeding / expressed breast milk	32 (80.0%)	24 (60.0%)	3.81	0.051
Mixed feeding	8 (20.0%)	16 (40.0%)		

Table 5: Comparison of Hypothermia Episodes Between Study Groups

Hypothermia episode	Group		Chi-square	p-value
	KMC, n(%)	Control, n(%)		
Present	4 (10.0%)	12 (30.0%)	5	0.025
Absent	36 (90.0%)	28 (70.0%)		

Table 6: Comparison of Duration of Hospital Stay

Duration of hospital stay, days	Groups (Mean ± SD)		t-test	p-value
	KMC, n(%)	Control, n(%)		
(Mean ± SD)	10.25 ± 2.86	13.40 ± 3.18	4.658	<0.001

Table 7: Association Between Duration of KMC and Average Weight Gain

Duration of KMC per day	Number of babies	Average weight gain Mean ± SD, g/day
4–6 hours/day	9	20.84 ± 4.16
7–9 hours/day	18	24.63 ± 4.72
≥10 hours/day	13	28.15 ± 5.08
Total	40	24.85 ± 5.42

Discussion

Kangaroo Mother Care (KMC) is a simple, low-cost and evidence-based method of care for preterm and low-birth-weight babies. It mainly includes prolonged skin-to-skin contact between mother and baby, promotion of exclusive breastfeeding and early discharge with proper follow-up. In the present study, a total of 80 preterm babies were included, with 40 babies in the KMC group and 40 babies in the control group. The baseline characteristics such as gestational age, birth weight and admission weight were comparable between both groups, indicating that the two groups were similar at the beginning of the study. Therefore, the difference observed in weight gain and other outcomes can be reasonably attributed to the effect of Kangaroo Mother Care.

In the present study, male babies were slightly more common than female babies in both groups. In the KMC group, 55.0% were males and 45.0% were females, while in the control group, 52.5% were males and 47.5% were females. The sex distribution was statistically not significant, showing that both groups were comparable with respect to gender. Similar comparable baseline distribution was also reported by Suman et al. in their randomized controlled trial conducted in Western India, where 206 low-birth-weight babies were randomized into KMC and conventional care groups [8].

In the present study, most babies belonged to the gestational age group of 32–34 weeks, followed by 35–36 weeks. The mean gestational age was 33.82 ± 1.64 weeks in the KMC group and 33.65 ± 1.71 weeks in the control group, and the difference was not statistically significant. Birth weight was also similar between the two groups, with mean birth weight of 1785.50 ± 265.40 g in the KMC group and 1762.75 ± 278.65 g in the control group. These findings suggest that the study groups were well matched at baseline. Suman et al. also included low-birth-weight babies weighing less than 2000 g and compared KMC with conventional care in a Level III NICU setting [8].

The most important finding of the present study was that babies in the KMC group had significantly better weight gain compared to the control group. The mean average weight gain was 24.85 ± 5.42 g/day in the KMC group, whereas it was 16.72 ± 4.96 g/day in the control group. The difference was statistically significant with $t = 6.99$ and $p < 0.001$. Similarly, average weight gain in g/kg/day was also significantly higher in the KMC group, 13.92 ± 2.84 g/kg/day, compared to 9.48 ± 2.51 g/kg/day in the control group. Weight gain after 7 days was also

higher in the KMC group, 173.95 ± 37.94 g, compared to 117.04 ± 34.72 g in the control group. These findings clearly indicate that KMC has a positive effect on weight gain in preterm babies.

The findings of the present study are comparable with the Indian randomized controlled trial by Suman et al., who reported significantly better average daily weight gain in the KMC group compared to the conventional care group. In their study, KMC babies had an average daily weight gain of 23.99 g compared to 15.58 g in the conventional care group, with $p < 0.0001$ [8]. This is very similar to the present study, where the KMC group gained 24.85 g/day compared to 16.72 g/day in the control group. Suman et al. also reported better head circumference and length gain in the KMC group, supporting the beneficial effect of KMC on overall growth [8].

Ramanathan et al., in an Indian study on very low birth weight infants, also reported that babies receiving KMC showed better weight gain after the first week of life compared with babies receiving conventional care [4]. This supports the findings of the present study, where the 7-day weight gain was significantly higher in the KMC group. The better growth observed with KMC may be due to improved thermal regulation, reduced energy expenditure, better sleep, early initiation and continuation of breastfeeding, and improved mother–infant bonding.

In the present study, exclusive breastfeeding or expressed breast milk feeding was higher in the KMC group, 80.0%, compared to 60.0% in the control group. Although the p-value was borderline significant, this finding suggests that KMC promotes breastfeeding practices. This is consistent with the study by Suman et al., where exclusive breastfeeding was significantly higher among KMC babies compared to conventional care babies, 98% versus 76% [8]. KMC encourages close maternal contact and frequent feeding opportunities, which may improve breast milk production and feeding success. The Government of India operational guidelines also emphasize that KMC includes prolonged skin-to-skin contact along with exclusive and frequent breastfeeding [9].

The present study also showed that hypothermia episodes were significantly lower in the KMC group, 10.0%, compared to 30.0% in the control group, with chi-square value of 5.0 and $p = 0.025$. This indicates that KMC is effective in maintaining thermal stability among preterm babies. Kadam et al., in their Mumbai-based Indian study, also reported a significant reduction in hypothermia in the KMC group compared to the conventional care group [10]. Similarly, Suman et al. observed that a significantly higher number of babies in the conventional care group suffered from hypothermia, hypoglycaemia and sepsis [8]. These findings support the role of KMC as a natural method of thermoregulation in low-birth-weight and preterm infants.

The duration of hospital stay was significantly shorter in the KMC group in the present study. The mean hospital stay was 10.25 ± 2.86 days in the KMC group compared to 13.40 ± 3.18 days in the control group, with $p < 0.001$. This suggests that KMC may help in earlier stabilization and discharge of preterm babies. Gupta et al., in a Western Rajasthan study, reported a mean duration of hospital stay of 15.5 ± 11.3 days among low-birth-weight babies receiving KMC [11]. Although the exact duration varies depending on neonatal unit policies, birth weight and clinical condition of babies, the overall evidence suggests that KMC supports clinical stability and may reduce hospital stay.

Another important finding in the present study was the positive association between duration of KMC and average daily weight gain. Babies who received KMC for 4–6 hours/day had mean weight gain of 20.84 ± 4.16 g/day, those who received KMC for 7–9 hours/day had mean weight gain of 24.63 ± 4.72 g/day, and those who received KMC for ≥10 hours/day had the highest mean weight gain of 28.15 ± 5.08 g/day. This shows a dose-response relationship between duration of KMC and weight gain. A prospective Indian study evaluating the correlation between duration of KMC and weight gain in low-birth-weight babies also supports the observation that longer duration of KMC is associated with improved weight gain [12].

The beneficial effect of KMC can be explained physiologically. Skin-to-skin contact helps maintain body temperature and reduces cold stress. As a result, the baby spends less energy on thermoregulation and more energy is available for growth. KMC also improves breastfeeding frequency, strengthens maternal confidence, reduces neonatal stress and promotes physiological stability. The Government of India guidelines describe KMC as a low-resource, evidence-based, high-impact intervention for low-birth-weight infants, which promotes breastfeeding, prevents infection and morbidities, stabilizes body temperature and supports early discharge [9].

Conclusion

The present study concluded that Kangaroo Mother Care is an effective intervention for improving weight gain in preterm babies. Babies who received KMC showed significantly higher average daily weight gain compared to those receiving conventional care. KMC was also associated with better breastfeeding practices, fewer episodes of hypothermia and shorter duration of hospital stay.

Longer duration of KMC was further associated with greater weight gain. Thus, Kangaroo Mother Care should be encouraged as a simple, safe, low-cost and practical method for improving growth and clinical outcomes among preterm babies.

Funding: None

References

1. World Health Organization. Preterm birth [Internet]. Geneva: World Health Organization; 2023 [cited 2026 May 28]. Available from: https://www.who.int/news-room/fact-sheets/detail/preterm-birth
2. Sivanandan S, Sankar MJ. Kangaroo mother care for preterm or low birth weight infants. BMJ Glob Health. 2023;8(6):e010728. doi:10.1136/bmjgh-2022-010728.
3. World Health Organization. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants [Internet]. Geneva: WHO; 2023 [cited 2026 May 28]. Available from: https://www.who.int/tools/elena/interventions/kangaroo-care-infants
4. Ramanathan K, Paul VK, Deorari AK, Taneja U, George G. Kangaroo Mother Care in very low birth weight infants. Indian J Pediatr. 2001;68(11):1019-1023. doi:10.1007/BF02722345.
5. Charpak N, Tessier R, Ruiz JG, et al. Systematic review and meta-analysis suggest that the duration of Kangaroo Mother Care has a direct impact on neonatal growth. Acta Paediatr. 2021;110(1):45-59. doi:10.1111/apa.15489.
6. Bueno-Pérez I, Sánchez-García JC, Montoro-García S, et al. Impact of the Kangaroo Mother Care method on weight gain in premature newborns: a systematic review. Healthcare. 2025;13(8):916. doi:10.3390/healthcare13080916.
7. Rehman MOU, Hayat S, Gul R, Waheed KAI, Victor G, Khan MQ. Impact of intermittent kangaroo mother care on weight gain of neonate in NICU: randomized control trial. J Pak Med Assoc. 2020;70(6):973-977. doi:10.5455/JPMA.45123.
8. Suman RP, Udani R, Nanavati R. Kangaroo mother care for low birth weight infants: a randomized controlled trial. Indian Pediatr. 2008;45(1):17-23.
9. Ministry of Health and Family Welfare, Government of India. Kangaroo Mother Care and optimal feeding of low birth weight infants: operational guidelines. New Delhi: Child Health Division, Ministry of Health and Family Welfare; 2014.
10. Kadam S, Binoy S, Kanbur W, Mondkar JA, Fernandez A. Feasibility of kangaroo mother care in Mumbai. Indian J Pediatr. 2005;72(1):35-38. doi:10.1007/BF02760578.
11. Gupta M, Jora R, Bhatia R. Kangaroo Mother Care in low birth weight infants: a Western Rajasthan experience. Indian J Pediatr. 2007;74(8):747-749. doi:10.1007/s12098-007-0131-x.
12. Gagandeep, R C, K F. A prospective clinical study to evaluate the correlation of duration of kangaroo mother care and weight gain in low birth weight babies. Int J Contemp Pediatr. 2019;6(5):1943-1946. doi:10.18203/2349-3291.ijcp20193690.