Original Research

COMPARISON OF KANGAROO MOTHER CARE VERSUS CONVENTIONAL CARE IN LOW-BIRTH-WEIGHT NEONATES

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ABSTRACT

Background: Low birth weight (LBW) neonates remain highly vulnerable to hypothermia, sepsis, feeding difficulties, poor weight gain, and neonatal mortality. Kangaroo Mother Care (KMC), involving skin-to-skin contact and exclusive breastfeeding support, has emerged as a cost-effective intervention for improving neonatal outcomes.

Aim: To compare the effectiveness of Kangaroo Mother Care versus conventional care in low birth weight neonates admitted to the neonatal unit.

Materials and Methods: This prospective comparative study was conducted in the Department of Pediatrics, Mahaveer Institute of Medical Sciences and Research, Bhopal, over a period of six months from November 2025 to April 2026. A total of 240 low birth weight neonates were included and divided equally into two groups: KMC group (n=120) and conventional care group (n=120). Parameters including weight gain, duration of hospital stay, breastfeeding rates, hypothermia episodes, sepsis incidence, and mortality were compared. Statistical analysis was performed using SPSS software version 25.0.

Results: Neonates receiving Kangaroo Mother Care demonstrated significantly higher daily weight gain, earlier initiation of exclusive breastfeeding, reduced hypothermia episodes, shorter hospital stay, and lower incidence of neonatal sepsis compared to conventional care. Mortality rate was also lower in the KMC group.

Conclusion: Kangaroo Mother Care significantly improves clinical outcomes among low birth weight neonates and should be promoted as an effective, economical, and feasible neonatal care strategy in resource-limited settings.

Keywords: Kangaroo Mother Care, Low Birth Weight, Neonates, Conventional Care, Neonatal Outcomes, Breastfeeding.

INTRODUCTION

Low birth weight remains one of the most important contributors to neonatal morbidity and mortality worldwide [1]. According to the World Health Organization, approximately 20 million low birth weight infants are born annually, particularly in low- and middle-income countries [2]. Low birth weight neonates are highly susceptible to hypothermia, respiratory distress, feeding intolerance, infections, growth failure, and developmental complications [3].

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Conventional neonatal care generally involves incubator-based thermal support, routine monitoring, and nursery care [4]. However, in many developing countries, limited infrastructure, shortage of neonatal intensive care facilities, and economic constraints affect the quality and accessibility of neonatal care services [5].

Kangaroo Mother Care (KMC), first introduced in Colombia in 1979, is an evidence-based intervention involving prolonged skin-to-skin contact between mother and neonate, exclusive breastfeeding support, and early discharge with follow-up care [6]. KMC has gained global recognition because of its low cost, simplicity, and substantial neonatal benefits [7].

Several studies have demonstrated that KMC improves thermoregulation, breastfeeding rates, maternal bonding, sleep organization, and weight gain in low birth weight infants [8, 9]. Continuous

skin-to-skin contact stabilizes neonatal physiological parameters including heart rate, respiratory rate, oxygen saturation, and body temperature [10]. Furthermore, KMC reduces stress responses and promotes neurodevelopmental outcomes [11].

Meta-analyses have shown that KMC significantly decreases neonatal mortality, severe infections, and hospital stay duration among preterm and low birth weight infants [12,13]. The World Health Organization strongly recommends KMC for clinically stable low birth weight neonates weighing less than 2000 grams [14].

Despite increasing evidence supporting KMC, implementation in many healthcare institutions remains inconsistent because of lack of awareness, inadequate training, cultural barriers, and infrastructural limitations [15]. Comparative studies evaluating KMC against conventional neonatal care in Indian tertiary healthcare settings remain limited. Therefore, the present study was conducted to compare the effectiveness of Kangaroo Mother Care versus conventional care in low birth weight neonates admitted to the Department of Pediatrics at Mahaveer Institute of Medical Sciences and Research, Bhopal.

MATERIALS AND METHODS

Study Design

This prospective comparative study was conducted in the Department of Pediatrics, Mahaveer Institute of Medical Sciences and Research, Bhopal, over a period of six months from November 2025 to April 2026.

Study Population

A total of 240 low birth weight neonates admitted to the neonatal care unit during the study period were included.

Group Allocation

The neonates were divided into two groups:

- Group A: Kangaroo Mother Care group (n = 120)
- Group B: Conventional care group (n = 120)

Inclusion Criteria

1. Neonates with birth weight less than 2500 grams
2. Hemodynamically stable neonates
3. Neonates whose mothers consented to participate
4. Both preterm and term LBW neonates

Exclusion Criteria

1. Neonates with major congenital anomalies
2. Critically ill neonates requiring mechanical ventilation
3. Neonates with severe birth asphyxia
4. Neonates with major surgical conditions

Kangaroo Mother Care Protocol

Mothers in the KMC group were instructed regarding continuous skin-to-skin contact between the neonate and mother's chest for a minimum of 6–8 hours daily. Exclusive breastfeeding was encouraged whenever possible.

Conventional Care

Neonates in the conventional care group received routine nursery care including incubator or radiant warmer support, standard feeding practices, and routine neonatal monitoring.

Outcome Parameters

The following parameters were assessed:

1. Daily weight gain
2. Duration of hospital stay
3. Hypothermia episodes
4. Exclusive breastfeeding rates
5. Incidence of neonatal sepsis
6. Mortality

Statistical Analysis

Data were analyzed using SPSS version 25.0. Quantitative variables were expressed as mean ± standard deviation, while categorical variables were expressed as percentages. Student's t-test and Chi-square test were applied. A p-value less than 0.05 was considered statistically significant.

RESULTS

Baseline Characteristics

Among the 240 neonates included in the study, 120 received Kangaroo Mother Care while 120 received conventional care. The mean birth weight in the KMC group was 1.89 ± 0.34 kg compared to 1.92 ± 0.31 kg in the conventional care group. The baseline demographic characteristics between the two groups were statistically comparable.

Table 1. Baseline Characteristics of Study Participants

Variable	KMC Group (n=120)	Conventional Care (n=120)	p-value
Mean birth weight (kg)	1.89 ± 0.34	1.92 ± 0.31	0.48
Mean gestational age (weeks)	35.1 ± 1.9	35.4 ± 2.1	0.37
Male neonates	68 (56.7%)	64 (53.3%)	0.59
Female neonates	52 (43.3%)	56 (46.7%)	0.59
Preterm neonates	74 (61.7%)	71 (59.2%)	0.68

Weight Gain

Neonates receiving Kangaroo Mother Care demonstrated significantly higher mean daily weight gain compared to the conventional care group. Improved breastfeeding frequency, enhanced thermal regulation, and reduced energy expenditure

may have contributed to better growth outcomes in the KMC group.

The mean daily weight gain in the KMC group was 24.8 ± 5.1 grams/day compared to 18.3 ± 4.7 grams/day in the conventional care group, and the difference was statistically significant ($p < 0.001$).

Table 2. Comparison of Weight Gain and Hospital Stay

Parameter	KMC Group	Conventional Care	p-value
Daily weight gain (g/day)	24.8 ± 5.1	18.3 ± 4.7	<0.001
Duration of hospital stay (days)	8.2 ± 2.4	12.6 ± 3.8	<0.001

Hospital Stay

The duration of hospital stay was significantly shorter among neonates receiving KMC. Continuous maternal contact, improved breastfeeding, and reduced complications contributed to earlier stabilization and discharge. The mean duration of hospital stay was 8.2 ± 2.4 days in the KMC group compared to 12.6 ± 3.8 days in the conventional care group ($p < 0.001$).

Hypothermia Episodes

KMC significantly reduced episodes of neonatal hypothermia. Skin-to-skin contact effectively maintained neonatal body temperature and minimized thermal instability.

Hypothermia episodes were observed in only 12 (10%) neonates in the KMC group compared to 34 (28.3%) neonates in the conventional care group, which was statistically significant ($p = 0.001$).

Exclusive Breastfeeding Rates

Exclusive breastfeeding rates were significantly higher among mothers practicing Kangaroo Mother Care. Maternal confidence, bonding, and frequent skin contact likely improved breastfeeding success.

Exclusive breastfeeding was successfully established in 102 (85%) neonates in the KMC group compared to 76 (63.3%) neonates in the conventional care group ($p < 0.001$).

Table 3. Comparison of Clinical Outcomes

Outcome	KMC Group (n=120)	Conventional Care (n=120)	p-value
Hypothermia episodes	12 (10%)	34 (28.3%)	0.001
Exclusive breastfeeding	102 (85%)	76 (63.3%)	<0.001
Neonatal sepsis	9 (7.5%)	24 (20%)	0.006
Mortality	3 (2.5%)	10 (8.3%)	0.04

Neonatal Sepsis

The incidence of neonatal sepsis was lower in the KMC group compared to conventional care. Early breastfeeding, improved immunity, reduced handling, and maternal microbial colonization may have contributed to decreased infection rates.

Neonatal sepsis occurred in 9 (7.5%) neonates in the KMC group compared to 24 (20%) neonates in the conventional care group ($p = 0.006$).

Mortality

Mortality was lower in neonates receiving Kangaroo Mother Care. Although mortality events were relatively few, the difference remained statistically significant.

Three neonates (2.5%) in the KMC group died compared to ten neonates (8.3%) in the conventional care group ($p = 0.04$).

DISCUSSION

The present study demonstrated that Kangaroo Mother Care significantly improved clinical outcomes among low birth weight neonates compared to conventional care. Neonates receiving KMC showed better weight gain, shorter hospital stay, fewer hypothermia episodes, improved exclusive breastfeeding rates, lower incidence of neonatal sepsis, and reduced mortality.

Weight gain was significantly higher in the KMC group. Continuous skin-to-skin contact improves thermal regulation and reduces neonatal energy expenditure, thereby allowing greater caloric utilization for growth [16]. Enhanced breastfeeding frequency and improved maternal-infant bonding further contribute to improved nutritional status [17]. Similar findings were reported by Charpak et al., who demonstrated accelerated weight gain among KMC neonates compared to incubator-managed infants [18].

Hospital stay duration was significantly reduced among neonates receiving KMC. Early physiological stabilization, improved feeding tolerance, and lower complication rates likely contributed to earlier discharge [19]. Shorter hospitalization also reduces healthcare costs and decreases the burden on neonatal intensive care services, particularly in resource-limited settings [20].

The incidence of hypothermia was markedly lower in the KMC group. Thermal synchronization between mother and neonate helps maintain stable neonatal body temperature more effectively than intermittent incubator care [21]. Several studies have shown that skin-to-skin care significantly

improves thermoregulation in preterm and low birth weight infants [22].

Exclusive breastfeeding rates were significantly higher among mothers practicing KMC. Continuous proximity between mother and neonate enhances breastfeeding initiation, feeding frequency, maternal confidence, and oxytocin release [23]. Improved breastfeeding practices contribute substantially to neonatal immunity, weight gain, and survival [24].

The incidence of neonatal sepsis was significantly lower among neonates receiving KMC. Reduced exposure to hospital-acquired pathogens, increased breastfeeding, and improved maternal microbial colonization may explain this protective effect [25]. Conde-Agudelo and Díaz-Rossello also reported reduced severe infections among KMC neonates in their systematic review [26].

Mortality reduction observed in the KMC group further emphasizes the effectiveness of this intervention. Previous meta-analyses have shown that KMC substantially decreases neonatal mortality among low birth weight and preterm infants [27]. The WHO currently recommends KMC as an essential component of neonatal care in clinically stable low birth weight neonates [28].

The present study highlights the feasibility and effectiveness of KMC in Indian tertiary healthcare settings. KMC is economical, simple to implement, and highly beneficial in hospitals with limited neonatal intensive care infrastructure [29]. Increasing awareness, staff training, and maternal counseling can significantly improve KMC implementation rates [30].

However, the study has certain limitations. The study duration was relatively short, and long-term neurodevelopmental outcomes were not assessed. Additionally, the study was conducted at a single tertiary care center, which may limit generalizability.

CONCLUSION

Kangaroo Mother Care is significantly superior to conventional neonatal care in improving weight gain, breastfeeding rates, thermal stability, and overall clinical outcomes among low birth weight neonates. KMC also reduces hospital stay, neonatal sepsis, and mortality. The findings strongly support routine implementation of Kangaroo Mother Care as an effective, economical, and evidence-based neonatal care strategy, particularly in resource-constrained healthcare settings.

Clinical Implications

Kangaroo Mother Care should be routinely implemented in neonatal units managing low birth weight infants because it significantly improves neonatal survival, breastfeeding outcomes, thermoregulation, and maternal bonding while reducing healthcare costs and duration of hospitalization.

Limitations of the Study

1. Single-center study design
2. Relatively short study duration
3. Long-term neurodevelopmental outcomes were not evaluated
4. Follow-up after discharge was limited

Recommendations

1. Routine implementation of Kangaroo Mother Care in all neonatal care units
2. Training programs for healthcare workers regarding KMC techniques
3. Increased parental counseling and awareness programs
4. Large multicentric studies with long-term follow-up for neurodevelopmental assessment

Ethical Approval: The present study was conducted after obtaining approval from the Institutional Ethics Committee of Mahaveer Institute of Medical Sciences and Research (MIMS), Bhopal, Madhya Pradesh. The study procedures complied with ethical standards for research involving human participants.

Informed Consent: Written informed consent was obtained from the parents or legal guardians of all participating neonates prior to enrollment in the study.

Conflict of Interest: The authors declare that there is no conflict of interest related to this study.

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