



## CLINICAL AUDIT OF KANGAROO CARE PRACTICES IN A TERTIARY CARE NEONATAL UNIT

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**ABSTRACT**

**Background:** Kangaroo Mother Care (KMC) is a globally recognised, evidence-based intervention for reducing mortality and morbidity in preterm and low birth weight (LBW) infants. Despite clear guidelines, translating KMC protocols into continuous clinical practice within high-dependency tertiary care settings remains challenging. **Objectives:** To audit current KMC practices in a tertiary care neonatal unit against established standards, identify barriers to optimal KMC delivery, and evaluate the impact of KMC on short-term neonatal outcomes. **Methods:** A prospective clinical audit was conducted at the Setu Newborn Care Centre, Ahmedabad, involving 151 stable preterm and LBW neonates and their mothers. Data regarding the timing of KMC initiation, daily duration, frequency, and associated barriers were collected using structured observation checklists and maternal questionnaires. Findings were compared against WHO standards. **Results:** Of the 151 neonates included, the mean gestational age was 32+5 weeks+3 days, and the mean birth weight was 1530+170 grams. KMC was initiated at a median age of 5.4 + 1.1 days. The average duration of KMC provided per day was 4.7 + 0.5 hours. Audit results revealed that 92.72% of mother-infant dyads met the standard criteria for optimal KMC duration. The primary identified barriers to prolonged KMC included maternal fatigue, postpartum pain and other institutional factors. Neonates receiving KMC durations closer to the standard demonstrated better temperature regulation, weight gain, maternal-infant bonding and breastfeeding rates, along with reduced risk of nosocomial infection and shortened hospital stay. **Conclusion:** Regular clinical audits of KMC highlight critical gaps between standard guidelines and actual practice. Addressing specific unit-level barriers such as documentation of duration, sessions per day, vital monitoring charts during the sessions and implementing targeted quality improvement initiatives can significantly enhance KMC compliance, duration, and subsequent neonatal outcomes in tertiary care units.

**KEYWORDS :** Kangaroo Mother Care, Clinical Audit, Prematurity, Low Birth Weight, NICU, Quality Improvement.

**1. INTRODUCTION**

Preterm birth and low birth weight (LBW) remain the leading causes of neonatal mortality and morbidity worldwide, particularly in developing nations like India. The World Health Organisation (WHO) strongly advocates for Kangaroo Mother Care (KMC)—defined by continuous skin-to-skin contact and exclusive breastfeeding—as a primary intervention for preterm and LBW infants.<sup>(5)</sup> KMC has been unequivocally proven to promote physiological stability, enhance breastfeeding rates, prevent hypothermia, and reduce the risk of severe hospital-acquired infections.

Despite robust evidence supporting its efficacy, the widespread implementation of KMC in tertiary Neonatal Intensive Care Units (NICUs) often falls short of the recommended standards. In high-acuity environments, factors such as reliance on technology, lack of space, understaffing, and maternal apprehension frequently interrupt or delay the initiation and duration of skin-to-skin contact. The "know-do" gap—the disparity between clinical evidence and everyday practice—necessitates continuous monitoring.

A clinical audit is a systematic quality improvement process that seeks to improve patient care and outcomes by systematically reviewing care against explicit criteria and implementing change. This study was undertaken to conduct a comprehensive clinical audit of KMC practices at a tertiary newborn care centre in Ahmedabad. By measuring current practices against established guidelines, this audit aims to identify systemic and maternal barriers, thereby paving the way for targeted interventions to optimise KMC delivery.

**2. OBJECTIVES****Primary Objective:**

- To audit the current practices of Kangaroo Mother Care (including the time of initiation, frequency, and duration per session) in a tertiary care neonatal unit and compare them against standard recommended guidelines.

**Secondary Objectives:**

- To identify the maternal, institutional, and staff-related barriers hindering the effective implementation of KMC.
- To assess the short-term neonatal outcomes associated with KMC, such as weight gain velocity, temperature stability, and time to achieve full enteral feeding.

**3. METHODS****3.1 Study Design and Setting**

This was a prospective clinical audit conducted at the Setu Newborn Care Centre, a tertiary care neonatal unit in Ahmedabad, India. The study took place over a period of six months.

**3.2 Participants**

The audit included stable preterm neonates (gestational age < 37 weeks) and low birth weight infants (birth weight < 2500g) admitted to the NICU.

- Inclusion Criteria:** Hemodynamically stable low birth weight (LBW) neonates breathing spontaneously or requiring minimal non-invasive respiratory support (such as CPAP), whose mothers were available and willing to provide KMC.
- Exclusion Criteria:** Neonates with severe congenital anomalies, hemodynamic instability requiring inotropes, those on invasive mechanical ventilation, those whose mothers are either physically or mentally unable to give KMC and those refusing to give consent.

**3.3 Audit Standards**

The practice standards were defined based on the guidelines provided by the World Health Organisation (WHO). The target standard for the audit was to initiate KMC within 48-72 hours of clinical stabilisation and to maintain a duration of at least 4 hours per session and at least 2 sessions per day.

**3.4 Data Collection**

Data were collected using a structured, pre-tested proforma. The parameters recorded included:

1. **Baseline Demographics:** Gestational age, birth weight, gender, mode of delivery, and maternal age.
2. **KMC Practices:** Time of first KMC initiation, number of sessions per day, duration of each session, and total daily duration.
3. **Neonatal Outcomes:** Daily weight records, incidence of hypothermia, time to full enteral feeds, and length of hospital stay.
4. **Barriers to KMC:** Assessed via direct observation and a structured questionnaire administered to mothers and nursing staff to identify reasons for interruptions or reluctance to practice KMC.

### 3.5 Statistical Analysis

Data were entered into Microsoft Excel and analysed using EPI Info software CDC 7. Continuous variables were expressed as mean  $\pm$  standard deviation (SD) or median (interquartile range), while categorical variables were presented as frequencies and percentages. A p-value  $< 0.05$  was considered statistically significant when comparing neonatal outcomes with KMC duration.

## 4. RESULTS

### 4.1 Baseline Characteristics

A total of 151 neonates met the inclusion criteria and were included in the audit. The mean gestational age of the cohort was 32 $\pm$ 5 weeks, 3 days weeks, ranging from 32-34 weeks. The mean birth weight was 1530 $\pm$ 170 grams. Of the audited neonates, 79 (52.3%) were males.

### 4.2 KMC Initiation and Duration Practices

The audit revealed that KMC was initiated at a median age of 5.4  $\pm$  1.1 days of life.

- **Initiation:** 21.19% (n = 32) of the neonates received their first KMC session within the targeted first 72 hours of life.
- **Duration:** The average duration of KMC per session was 4.7  $\pm$  0.5 hours. The cumulative duration of KMC provided per day averaged 4-6 hours.
- **Compliance with Standards:** 92.72% of the mother-infant dyads met the institutional target of at least 4-6 hours of KMC per day, highlighting that most babies in our centre meet the recommended standards of practice. Most mothers had a late initiation of KMC, highlighting a significant gap between the recommended standards and current practices.

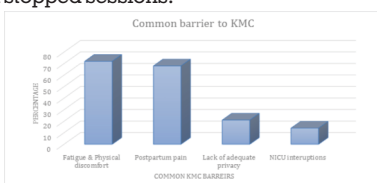
**Table 1: Summary of KMC Practices Based on Duration of KMC**

| Duration of KMC (hours/day) | Number | Percentages |
|-----------------------------|--------|-------------|
| < 4hours                    | 28     | 18.54       |
| 4-6 hours                   | 140    | 92.72       |
| >6 hours                    | 3      | 1.99        |

### 4.3 Identified Barriers to KMC

Analysis of the questionnaires and unit observations identified several recurring barriers to prolonged KMC:

1. **Maternal Factors:** The most common maternal barrier was fatigue and physical discomfort, reported by 72% of mothers. Postpartum pain (especially following cesarean sections) accounted for delayed initiation in 68% of cases.
2. **Institutional Factors:** Lack of adequate privacy in the NICU was cited by 11% of mothers. Furthermore, rigid NICU routines and scheduled interventions frequently interrupted KMC sessions.
3. **Infant Factors:** Interruption due to investigations, feeding schedules, or minor clinical deteriorations accounted for 14% of stopped sessions.



**Figure 1: Bar Chart Representing the Percentage Distribution of Barriers to KMC**

### 4.4 Neonatal Outcomes

The audit evaluated clinical outcomes in relation to KMC compliance. Neonates who received 4-6 hours of KMC per day demonstrated:

- **Temperature Stability:** A significantly lower incidence of hypothermic episodes compared to those receiving brief KMC sessions (2% vs. 14%, = [p-value=  $<0.05$ ]).
- **Weight Gain:** An average weight gain of 24 g/kg/day, which was superior to the 18 g/kg/day observed in the lower-duration group (p =  $<0.05$ ).
- **Feeding:** A reduction in the time required to achieve full enteral feeding by an average of 1.7 days.

**Table 2: Adverse Effects of KMC**

|                  | Number | Percentages |
|------------------|--------|-------------|
| Apnoea           | 18     | 11%         |
| Vomiting         | 17     | 11.2%       |
| Any dislodgement | 08     | 5%          |
| Brady cardia     | 02     | 1.3 %       |
| Fall             | 01     | 0.6%        |

## 5. DISCUSSION

The present clinical audit aimed to evaluate the real-world implementation of Kangaroo Mother Care in a high-volume tertiary neonatal unit. While the physiological and psychological benefits of KMC are extensively documented, our findings underscore the persistent operational challenges in translating these benefits into consistent clinical practice.

In our audit, the average daily duration of KMC was 4-6 hours. This aligns with findings from Tharashree et al. (2018), who noted that despite awareness, the actual duration of KMC in tertiary government hospitals often remains suboptimal without targeted quality improvement initiatives.<sup>[2]</sup> To bridge this gap, continuous auditing and feedback are required. Similarly, Ariff et al. (2021), in their retrospective review of a tertiary hospital in Pakistan, reported that infrastructural constraints and maternal health issues were primary barriers to prolonged KMC, which mirrors our finding that maternal fatigue and lack of privacy were significant deterrents.<sup>[1]</sup>

Our data demonstrated a positive correlation between optimal KMC duration and improved neonatal outcomes, particularly regarding temperature stability and weight gain. This is consistent with the findings of Heidarzadeh et al. (2013), who observed profound impacts of KMC on neonatal outcomes in the NICU setting.<sup>[4]</sup> Furthermore, the WHO Immediate KMC Study Group has emphasised the critical nature of early and continuous skin-to-skin contact to improve survival rates among LBW infants.<sup>[5]</sup>

The identification of barriers in this audit provides a clear roadmap for unit-level quality improvement. To increase KMC duration, tertiary units must transition toward family-centred care models. Simple interventions, such as providing comfortable reclining KMC chairs, utilising privacy screens, adjusting NICU visitation policies to allow continuous maternal presence, and counselling mothers on KMC post-delivery, can drastically improve compliance.

### Limitations of the Study

This audit was limited by its single-centre nature and small sample size, which may affect the generalizability of the findings. Additionally, the measurement of KMC duration relied partially on nursing documentation, which may be subject to reporting bias.

## 6. CONCLUSION

This clinical audit highlights that while KMC is widely accepted in tertiary neonatal care, there remains a notable gap between the recommended guidelines for KMC duration and actual clinical practice. Systemic and maternal barriers, primarily NICU environmental constraints and maternal

fatigue, significantly hinder optimal KMC delivery. However, even within these constraints, longer durations of KMC were associated with better neonatal outcomes, including improved temperature regulation and weight gain. Routine clinical audits, followed by targeted, family-centred quality improvement interventions—such as enhanced privacy, dedicated KMC support staff, and improved maternal seating—are essential to optimise KMC practices and maximise the survival and health of vulnerable neonates.

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