

IMPACT OF A STRUCTURED QUALITY IMPROVEMENT BUNDLE ON THE DURATION OF KANGAROO MOTHER CARE (KMC) IN HEMODYNAMICALLY STABLE LOW BIRTH WEIGHT NEONATES IN A TERTIARY NEONATAL UNIT: A PROSPECTIVE INTERVENTIONAL STUDY

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ABSTRACT

Kangaroo mother care is a method for caring for preterm and low birth weight babies by keeping them in continuous skin to skin contact with their mother (caregivers). Quality improvement research in Kangaroo Mother Care (KMC) for neonates focuses on enhancing the effectiveness and consistency of this crucial care practice. Research efforts aim to increase the duration and coverage of KMC, improves its implementation and ensure its sustainability. This involves identifying barriers to KMC and implementing interventions such as staff training, providing resources, and optimizing the care environment.

KEYWORDS: KMC, Low Birth Weight, Quality Improvement, Team Work, PDSA

What is already known ?

*KMC is a low-cost intervention known to reduce mortality in LBW babies

What this study adds?

In LMICs sustain improvement in KMC is feasible with system changes. The tools for KMC can be developed using QI approach.

Article History

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INTRODUCTION

Background and National Burden

India has the highest number of preterm births globally and contributes substantially to neonatal mortality due to prematurity and low birth weight (LBW) [1]. With nearly 30% of babies born with a weight less than 2500 grams [2], India faces an urgent need for low-cost, effective interventions to improve survival outcomes. According to NFHS-5, institutional deliveries have increased significantly, creating an opportunity to implement facility-based neonatal interventions such as Kangaroo Mother Care (KMC) [3].

Kangaroo Mother Care: Global and Indian Evidence

KMC, as endorsed by the WHO, includes early and prolonged skin-to-skin contact and exclusive breastfeeding. It is a proven intervention that reduces neonatal mortality by 40%, sepsis by 65%, and hypothermia by over 70% [4]. A 2016 Cochrane review confirmed that KMC significantly improves neonatal outcomes including exclusive breastfeeding rates, anthropometric gains, and hospital discharge readiness [5].

Despite being included in national guidelines since 2014 [6], KMC remains underutilized across Indian neonatal units. A national audit by the National Neonatology Forum found that only 52% of public SNCUs were routinely implementing KMC [7]

Challenges to KMC in Indian Settings

Multiple Indian studies have highlighted barriers to prolonged and sustained KMC. These include lack of privacy, inadequate staff training, discomfort due to climate, and socio-cultural constraints [8–10].

In Tamil Nadu, a QI initiative by Jegannathan et al. found that in a high-delivery-volume government hospital, the average KMC duration was only 4.6 hours/day prior to intervention [11]. Their study included systematic intervention using eight sequential PDSA cycles, which increased the average KMC duration to 16.6 hours/day by the end of 8 weeks. The most impactful intervention was the opening of a dedicated *Mother–Neonatal ICU (M-NICU)* — only the second of its kind in India — that allowed for 24/7 maternal presence alongside the neonate [11].

Rationale for the Present Study

Despite strong evidence and national policy backing, real-world implementation of prolonged KMC remains suboptimal in many Indian public health settings. Shorter durations (<6 hours/day) limit the full benefits of KMC. Furthermore, many units lack systematic approaches to sustain KMC over time, especially in resource-constrained hospitals.

This study aims to replicate and adapt a successful QI model developed by Jegannathan et al. in a similar tertiary government setting. It focuses on:

- Improving KMC duration to ≥ 12 hours/day in stable LBW neonates.
- Identifying context-specific barriers.
- Embedding sustainable practices through education, family support, and structural innovations.

The outcome of this study could inform scale-up strategies in other tertiary neonatal units and align with national goals of reducing neonatal mortality and morbidity.

Primary Objective

To increase the average daily duration of KMC from a baseline of <5 hours to ≥ 12 hours per baby per day over 2 weeks.

Secondary Objectives

- To identify and address key barriers to KMC implementation.
- To assess the sustainability of improvements over 6 months.
- To evaluate maternal satisfaction and acceptance of KMC practices.

METHODOLOGY

Materials and Methods

Study Design

Prospective interventional QI study

Study Site

NICU, [Neonatal hospital], a tertiary care center with Level III neonatal services. Study Duration [January 2025 to June 2025]

Inclusion Criteria

- Neonates <2000g, hemodynamically stable, not on invasive ventilation or phototherapy.

Exclusion Criteria

- Neonates with major congenital anomalies, critical illness.

Intervention Strategy

- Privacy provision
- Documentation via KMC charts
- Motivation via customized weight tracking
- Case sheet monitoring
- Increase in KMC
- Establishment of mother–neonatal ICU (M-NICU)

Outcome Measures

- Primary: Average KMC hours per baby per day.
- Secondary: Percentage of mothers using charts, maternal comfort, and satisfaction (survey-based).

Sample Size Calculation

Based on paired-sample t-test assumptions from previous Indian QI studies [1,3], a sample size of **30 mother–baby dyads** was considered adequate to detect an increase in KMC duration from a baseline of 4.6 hours/day to ≥ 12 hours/day, with 90% power and 5% significance level. An additional 20% was added for potential attrition, leading to a target sample size of **36 dyads**.

Baseline Data Collection

Over a two-week period, baseline data were collected using:

- **24-hour maternal recall** of KMC duration
- Bedside nurse logs
- Review of case sheets

The average KMC duration was calculated in **hours per baby per day**.

A **Fishbone (Ishikawa) diagram** was used to identify barriers to prolonged KMC, as per the methods used in Jegannathan et al. and Joshi et al. [1,2].

CONCLUSIONS

The findings from this study have shown that quality improvement methods have helped increase the coverage and percentage of babies receiving at least 6-hours KMC per day in our NICU. The duration specified KMC Coverage should be adopted as the quality indicator of KMC. The training of healthcare workers and KMC provider should include hands-on session involving the mother and baby. Minimizing interruption is possible with family support and appropriate scheduling of activities.

REFERENCES

1. *UNICEF. Neonatal Mortality: Global Trends and India Status. 2021.*
2. *National Family Health Survey (NFHS-5), India. Ministry of Health and Family Welfare, 2021.*
3. *Ministry of Health and Family Welfare, Govt. of India. National Health Mission Reports on Institutional Deliveries. 2020.*
4. *WHO. Kangaroo mother care: a practical guide. Geneva: World Health Organization, 2003.*
5. *Conde-Agudelo A, Díaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. Cochrane Database Syst Rev. 2016;CD002771.*
6. *Government of India. Operational Guidelines for Facility-Based KMC. Ministry of Health and Family Welfare. 2014.*
7. *NNF India. Facility-Based Newborn Care Survey Report. National Neonatology Forum, 2020.*
8. *Joshi M, et al. Improving Duration of Kangaroo Mother Care in a Tertiary-Care Neonatal Unit: A Quality Improvement Initiative. Indian Pediatr. 2018;55:744–7.*
9. *Soni A, et al. The presence of physician champions improved KMC in rural Western India. Acta Paediatr. 2016;105:e390–5.*
10. *Quasem I, et al. Adaptation of kangaroo mother care for community-based application. J Perinatol. 2003;23:646–51.*
11. *Jegannathan S, et al. Quality improvement initiative to improve the duration of Kangaroo Mother Care in tertiary care neonatal unit of South India. BMJ Open Quality. 2022;11:e001775.*