

# Outcomes of Kangaroo Mother Care in Preterm and Low Birth Weight Newborn Babies

Mehwish Asghar, Naseer Ahmed, Neelam Dileep, Asghar Ali Kerio, Laila Pirzado and Mubashir Hussain

*Department of Paeds Medicine, Peoples University of Medical and Health Sciences for Women, Nawabshah, Pakistan*

## ABSTRACT

The objective of this study was to determine the outcomes of Kangaroo Mother Care (KMC) in preterm and low birth weight newborn babies. This prospective observational study was conducted at the Department of Paeds Medicine, People's University of Medical and Health Sciences for Women, Nawabshah, Pakistan, from March to December 2022. A total of 106 neonates were included. KMC was initiated right after stabilising the baby. Outcome measures were length of hospital stay, mortality, and morbidities (hypothermia, hyperthermia, hypoglycaemia, and sepsis). The average weight at birth was  $2041.53 \pm 145.41$  grams. The mean gestational age at birth was  $37.42 \pm 29.02$  weeks. The mean KMC duration was  $13.91 \pm 1.37$  hours. The mean hospital stay was  $10.20 \pm 2.3$  days. Mortality was 4.7%. Hypothermia was found in 7 (6.6%) patients, hyperthermia was found in 12 (11.3%) patients, sepsis was found in 6 (5.7%) patients, and hypoglycaemia was found in 7 (6.6%) patients. The KMC method played an important role in reducing the duration of hospital stay and decreasing the mortality rate in infants with low birth weight.

**Key Words:** Kangaroo mother care, Preterm birth, Low birth weight, Newborns.

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Kangaroo mother care (KMC) is an effective way of reducing chances of mortality among infants related to low birth weight (LBW) and preterm birth by involving baby's skin-to-skin contact and exclusive feeding of breast milk. KMC initiated right after the infant's birth has shown promising results in terms of saving lives with an estimate of approximately 150,000 lives annually. Effectiveness of KMC by decreasing the rate of mortality by nearly 40% in newborns having a birth weight of  $>2.0$  kg. The WHO categorised KMC in four vital components: Immediate, continuous, and persistent skin-to-skin interaction between the neonate and mother, breastfeeding exclusively, reduced hospital stay, and frequent monitoring at the facility.<sup>1</sup>

Preterm births around the world are recorded 15 million each year, and the mortality rate associated with this complication is nearly one million infants annually.<sup>2</sup> The factors that often influence preterm births are placenta previa, poor diet, stress, insufficient prenatal care, oligohydramnios, maternal age above 40 or below 18 years, and poor nutrition.<sup>3</sup>

According to WHO guidelines, a baby would be declared as LBW if it weighs less than 2500 gm or 5.5 lb. In third-world countries, majority of LBW babies are born per year as a consequence of preterm birth.

It contributes to a surprisingly higher frequency of mortality among newborns with equal frequency and distribution to the poor class of the country.<sup>4</sup>

The availability of technology in healthcare set-ups, such as incubators, paves a path for yielding positive outcomes in neonates associated with a higher risk of morbidity and mortality. However, these technologies are not readily available in underdeveloped countries due to which mortality of neonates is recorded significantly high at 99%.<sup>4</sup>

KMC started after the stabilisation decreased the mortality rate in newborns with birth-weight  $<2500$ gm. However, in underdeveloped countries, the majority of deaths occur before stabilisation. The established evidence on the effectiveness and safety of immediate KMC after birth remains unclear. This study aimed to determine the outcome of KMC amongst neonate born preterm and with LBW in a tertiary care setting in Pakistan. The results of this study will help medical practitioners to determine goals and achieve expertise to minimise the risks related to newborn and mothers.

This observational study was conducted on 106 neonates at the Maternal and Child Healthcare Institute, Peoples University of Medical and Health Sciences for Women, Nawabshah, Pakistan, from March to December 2022 after taking approval from the hospital's ethical committee. The inclusion criteria encompassed preterm or LBW neonates, admitted to the institute during the study period, and those who received KMC intervention. Babies who were critically ill or needed ventilation support and those born with life-threatening abnormalities were excluded from the study. All the mothers were educated on the KMC method. The technique was initiated as early as the baby was stable. The mothers and the

Correspondence to: Dr. Mehwish Asghar, Department of Paeds Medicine, Peoples University of Medical and Health Sciences for Women, Nawabshah, Pakistan  
E-mail: [drmehwishasghar@outlook.com](mailto:drmehwishasghar@outlook.com)

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babies had skin-to-skin contact using a specially tailored cotton cloth to tie up the babies to their mothers. The mothers were advised to keep their babies in that position for at least 2 to 3 hours at a time during the day. The mothers were told to keep the babies close to them during the feeding time. The outcomes of this study were length of hospital stay, mortality, and morbidities such as hypothermia, hypoglycaemia, and sepsis. The babies were monitored for seven days and the outcomes were recorded on a pre-designed proforma on the 7<sup>th</sup> day. The sample size was determined as 13 with the help of OpenEpi calculator taking 95% of CI, 4% of absolute precision, and 4.6% of mortality from existing research. IBM SPSS version 24 was used for the analysis of data. Qualitative data were mentioned as frequencies and percentages, and quantitative data were mentioned as mean and standard deviation.

The average weight recorded at birth was 2041.53 ± 145.41 grams. The mean gestational age at birth was 37.42 ± 29.02 weeks. The mean hospital stay recorded was 10.20 ± 2.3 days. The mean KMC duration per day was 13.91 ± 1.37 hours as given in Table I. The mortality rate recorded was 4.7%. Median hospital stay was 10.20 ± 2.3 days. According to morbidities, hypothermia was found in 7 (6.6%) patients, hyperthermia was found in 12 (11.3%) patients, sepsis was found in 6 (5.7%) patients, and hypoglycaemia was found in 7 (6.6%) patients.

**Table I: Baseline characteristics.**

Baseline characteristics	Statistics
Gender	
Male	49 (46.2%)
Female	57 (53.8%)
Weight at birth (g)	2041.53 ± 145.41
Gestational age at birth (weeks)	37.42 ± 29.02
KMC duration	13.91 ± 1.37

KMC is a straightforward and low-cost strategy. It benefits both the infant and the mother, and it can be done anywhere without any particular equipment. Although this method was introduced for use in low-income nations with limited resources, it is now being used all over the world as caregivers, parents, and administrators become more aware of the physiological, psychological, and financial benefits of the practice.

The average time of KMC delivered in this trial was 13.19 hours per day. Because organisational policies prevent the guardians from being with the neonate in the NICU or postnatal wards, the shorter duration of skin-to-skin contact in the current study compared to other studies might be because of the promotion of the mother alone as the kangaroo care provider.<sup>5</sup>

The length of hospital stay in this study was 10.20 ± 2.3 days. A randomised control study conducted in Cuba reported shorter hospitalisation in the KMC group in contrast to control.<sup>5</sup>

The mortality rate in this study was 4.7%. A multicentre trial showed that in newborns with a birth weight between 1.0 and 1.799 kg, initiating uninterrupted kangaroo mother care instantly after birth enhanced neonatal survival by 25%. Their mortality rate was 4.6% in KMC group which is comparable to this study.<sup>5</sup>

In this study, 7 (6.6%) patients had hypoglycaemia, 12 (11.3%) had hyperthermia, 6 (5.7%) had sepsis, and 7 (6.6%) had hypothermia. These findings are similar to an Indian study which showed that KMC was effective against the aforementioned morbidities.<sup>6</sup>

The study's limitations include its single-centre design, limiting generalisability. The relatively small sample size (106 neonates) may compromise statistical power. The observational design precludes establishing causation, and excluding critically ill neonates introduces selection bias. The short seven-day follow-up period limits assessing long-term effects.

The KMC method plays an important role in reducing the duration of hospital stay and decreasing the mortality rate in low-birth infants. It will also be effective against various morbidities such as hyperglycaemia, hypoglycaemia, and sepsis. The authors recommend the KMC method for developing countries where resources are scarce at the Neonatal Intensive Care Unit for LBW and preterm babies.

**COMPETING INTEREST:**

The authors declared no conflict of interest.

**AUTHORS' CONTRIBUTION:**

MA: Acquisition and drafting of the work.

NA: Critical revision of the manuscript for important intellectual content.

ND: Conception and design of the work.

AAK, LP: Analysis or interpretation of data for the work.

MH: Final approval of the version to be published.

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