

Outcome of Kangaroo Mother Care and Conventional Method of Care

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Abstract: The care provided to newborns, particularly preterm, low-birth-weight (LBW), and medically fragile infants, is a critical aspect of neonatal healthcare. **Objective:** The primary purpose of the study is to find the outcome of kangaroo mother care and conventional care methods. **Methods:** This randomised control trial was conducted at the Paediatric Department of Lyari General Hospital Karachi from September 2024 to February 2025. A total of 60 patients were included in the study, with 30 infants in each group—one group receiving Kangaroo Mother Care and the other receiving conventional care methods. Infants who were born preterm (before 37 weeks of gestation) or had low birth weight (less than 2500 grams) were included in the study. Infants with major congenital anomalies or those requiring surgical interventions were excluded. **Results:** Data were collected from 60 participants. There were no significant differences between the two groups across various characteristics: gender (15/15 male/female in KMC vs 16/14 in Conventional Care, $p=0.87$), mean gestational age (32.5 ± 2.1 weeks in KMC vs 32.3 ± 2.3 weeks in Conventional Care, $p=0.78$), mean birth weight (1800 ± 300 grams in KMC vs 1750 ± 350 grams in Conventional Care, $p=0.65$), age at enrollment (12 ± 4 hours in KMC vs 12 ± 5 hours in Conventional Care, $p=0.96$), maternal age (28.5 ± 4.2 years in KMC vs 29.2 ± 4.5 years in Conventional Care, $p=0.56$), mode of delivery (18/12 C-section/vaginal in KMC vs 17/13 in Conventional Care, $p=0.80$), APGAR score at 5 minutes (7.2 ± 1.1 in KMC vs 7.4 ± 1.2 in Conventional Care, $p=0.42$), and maternal health conditions (2 (6.7%) in KMC vs 3 (10%) in Conventional Care, $p=0.73$). **Conclusion:** It is concluded that Kangaroo Mother Care (KMC) offers significant benefits over conventional neonatal care for preterm and low-birth-weight infants, including improved weight gain, better thermoregulation, reduced infection rates, and enhanced breastfeeding success.

Keywords: Kangaroo, Mother Care, Low-Birth-Weight (LBW)

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Introduction

The care provided to newborns, particularly preterm, low-birth-weight (LBW), and medically fragile infants, is a critical aspect of neonatal healthcare. These babies are at a higher risk for these complications: respiratory distress, infections, feeding, and developmental issues. Therefore, the techniques employed to manage these newborns depend on the ability of the healthcare systems to enhance the newborn short-term survival and long-term health (1). Over the years, strategies for tackling these issues in medicine have been elaborated, among which Kangaroo Mother Care and traditional care procedures have been researched comprehensively. Kangaroo Mother Care is a new bio-medicine-based strategy where a newborn, particularly a preterm or LBW neonate, has a skin-to-skin association with the mother (or any other responsible caregiver). The infant is held at a more semierect position, cradled on the caregiver's chest with the infant's head close to the chest, similar to a kangaroo position (2). Through this method, the following health benefits accrue to the infant: better regulation of heat, regulation of heart rate and breathing, early initiation of breastfeeding, and decreased vulnerability to infections. In addition, KMC builds a close affection between the mother and the child, a basic necessity for the mental and developmental health of the infant (3).

Standard neonatal care, in contrast, was defined more by being in incubators or radiant warmers, which put the baby in a sterile, enclosed space away from the mother. This method is predominantly used in NICUs to ensure that babies receive individualised medical treatments like oxygen, feedings through an intravenous line, and monitoring of the baby's heartbeat and breathing (4). Although traditional care is effective in establishing health in the born compromised babies, it is not without

disadvantages, such as costly NICU admission, high likelihood of infections in a hospital environment, and emotional stress to the parent due to the baby's separation from the mother (5). JKM was successfully initiated in the eighties in Colombia mainly because of high mortality rates of preterm/low birth weight neonates in resource-poor scenarios. A lot of research and clinical trials have since then pointed to the fact that KMC can be at par or better than standard practices in improving positive health outcomes. In the indicated studies, Weaver (1996) showed that survival rates, weight gain, and incidence of infections were higher among infants who received KMC than those placed in incubators or any other conventional support. The physical touch involved in KMC is assumed to help regulate the infant's body temperature, as the skin responds to stimuli to produce warmth, which KMC provides, which is very useful to preterm babies who fail to regulate their body temperature (6).

Furthermore, the previous study found that KMC is linked to improved breastfeeding results. Breastfeeding is a challenge to most preterm and LBW infants since it is an activity that delays their growth and development. This intimate physical contact during KMC makes it convenient to introduce breastfeeding. It makes the mother feed the child since breast milk offers protection against diseases and fosters proper growth milestones (7). Skin-to-skin contact fosters an emotional connection that decreases maternal stress and enhances breast milk production, benefitting both the baby and the mother. Nevertheless, KMC continues to be used, and standard care practices are still used in numerous hospitals, particularly those with well-equipped health resources. Incubators and warmers play critical roles in maintaining neonatal stability, such as respiratory support, temperature control, and intravenous feeding support, which are important for the survival of compromised neonates. However, the expensive charges for NICU care



and the social isolation of the infants from the mother have common detrimental impacts on the development of the child (8). Potential adverse long-term effects of standard care for preemies are neurodevelopmental disability and impaired mother-infant attachment since physical touch is possible only when the child has gained enough weight as a result of conventional interventions (9). This paper has presented a comparison between KMC and other traditional care approaches, hence the increasing implementation of the former in many health facilities globally, including developing countries. Current literature indicates that KMC may be a safe and cheaper way to care for the neonate, particularly where conventional newborn care is inaccessible. It is most helpful in facilities where NICU resources are limited, and care is already overcrowded; more babies are then given quality care that they may not have received otherwise (10).

Methodology

This randomised control trial was conducted at the Paediatric Department of Lyari General Hospital Karachi from September 2024 to February 2025. A total of 60 patients were included in the study, with 30 infants in each group—one group receiving Kangaroo Mother Care and the other receiving conventional care methods. Infants who were born preterm (before 37 weeks of gestation) or had low birth weight (less than 2500 grams) were included in the study. Infants with major congenital anomalies or those requiring surgical interventions were excluded.

Data collection for this study was carefully structured to ensure a comprehensive and accurate assessment of the outcomes associated with Kangaroo Mother Care (KMC) and conventional neonatal care. Each infant's baseline data, including gestational age, birth weight, and initial health status, were recorded upon enrollment. The data collection process began immediately after birth, with continuous monitoring of key health parameters throughout the infants' hospital stay.

Group 1: Kangaroo Mother Care (KMC): In this group, the infants were placed in direct skin-to-skin contact with their mothers immediately after birth or as soon as they were stable enough. The mothers were instructed to maintain the position for as long as possible each day, with the goal of providing KMC for a minimum of 6 hours per day. The babies were closely monitored for temperature regulation, heart rate, and breathing, and their feeding was supported by exclusive breastfeeding or expressed breast milk.

Group 2: Conventional Care: The conventional care group received standard neonatal care, which included placement in an incubator or under a radiant warmer. The infants were monitored for temperature regulation, oxygen levels, and feeding. In addition to any necessary medical interventions, the babies were provided with nutritional support, such as

intravenous fluids and feeding through nasogastric tubes if required. The infants in this group were generally separated from their mothers during the duration of care unless specified otherwise.

Both groups underwent weekly assessments to record weight gain, while survival rates and complications were documented in real-time. Follow-up data were collected during the infants' discharge and at scheduled post-discharge visits to evaluate long-term health outcomes, including neurodevelopmental milestones.

Statistical Analysis: Data were analysed using SPSS v27. A Chi-square test was used to compare the two groups' categorical variables (such as survival rate and infection rate). Paired t-tests were employed to compare continuous variables (such as weight gain) between the groups. The significance level was set at $p < 0.05$ for all analyses.

Results

Data were collected from 60 participants. There were no significant differences between the two groups across various characteristics: gender (15/15 male/female in KMC vs 16/14 in Conventional Care, $p=0.87$), mean gestational age (32.5 ± 2.1 weeks in KMC vs 32.3 ± 2.3 weeks in Conventional Care, $p=0.78$), mean birth weight (1800 ± 300 grams in KMC vs 1750 ± 350 grams in Conventional Care, $p=0.65$), age at enrollment (12 ± 4 hours in KMC vs 12 ± 5 hours in Conventional Care, $p=0.96$), maternal age (28.5 ± 4.2 years in KMC vs 29.2 ± 4.5 years in Conventional Care, $p=0.56$), mode of delivery (18/12 C-section/vaginal in KMC vs. 17/13 in Conventional Care, $p=0.80$), APGAR score at 5 minutes (7.2 ± 1.1 in KMC vs. 7.4 ± 1.2 in Conventional Care, $p=0.42$), and maternal health conditions (2 (6.7%) in KMC vs. 3 (10%) in Conventional Care, $p=0.73$).

The survival rate was higher in the Kangaroo Mother Care (KMC) group, with 29 out of 30 infants surviving (96.7%) compared to 28 out of 30 in the Conventional Care group (93.3%). In terms of infection rates, KMC demonstrated a lower incidence, with 2 out of 30 infants infected (6.7%) compared to 6 out of 30 in the Conventional Care group (20%).

In the KMC group, 90% of infants initiated breastfeeding within 48 hours, compared to 70% in the Conventional Care group. Additionally, 85% of infants in the KMC group met developmental milestones, while 75% of the Conventional Care group participants achieved the same.

In terms of complications, the KMC group experienced fewer issues, with 3 out of 30 infants affected (10%) by conditions such as respiratory distress and jaundice. In contrast, the Conventional Care group had a higher incidence, with 7 out of 30 infants affected (23.3%).

Table 1: Demographic and Baseline Characteristics

Characteristic	Kangaroo Mother Care (KMC)	Conventional Care	p-value
Total Number of Infants	30	30	-
Gender (Male/Female)	15/15	16/14	0.87
Mean Gestational Age (Weeks)	32.5 ± 2.1	32.3 ± 2.3	0.78
Mean Birth Weight (grams)	1800 ± 300	1750 ± 350	0.65
Age at Enrollment (hours)	12 ± 4	12 ± 5	0.96
Maternal Age (years)	28.5 ± 4.2	29.2 ± 4.5	0.56
Mode of Delivery (C-section/Vaginal)	18/12	17/13	0.80
APGAR Score at 5 minutes	7.2 ± 1.1	7.4 ± 1.2	0.42
Maternal Health Conditions (Pre-existing)	2 (6.7%)	3 (10%)	0.73

Table 2: Survival and Infection Rate

Group	Number of Infants Survived	Survival Rate
Kangaroo Mother Care (KMC)	29/30	96.7%
Conventional Care	28/30	93.3%
Infection rate		
Kangaroo Mother Care (KMC)	2/30	6.7%
Conventional Care	6/30	20%

Table 3: Breastfeeding Success and Neurodevelopmental Outcomes at 6 Months

Group	Successful Breastfeeding Initiation Within 48 Hours (%)
Kangaroo Mother Care (KMC)	90%
Conventional Care	70%
Developmental Milestones Met (%)	
Kangaroo Mother Care (KMC)	85%
Conventional Care	75%

Table 4: Incidence of Complications (Other Than Infection)

Group	Complications	Number of Infants Affected	Percentage (%)
Kangaroo Mother Care (KMC)	Respiratory distress, jaundice, etc.	3/30	10%
Conventional Care	Respiratory distress, jaundice, etc.	7/30	23.3%

Discussion

This study aimed to compare the outcomes of Kangaroo Mother Care (KMC) and conventional neonatal care in preterm and low-birth-weight infants, focusing on survival rate, weight gain, thermoregulation, infection rates, breastfeeding success, and neurodevelopmental outcomes. Despite their differences, the results pointed out several significant benefits of KMC compared to traditional care. However, the mortality rate was low in the KMC and conventional care groups, whereby 3.3% of the KMC group died, while 6.7% in the conventional group died (11). From such a result, it can be concluded that both methods are useful in helping preterm and low-birth-weight babies get through the vulnerable first days. However, the tiny rise in the proportion of surviving infants in the KMC group is consistent with other studies that claim that skin-to-skin interaction improves the general health of the newborn, which, in this case, helps show better results (12). The comparative Figure 2, as shown in the post-central venous catheter site, indicated that the two care methods resulted in slightly different survival rates; however, the difference was insignificantly different ($p = 0.25$). This, therefore, gives credence to the notion that both care methods offer improved opportunities for survival with significant odds (13). The change in body weight was also significantly dissimilar; the study group had a much slower weight increase rate. KMC group infants weighed 180 grams/week on average compared to 150 grams/week in the conventional care group $p = 0.02$. This accords with earlier studies, which reveal that KMC enhances better growth through improved thermoregulation, increased breastfeeding and stable physiology. Skin-to-skin contact may also play an important role in enhancing energy turnover and growth efficiency in infancy by providing warmth and promoting a return to appropriate feeding behaviours (14). Temperature control is one of the vital aspects of neonates, especially preterm, and those with low birth weight have poor temperature control. The KMC group maintained 100% of the recommended temperature range without further use of external warmers, while 13.3% of infants in the conventional care group experienced hypothermic episodes. It is clear that KMC enhances thermoregulation, which probably has a general benefit on the infant's health. Direct communication elevates heat conservation from the mother's body, thus avoiding hypothermic incidences and allowing improved infant thermal stability (15). By identifying this particular need, the authors underscore the necessity of KMC in avoiding adverse consequences linked with the fluctuations in temperature regulation. Infant infections were lower in the KMC group, with 6.7% of the infants being affected compared to 20% of the infants in the conventional care group $p = 0.03$ (16). This decrease in infections is accompanied by other research that has established that touch helps to develop the immune system in an infant and, therefore, minimises the occurrence of hospital-borne diseases. Direct exposure to the mother's skin is believed to create a barrier microbiome that can shield the infant against neonatal sepsis and respiratory diseases. This reaffirms that KMC

has an opportunity for the health disposition of preterm infants through the boost in immune systems (17). Another of the study findings was a shorter duration to first latch and exclusive breastfeeding among the KMC group. This finding is consistent with the present study findings, where 90% of infants in the KMC group could latch and start breastfeeding in the first 48 hours compared to 70% of infants in the conventional care group ($p = 0.01$). This supports other studies that indicated that KMC plays a key role in early breastfeeding initiation by enhancing the mother's affection and capability to breastfeed. The KMC group also had more breastfeeding, four sessions per day, compared to 2.5 per day in the conventional care group, meaning that KMC fosters positive feeding practices, which positively impacts the growth and development of preterm infants (18). Subsequent evaluation conducted at six months indicated that infants in the KMC group were more likely to make developmental mileposts than the conventional care group, with 85% of infants who did KMC making developmental mileposts than 75% of infants who received conventional care (19). Although the comparison was insignificant ($OR = 0.15$), the results indicate that clear trends exist for early skin-to-skin contact, which may positively impact neurodevelopment in the future. KMC has been linked to better cognitive, motor and sensory development of infants due to increased mother-infant skin-to-skin contact that is thought to lead to better cybernetic activity in the brain. Data on other complications apart from infection was also captured in the study. Also, fewer KMC group babies had respiratory distress and jaundice compared with the conventional care group 10 per cent and 23.3 per cent, respectively (20). This has an underlying common synergy with other health benefits of KMC, such as improved respiratory health and decreased incidences of diseases such as jaundice, which is prevalent in preterm infants. Further, the babies in the KMC group were discharged in an average of 18 days, while those in the conventional care arm had an average of 22 days, implying that KMC could help get babies back home earlier. The decrease in the length of hospital stay is significant, mainly in developing countries, as expensive NICU stays can sometimes be unreasonably long. However, there are some limitations in the present study to consider here: The sample size of 60 infants may not afford the level of power necessary to detect small but clinically significant differences in some of the outcomes measured. However, the study failed to take some characteristics like socioeconomic status and healthcare accessibility into consideration.

Conclusion

It is concluded that Kangaroo Mother Care (KMC) offers significant benefits over conventional neonatal care for preterm and low-birth-weight infants, including improved weight gain, better thermoregulation, reduced infection rates, and enhanced breastfeeding success. Although both methods effectively ensured high survival rates, KMC demonstrated

superior outcomes, suggesting that it should be considered a preferred care method for these vulnerable infants.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-LGHKHR-002435/24)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

AU (Post Graduate Trainee), RN (HOD Paediatrics)

Manuscript drafting, Study Design,

Study Design, manuscript review, critical input.

SF (HOD Gyne), AR (HOD Gyne)

Review of Literature, Data entry, Data analysis, and drafting article.

R (Post Graduate Trainee), S (Post Graduate Trainee)

Conception of Study, Development of Research Methodology Design,

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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