

Difference in mean weight gain and hospital stay in preterm babies receiving complete or partial kangaroo mother care compared to no kangaroo mother care: Experience from a tertiary care hospital

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ABSTRACT

Background: Pakistan is a resource limited country with one of the highest neonatal mortality rate (NMR) in the world. Kangaroo Mother Care (KMC) helps in reducing the mortality and improving the care of preterm babies. The objective of this study was to identify the benefits of KMC in hospitalized newborns in terms of better weight gain and early discharge from hospital.

Subjects and methods: A retrospective case-control study was conducted in the Neonatal Department of Services Hospital from 01.02.2019 to 31.01.2020. A total of 144 case notes, who met inclusion criteria were included. Subjects were divided in 2 Groups of 77 each. Group 1 did not receive KMC and Group 2 received KMC (partial or complete). Admission weight, gestational age at birth, duration of hospital stay and the average weight gain was noted for subjects in both groups. SPSS version 23 was used to analyze data. Independent samples t-test was applied. A p-value of ≤ 0.05 is taken as significant.

Results: Mean weight gain in Group 1 was 5.521 g/kg/day (± 6.664), whereas in Group 2 was 15.635 g/kg/day (± 9.268). Mean hospital stay in Group 1 was 12.558 days (± 10.856) and in Group 2 it was 8.208 days (± 6.473). Weight gain and duration of hospital stay was significantly better in KMC Group with a p-value < 0.05 . This benefit was observed both for partial and complete KMC.

Conclusion: KMC (partial or complete) leads to better weight gain and reduces the duration of hospital stay.

Keywords:

Kangaroo Mother Care, Preterm infants, Weight gain, Hospital stay

INTRODUCTION

Neonatal mortality and morbidity in Pakistan remains unacceptably high and there has been no significant improvement since 1990.¹ Neonatal mortality in Pakistan is 42 per 1000 live births, which is highest in the world.^{1,2} Preterm birth complications are the leading cause of death among neonates.³ Kangaroo Mother Care (KMC) has been shown to reduce neonatal deaths, improve weight and promote breast feeding.⁴ There are four components of KMC: skin-to-skin contact; breastfeeding; early discharge from hospital; and home support.⁵ World Health

Organization also supports KMC in stable newborns weighing less than 2 Kg.⁶ Despite its ease and cost effectiveness, this practice has not gained popularity in Pakistan. This may be due to cultural inhibition in the acceptability of KMC.^{7,8} Pakistan is a developing country and KMC, being a cost-effective intervention, has the potential to bring reduction in neonatal mortality and morbidity without imposing significant financial burden on the existing health care system.

The objective of this study was to identify the benefits of complete and partial KMC, in hospitalized preterm babies in terms of better weight gain and early discharge in comparison to those who did not receive KMC.

SUBJECTS AND METHODS

A retrospective case-control study was conducted in the Neonatal Department of Services Hospital, Lahore from 01.02.2019 to 31.01.2020, after gaining approval

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from the IRB, we reviewed the previous 12 months record of preterm babies who had survived till discharge. A total of 144 case notes were reviewed and divided in 2 Groups comprising 77 babies each; Group 1 did not receive KMC (No KMC Group) and Group 2 received KMC. Group 2 (KMC Group) was further divided into complete KMC Group (2a: cKMC) and partial KMC Group (2b: pKMC). Kangaroo mother care (KMC) Group was defined as post stabilization skin to skin contact with mothers along with breast feeding in addition to necessary medical care. Complete KMC Group was defined as kangaroo mother care (KMC) for more than 20 hours/day for at least 3 days during their hospital stay. Whereas, partial KMC was defined as kangaroo mother care for a cumulative duration of more than 1 but less than 20 hours/day. Likewise, No KMC Group was defined as preterm babies with weight more than 1 kg, undergoing routine treatment in Nursery without skin to skin contact with mother.

Parameters included were admission weight, gestational age at birth, duration of hospital stay and the average weight gain per day. Admission weight and gestational age at birth were comparable in all groups to minimize bias. Hospital stay and average weight gain were documented and outcome compared in all groups. All babies who received treatment in the Neonatology department either in KMC room or NICU/Stepdown nursery, having gestational age less than 37 weeks and weight more than 1 kg, were included. All preterm babies having dysmorphism or those did not survive till discharge were excluded. SPSS version 23 was used to

analyze data. Independent samples t-test was applied. A p-value ≤ 0.05 was taken as significant.

RESULTS

A total of 144 cases were included in the study. This included 77 babies in Group 1 (No KMC Group) and 77 babies in Group 2 (KMC Group). Group 2 was further subdivided into; 2a: complete KMC (cKMC) including 49 babies, and 2b: partial KMC (pKMC) comprising 28 babies. Group 1 included 38 male and 39 female babies. Group 2a included 27 male and 22 female babies and Group 2b comprised 17 male and 11 female babies.

Table 1 provides comparison of Group 1 and Group 2 as whole (including 2a and 2b). Significant reduction in duration of hospital stay and improved weight gain were noted in Group 2 (p-value <0.05), whereas admission weight and gestational age were comparable (p-value >0.05).

Table 2 shows comparison between Group 1 and Group 2b. Reduced duration of hospital stays and improved weight gain were noted in Group 2b (p-value <0.05). However, the admission weight and gestational age in the Group 2b were significantly better (p-value <0.05) and this could have been be a confounding factor.

This confounding bias (admission weight and gestational age >0.05) was not seen when comparison was made between Group 1 and Group 2a as shown in Table 3. The outcome was significantly better in terms of weight gain and early discharge from hospital in Group 2a (p-value <0.05).

Table 1. Comparison between Group 2 and Group 1

Characteristics	Group 2: KMC Group	Group 1: No KMC Group	p-value
Admission weight \pm SD (kg)	1.707 \pm 0.4322	1.575 \pm 0.620	0.128
Gestational age \pm SD (weeks)	34 ⁺⁵ \pm 2	33 ⁺⁶ \pm 3	0.062
Weight gain \pm SD (g/kg/day)	15.635 \pm 9.268	5.521 \pm 6.664	0.000
Hospital stay \pm SD (days)	8.208 \pm 6.473	12.558 \pm 10.856	0.003

Table 2. Comparison of Group 2b and Group 1

Characteristics	Group 2b: Partial KMC (pKMC)	Group 1: No KMC group	p-value
Admission weight \pm SD (kg)	1.958 \pm 0.385	1.575 \pm 0.620	0.003
Gestational age \pm SD (weeks)	35 ⁺⁶ \pm 3	33 ⁺⁶ \pm 3	0.006
Weight gain \pm SD (g/kg/day)	17.411 \pm 10.374	5.521 \pm 6.664	0.000
Hospital stay \pm SD (days)	6.036 \pm 5.594	12.558 \pm 10.856	0.003

Table 3. Comparison between Group 2a and Group 1

Characteristics	Group 2a: Complete KMC Group (cKMC)	Group 1: No KMC Group	p-value
Admission weight \pm SD (kg)	1.563 \pm 0.392	1.575 \pm 0.620	0.899
Gestational age \pm SD (weeks)	34 ⁺¹ \pm 2	33 ⁺⁶ \pm 3	0.597
Weight gain \pm SD (g/kg/day)	14.620 \pm 8.519	5.521 \pm 6.664	0.000
Hospital stay \pm SD (days)	9.449 \pm 6.664	12.558 \pm 10.856	0.049

Table 4. Comparison between Group 2a and Group 2b

Characteristics	Group 2a: Complete KMC (cKMC)	Group 2b: Partial KMC (pKMC)	p-value
Admission weight \pm SD (kg)	1.563 \pm 0.392	1.958 \pm 0.385	<0.001
Gestational age \pm SD (weeks)	34 ⁺¹ \pm 2	35 ⁺⁶ \pm 3	0.005
Weight gain \pm SD (g/kg/day)	14.620 \pm 8.519	17.411 \pm 10.374	0.232
Hospital stay \pm SD (days)	9.449 \pm 6.664	6.04 \pm 5.594	0.019

Likewise, when Group 2a and 2b were compared, difference in improvement of weight gain was not statistically significant (p-value >0.05) whereas duration of hospital stay was significantly reduced in Group 2b when compared with Group 2a (p-value <0.05) (Table 4). However, difference in admission weight and gestational age was also significantly higher in Group 2b which may represent a bias and effect outcome. The babies in Group 2b weighed more and were closer to term than other two groups.

DISCUSSION

Pakistan is a resource limited country with one of the highest NMR in the world.^{1,2} Over the recent past the efforts to decrease it have not met with desirable success. Several measures have been studied in resource limited settings to find cost effective way to reduce mortality and morbidity in preterm infants. One such measure is Kangaroo Mother Care.⁴ The essential components of KMC as described by WHO include skin-to-skin contact, breastfeeding, early discharge from hospital and home support.^{5,6} Services Hospital, Lahore is a tertiary care hospital providing care to newborns including preterm babies delivered in the hospital as well as those referred from surrounding hospitals. Before 2018 there was no policy of providing KMC as part of management of these newborns. Later, the departmental policy was changed to encourage mothers to provide skin to skin contact to all admitted preterm babies at every opportunity with the aim of optimizing breast feeding. Even mothers of babies on non-invasive ventilation like nasal continuous positive airway pressure (CPAP) were encouraged to sit by the bedside and hold their babies in skin-to-skin contact with support of nursery staff for as long as was possible. The babies were continuously monitored and put back in their cots/ incubators in case of any instability or maternal fatigue. The aim of the current study was to evaluate if inclusion of KMC in the practice guidelines did indeed confer benefit in terms of improved weight gain and early discharge. While the 4th component of KMC was beyond the scope of current study, the first 3 were evaluated through review of case notes. In addition, we also compared average weight gain in preterm babies receiving KMC vs. those who did not received KMC.

There is sufficient data in literature about benefits of Kangaroo mother care as cost effective intervention that helps in reducing mean hospital stay and improving mean weight gain in preterm infants.^{9,10} However, there is paucity of information on benefits of KMC in hospitalized babies from Pakistan. The advantages of this simple intervention include promoting breastfeeding, reducing mortality and morbidity of preterm infants.¹¹⁻¹⁶ One local study conducted in Agha Khan University Medical Center Karachi, concluded that duration of hospital stay was significantly reduced in KMC babies in comparison with No KMC Group*, these results are similar to our study. However, Partial KMC and Complete KMC was not discussed in this study and mean weight gain was not explored in study from Agha Khan University Medical Center¹¹ Other local studies have forwarded on reduced mortality, morbidity with prevention of nosocomial infections and early initiation of breast feeding in hospital and community settings, whereas our study is focusing on mean reduction in hospital stay and mean weight gain in hospital settings in preterm babies receiving Partial KMC, Complete KMC and No KMC, this is the novelty in present study.¹²⁻¹⁴

Common practice in local public sector hospitals is that mothers are frequently discharged long before their preterm babies. Providing long term skin to skin contact is not always possible. However, results of this study show that even minimal skin to skin contact between the mother and her baby confers significant benefit in terms of weight gain and early discharge.

Experience shared by other countries in the region have pointed to KMC as simple low-cost measure and as effective tool for decreasing neonatal mortality and morbidity, whereas reduction of hospital stay, mean weight gain and comparison of KMC (Complete & Partial) with No KMC is unique to our study.¹⁵⁻¹⁷

This study has few limitations, it is a retrospective study with small sample size. The patients included in the study had different pathologies, some study group may have included sicker infants. However, by including only those cases who survived till discharge, attempt was made to exclude extremely sick babies from all groups.

The unique aspect of this study is the comparison of three groups (Group 1, 2a and 2b) with each other in

tertiary care resource limited settings (space, infrastructure and human resource). But with same limited resource settings, partial KMC is possible and effective.

CONCLUSION

Skin to skin contact with the mother, regardless of its duration is associated with better weight gain and early hospital discharge. KMC should be promoted in public sector hospitals, particularly in resource-limited settings by addressing barriers and enablers of KMC.

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