IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 5 Ser.12 (May. 2020), PP 13-18
www.iosrjournals.org

A Study on Effect of Kangaroo Mother Care on Weight Gain of Normal and Low birth Weight Infants in a Rural Medical College in West Bengal.

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Abstract:
Objectives: *To assess the effect of Kangaroo mother care (KMC) and conventional methods of care (CMC) on weight gain in normal birth weight and low birth weight babies.* ***Methods:*** *This is a prospective analytical interventional study design carried out on 108 patients subdivided into 2 groups viz. KMC & CMC/Non KMC group. Data were collected in a predesigned proforma and analyzed in Microsoft excel 2010 using standard statistical techniques, p values were obtained using chi square test and was considered significant if p < 0.05.* ***Results:*** *Weight loss during first 7 days of life was significantly less in KMC group than Non KMC group with average weight loss being 40 g vs 71 g in these groups respectively at a p value of 0.008 in the weight band of (1.5 kg to 2.5 kg).Average weight gain at day 42 was high in KMC group compared to non KMC group (p value= 0.0005) in the weight band of (1.5-2.5) kg was significantly higher with average weight gain being 1125g vs 1025g in KMC & Non KMC groups respectively in the above mentioned weight band. Mean weight gain in Kg at day 70 in KMC group was 2020g vs 1860g in non KMC group (p value <<<0.05).* ***Conclusion:*** *KMC decreased early neonatal period weight loss in normal & low birth weight infants & also have a lasting positive impact on weight gain in early infancy, especially in preterm low birth weight babies, helping them in achieving catch up growth earlier thus reducing their excursion time in high risk low weight zone. However the effects on Normal birth weight was not so prominent.*

Key words: *Kangaroo Mother Care, Low birth weight, Skin to skin, Sick newborn care unit, Weight gain.*

-Date of Submission: 11-05-2020 Date of Acceptance: 23-05-2020

I. Introduction:

Kangaroo mother care (KMC) is a method of care of preterm and low birth weight (LBW) infants by placing them in skin to skin (STS) contact with mother or other caregiver in order to ensure optimum growth and development of the infant[1].

Components of KMC are the following,

1. Kangaroo position : The kangaroo position consists of skin-to-skin contact (SSC) between the mother and the infant in a vertical position, between the mother's breasts and under her clothes · The provider must keep herself/himself in a semi- reclining position to avoid the gastro-esophageal reflux of the infant · The kangaroo position is maintained until the infant no longer tolerates it- as indicated by sweating of the baby or baby refusing to stay in KMC position · When continuous care is not possible, the kangaroo position can be used intermittently, providing the proven emotional and breastfeeding promotion benefits · The kangaroo position must be offered for as long as possible (but at least 1-2 hr/sitting), provided the infant tolerates it well.
2. Kangaroo nutrition: Kangaroo nutrition is the delivery of nutrition to "kangarooed" infants as soon as oral feeding is possible. Goal is to provide exclusive or nearly exclusive breastfeeding with fortification, if needed.
3. Kangaroo discharge and follow up: Early home discharge in the kangaroo position from the neonatal unit is one of the original components of the KMC intervention. · Mothers at home require adequate support and follow up; hence a follow-up program and access to emergency services must be ensured [2, 3, 4].

The present study was conducted to assess the effect of Kangaroo mother care (KMC) and conventional methods of care (CMC) on growth in normal birth weight and low birth weight babies.

II. Materials & Methods:

A prospective study was carried out for a period of 1 year from February 2016 to January 2017 in Bankura Sammilani Medical College and Hospital, a tertiary care hospital in West Bengal, to study the effects of Kangaroo Mother Care on weight gain in normal & low birth weight neonates & follow up of growth parameters at day 7, 14, 42 & 70 of life.

The data thus collected was analyzed with the help of computer software, Microsoft excel (2010) & SPSS 20.0 for Windows. Chi-square test& Student's t tests were used to ascertain statistical significance among the proportions. Prevalence along with 95% confidence limits was calculated to express the magnitude. A p value<0.05 was considered as statistically significant, unless proved otherwise. Sample was selected from patients admitted in SNCU using simple random sampling by flipping a coin for each potential candidate meeting the inclusion criteria from Monday to Friday every week for the period of one year from February 2016 to February 2017. This sampling was done at the time of admission & was reviewed at day 7 to meet inclusion criteria. Thus initially 138 patients were selected but subsequently 28 patients (11 from Non KMC group & 17 from KMC group) were removed from study due to not meeting inclusion criteria.

Inclusion criteria:

- Neonates with birth weights between 1500gram to 4000 gram
- Willing Parents/guardian who gave informed consent.
- Parents willing to attend follow up clinic at specified schedule
- Participants were given mandatory KMC between day 5 to 7 of life & mothers were sensitized rigorously regarding practice of KMC. At first, the mothers were counselled regarding breastfeeding and KMC and their benefits. Then, breastfeeding and KMC were demonstrated with the help of volunteer mothers. KMC was started soon after admission in SNCU whenever possible but only those receiving mandatory in hospital/ closely monitored KMC between 5-7 days were included in the KMC group.

Exclusion criteria:

- Critically ill babies requiring ventilatory or inotropic support
- Birth weight not meeting the criteria (e.g VLBW & ELBW babies were excluded from the study)
- Babies with life threatening/ gross congenital anomalies
- Babies whose mothers are critically ill
- Mothers who were unwilling or abandoned the practice of KMC between Day 5 to Day 7 were removed from the study.

III. Results:

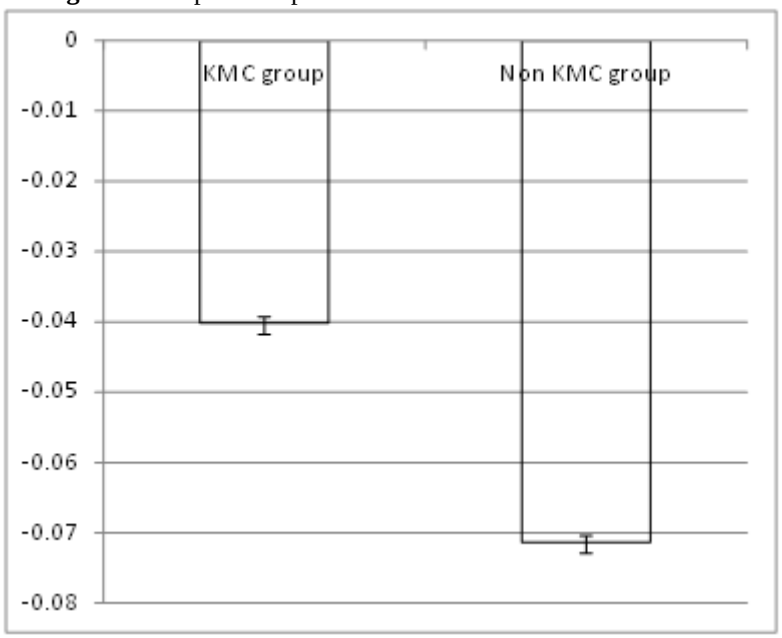
Effect of KMC on Weight Gain:

There is a significant difference between two groups with regards to Weight loss during first seven days with degree of weight loss being significantly low in KMC group in the weight band (1.5-2.5 kg). (p value = 0.008191253)

Table 1:

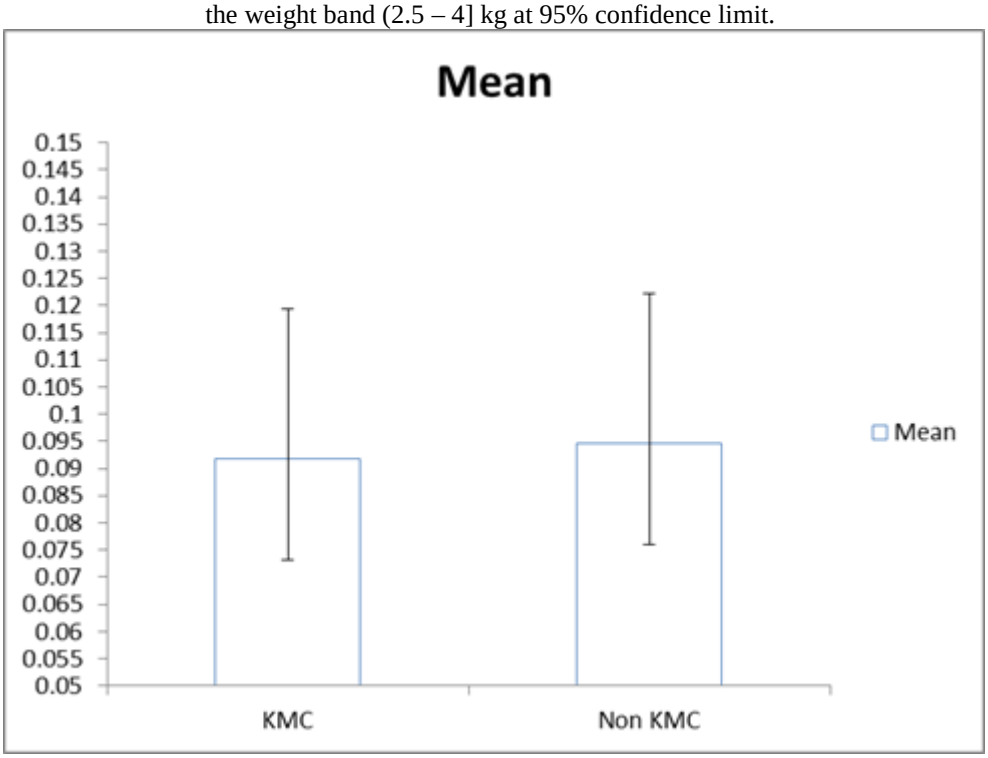
	KMC group	Non KMC group
Mean	-0.0402	-0.0713
SEM	0.0009	0.0015

Figure 1: Graphical depiction of the above table with error bars.



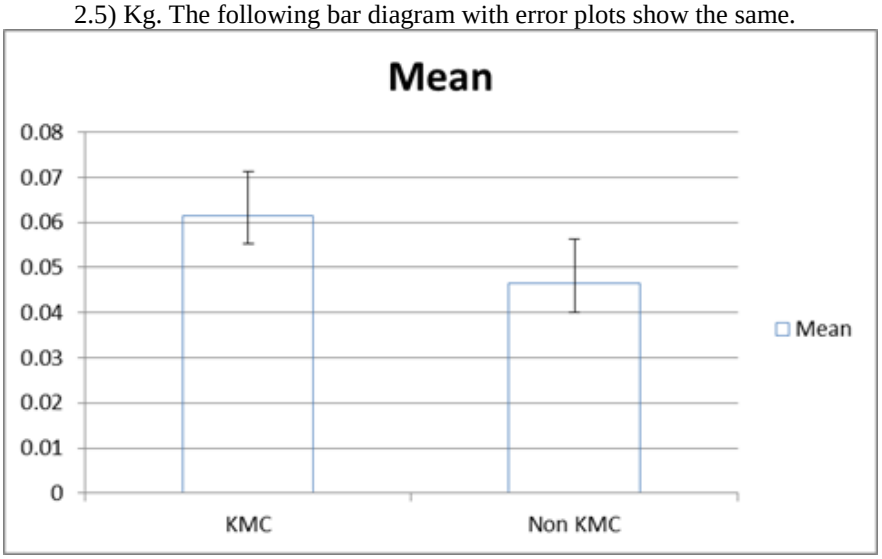
Y axis shows change in weight in Kg

Figure 2: No significant difference in weight gain at day 14 of life between two groups (KMC & Non KMC) in the weight band (2.5 – 4] kg at 95% confidence limit.



Y axis shows weight gain in Kg

Figure 3: The same i.e no significant difference was observed between two groups at the weight band of (1.5-2.5) Kg. The following bar diagram with error plots show the same.



Y axis shows weight in Kg

Figure 4: Mean difference of weight gain in Kg at day 42 between KMC & non KMC group (p value = 0.000504) in the weight band of (1.5-2.5) kg

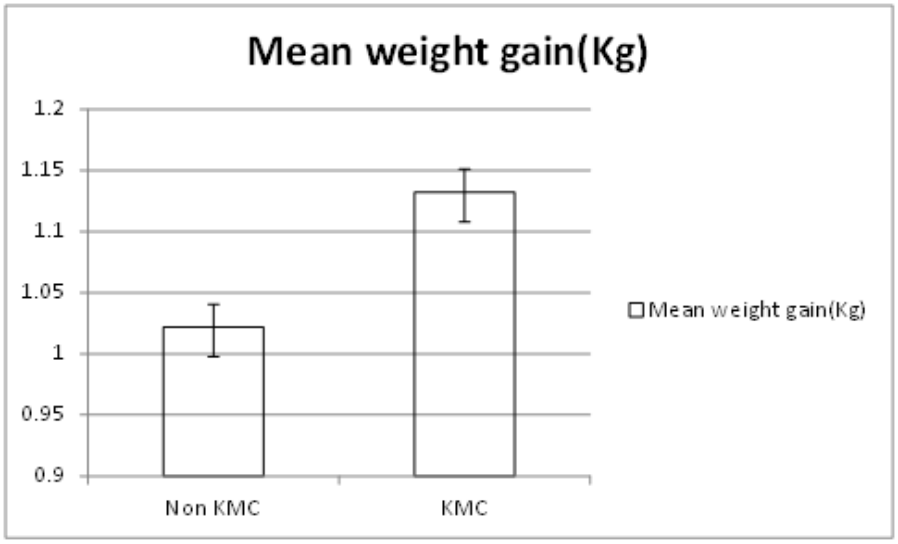
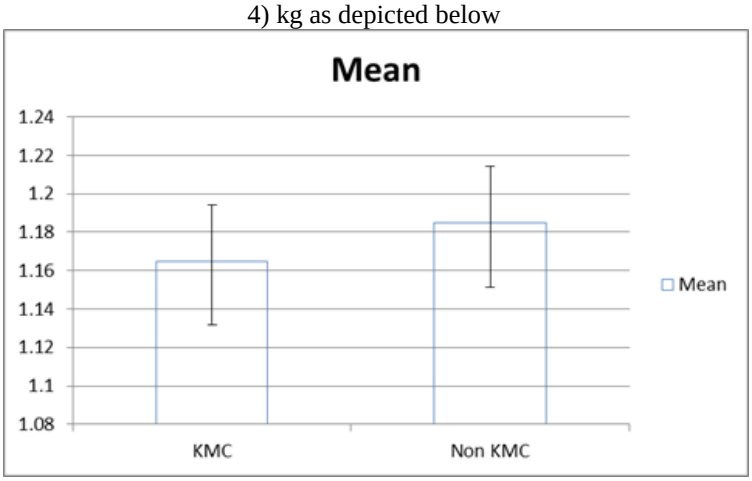
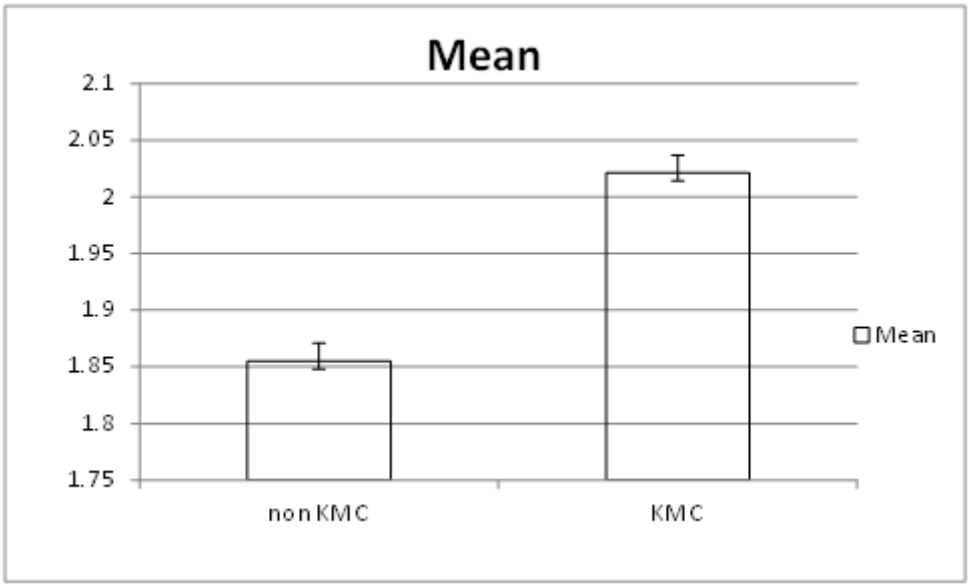


Figure 5: Figure: No significant difference noted in weight gain between two groups in the weight band of (2.5-4) kg as depicted below



Y axis shows weight in kg

Figure 6: Mean difference of weight gain in Kg at day 70 between KMC & non KMC group (p value 0.00000296)



Y axis shows weight in kg
Summarizing this translates to,

Weight loss during first 7 days of life was significantly less in KMC group than Non KMC group with average weight loss being 40 g vs 71 g in these groups respectively at a p value of 0.008191253 in the weight band of (1.5 kg to 2.5 kg)

Average weight gain at day 42 was high in KMC group compared to non KMC group (p value= 0.000504) in the weight band of (1.5-2.5) kg was significantly higher with average weight gain being 1125g vs 1025g in KMC & Non KMC groups respectively in the above mentioned weight band.

Mean weight gain in Kg at day 70 in KMC group was 2020g vs 1860g in non KMC group (p value 0.00000296).

IV. Discussion:

In this study KMC group was comprised of 30 male & 28 female babies & that of Non KMC group was 26 male & 26 female babies summing up to 56 male & 54 female participants. Chi square test estimated the p value to be 0.856689593 implying no significant difference between two groups in terms of gender wise distribution.

In this study number of participants distributed in the birth weight band of (1.5 – 2.5 kg) were 36 in non KMC group & 48 in KMC group & participants in the weight band of >2.5 kg were 16 in Non KMC & 10 in KMC group. Our study did not involve babies with birth weight less than 1.5 kg as this was the exclusion criteria & also as KMC is an established method of care in preterm VLBW infants, depriving them from this won't be a logical idea to test. The number of participants in the 2 abovementioned weight band varied significantly as increasing unwillingness faced in acceptance of KMC among the mothers of higher birth weight babies (>2.5 kg).

No statistically significant difference was noted in birth weights between two groups (p value = 0.091539) consistent with the randomness of sample collection.

The study shows a small but significantly higher mean gestational age among participants of Non KMC group than KMC group probably due to the mothers of preterm babies were more convinced by the already existing positive data on the impact of KMC in Preterm babies.

Weight loss during first 7 days was significantly less in KMC group than in Non KMC group in the weight band of (1.5-2.5 kg). Though no significant difference in weight gain noted at day 14 but this positive effect on weight gain was again realized in the KMC at day 42 & day 70 especially in the weight band of (1.5-2.5 kg).The fact that no significant difference observed at day 14 may be due to the fact that both group received adequate attention and care at immediate post discharge period at home given that they all required hospitalization.

The results of this study correlates well with previous studies by Suman RP et al. In their study they found the KMC babies had better average weight gain per day (KMC: 23.99 g vs CMC: 15.58 g, P< 0.0001).

The limitations of the study were following

Despite being motivated, several mothers failed to provide KMC correctly, even after repeated demonstrations, and their data had to be excluded. This emphasizes the need for perseverance for both mothers and nursing staff towards proper KMC technique[6].

V. Conclusion:

KMC decreased early neonatal period weight loss in normal & low birth weight infants & also have a lasting positive impact on weight gain in early infancy, especially in preterm low birth weight babies, helping them in achieving catch up growth earlier thus reducing their excursion time in high risk low weight zone.

Authors' contributions:
Das P S conceived the idea and actually conducted the study. He collected the data and finally drafted the manuscript. Dey S revised the manuscript and added some intellectual contents to it. He provided necessary guidance whenever needed. Saha S helped in every step of the study and maintained co-ordination with other wards and follow up clinic whenever necessary. Pal A C contributed in the statistical analysis and also added some valuable contents.

Acknowledgement

All the mothers of the babies included in the study and the nursing staffs of SNCU in assisting the mothers to carry out KMC in wards. We also thank the administration of Bankura Sammalini Medical College and Hospital (BSMCH) for their kind assistance in permitting us to use patient's data in this study. The contents of this study are solely responsibility of the authors and are in no way representative of the official views BSMCH

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Dey S, et. al. "A Study on Effect of Kangaroo Mother Care on Weight Gain of Normal and Low birth Weight Infants in a Rural Medical College in West Bengal." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(5), 2020, pp. 13-18.