

# Effect of Educational Intervention on Knowledge, Attitude and Practice of Nursing Mothers of Babies Receiving Kangaroo Mother Care and its Impact on Weight Gain: A Randomised Controlled Trial

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## ABSTRACT

**Introduction:** Kangaroo Mother Care (KMC) has proven to be a humane, powerful, easy-to-use, and low-cost method to promote the health of Low Birth Weight (LBW) neonates. The level of Knowledge, Attitude and Practice (KAP) of nursing mothers on KMC is variable. The KAP of mothers on KMC can be improved through mass media communication, which in turn improves the outcome of LBW.

**Aim:** To determine the level of KAP regarding KMC among the mothers admitted to the KMC ward and to assess the impact of educational intervention on babies' weight gain during KMC stay and on follow-up.

**Materials and Methods:** This was a Randomised Controlled Trial conducted in the KMC ward, Belagavi Institute of Medical Science (BIMS) (a tertiary care centre), Northern Karnataka, India, from March 2021 to February 2022. A total of 79 subjects were included in the study and randomised into two groups: the case group (n=39) and the control group (n=40). The case group received educational intervention on KMC using audiovisual aids, while the control group received standard KMC counselling. Mothers from both groups were assessed for KAP using a prestructured questionnaire. Babies were followed-up at the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> months after discharge for weight gain. Data were analysed using Statistical Package for Social Sciences (SPSS) software version 23.0. Chi-square tests and Mann-Whitney U tests were applied for analysis.

**Results:** The study comprised 79 KMC mother-baby dyads, with 39 in the case group and 40 in the control group. Most mothers (91%) were in the age group of 20-30 years, and 92% of the mothers had an educational status of Secondary School Leaving

Certificate (SSLC), and Pre-university Course (PUC). The mean birth weight was 2.1 kg, 57% of babies were delivered by Lower Segment Caesarean Section (LSCS), and the mean gestational age was 34.48 weeks. There were no significant differences in demographic characteristics between the two groups. At admission, there was no significant difference in knowledge scores between the case and control groups (20.83±1.89 vs 19.19±3.04, p-value=0.06), but there was a statistically highly significant difference at discharge (23.9±0.38 vs 21.63±3.31, p-value <0.001). Statistically significant differences were also found in attitude (6.98±0.16 vs 6.7±0.62, p-value=0.005) and practice scores (9.38±1.39 vs 6.0±1.97, p-value <0.001). The present study found that 89.74% of mothers in the case group and 90% in the control group had good knowledge at admission, and 100% and 95% at discharge, respectively. In terms of practice, 51.3% of mothers in the case group and 15% in the control group had good practices, while only 2.56% in the case group and 70% in the control group had poor practices, which was statistically significant across all grades. All mothers in the case group and 97.5% in the control group had a good attitude. The mean weight gain (grams per day) during follow-up was statistically significant at two months (25.32±8.09 g/day vs 22.43±4.99 g/day, p-value=0.005) and at three months (25.21±6.75 g/day vs 22.69±3.81 g/day, p-value=0.004).

**Conclusion:** Kangaroo mother care is a very effective and easy-to-practice method to improve the outcomes of LBW babies. Counselling using educational audiovisual aids will improve the KAP of mothers. Therefore, improved counselling should be advocated to enhance the efficacy of KMC and promote better weight gain.

**Keywords:** Counselling, Follow-up, Low birth weight, Preterm, Questionnaire

## INTRODUCTION

The prevalence of LBW neonates (17.5%) in India constitutes a heavy burden [1]. About 28% of all early neonatal deaths (deaths within the first seven days of life) that are not related to congenital malformations are due to preterm birth [2]. Kangaroo Mother Care (KMC) has proven to be a humane, powerful, easy-to-use, and low-cost method to promote the health of LBW neonates, particularly for those weighing <2000 g at birth [3,4]. KMC involves care of preterm infants carried skin-to-skin with the mother. It decreases infant mortality, encourages breastfeeding, and reduces

the frequency of LBW babies visiting clinics after discharge from hospitals [5]. KMC has shown to improve lactation in mothers, boost the physiological bonding between mother and neonate, improve the sleep cycle and oxygenation in sick preterm infants and reduce apnoeic spells [5,6].

A Cochrane review found that neonates given KMC had a lower risk of nosocomial infections, severe illness, and respiratory tract diseases, and better weight gain at six months of follow-up compared to neonates who received standard care [6]. Despite

the advantages of KMC, it is still not widely practiced for the care of LBW infants in India. The level of KAP of nursing mothers on KMC varies from 65-90% to 4-40% [7-18]. A study conducted by Urmila KV et al., concluded that the KAP of mothers on KMC can be improved through mass media communication, which in turn improves the outcomes of LBW babies, especially in developing countries [18]. The present study aimed to use audiovisual aids as an educational interventional tool in KMC counselling. Additionally, there is insufficient data regarding the KAP of KMC on weight gain [19]. Hence, the present study was conducted to assess the effect of audiovisual aids as an educational intervention on the KAP of mothers regarding KMC compared to the standard method of counselling and its impact on weight gain during KMC stay and on monthly follow-up for three months.

### MATERIALS AND METHODS

The present randomised controlled trial conducted in the KMC ward at BIMS Hospital, a tertiary care centre in Northern Karnataka, from March 2021 to February 2022. After obtaining ethical clearance from the Institutional Ethical Committee (BIMSIEC/130/2020-21) and informed written consent from mothers admitted to the KMC ward, they were enrolled in the study.

**Sample size calculation:** Sample size estimation was calculated using the formula with 95% power as per a similar study [20].

$$n = \frac{2(Z_{\alpha} + Z_{\beta})^2 pq}{(P1 - P2)^2}$$

$$n = \frac{2(1.96 + 1.28)^2 76.32 \times 23.68}{(95.4 - 57.24)^2}$$

n=30 in each group

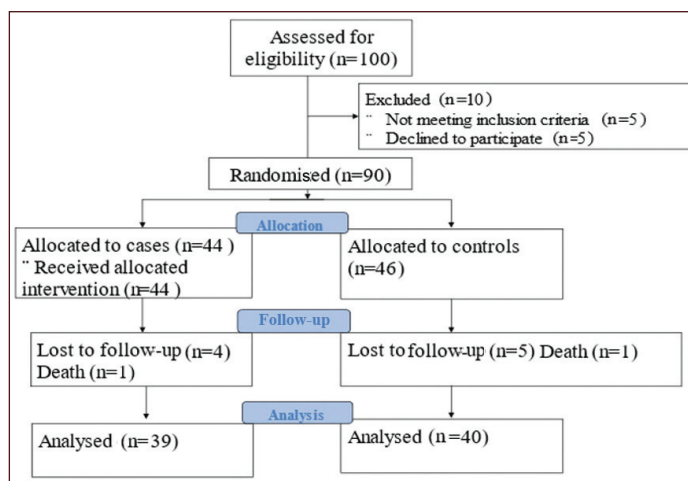
Where,  
 $Z_{\alpha}$  = Z value of  $\alpha$  error = 1.96  
 $Z_{\beta}$  = Z value for  $\beta$  error (Power 90%) = 1.28

P1=95.4% did not have knowledge about KMC from the article by Urmila KV et al., [18]. P2=assumption of a 60% decrease in P1=57.24, q=100-p=23.68.

With 10% loss to follow-up, N=n/1-10%=26/0.9 N=33 in each group.

**Inclusion criteria:** Haemodynamically stable neonates admitted to the KMC ward weighing between 1500 g to 2499 g were included in the study. Mothers of babies admitted to the KMC ward administering KMC according to standard KMC guidelines were included in the study [5].

**Exclusion criteria:** Haemodynamically unstable neonates and mothers were excluded from the study.



[Table/Fig-1]: Study enrollment in detail.

### Study Procedure

The subjects were randomised into two groups: the case group and the control group. Randomisation was achieved by simple randomisation, and allocation was concealed using the sealed envelope technique. In the present study, 90 mothers were included and 10 were excluded from the study. Details of the study enrollment are explained in [Table/Fig-1].

The case group received three sessions of educational intervention on the 1<sup>st</sup> day, 3<sup>rd</sup> day, and 5<sup>th</sup> day on KMC using audiovisual aids and explanations in their own vernacular language, available on the Government of India website [21]. The control group received standard counselling in the KMC ward. Mothers from both groups were encouraged to practice KMC daily for, as long as possible during the day and night, with a minimum period of two hours at a time, gradually increasing to a maximum duration throughout the day. Mothers were provided with a KMC chart to record the duration of kangaroo care provided.

All demographic data of both mothers and babies, such as age, educational status, parity, mode of delivery, gestational age and birth weight, were entered into a predesigned, pretested proforma. Mothers from both groups were assessed for knowledge at admission and discharge [Table/Fig-2]. Attitudes and practices were assessed at discharge using an assessment tool with a prestructured questionnaire, and scores were recorded in the proforma [Table/Fig-2,3] [11].

The questionnaire consisted of 12 questions testing knowledge regarding KMC [Table/Fig-2]. Each correct response was scored as 1, while an incorrect response was scored as 0. Therefore, the maximum total score for “knowledge” was 24. The mothers’ attitudes were assessed based on 6 questions [Table/Fig-3], with a maximum total score of 7. The practice component of KMC was

Questionnaire regarding knowledge aspect of KMC	Answers	Points
<b>1. What is KMC?</b>		
a. A special way of caring for babies (yes, correct; no, incorrect)	Yes/no	1 point for yes 0 point for no
b. Baby is kept continuously in skin-to-skin contact	Yes/no	
c. Baby is exclusively breastfed	Yes/no	
<b>2. Which babies need KMC?</b>	Small size baby (<2.5 kg) or Normal babies (>2.5 kg)	1 point for yes 0 point for no
<b>3. Can you continue KMC at home?</b>	Yes/no	1 point for yes 0 point for no
<b>4. Who else can provide KMC?</b>	Only mother or Any other healthy house members	0 point 1 point

<b>5. What is the normal position of KMC?</b>		
a. Between the mother's breasts in upright position	Yes/no	1 point for yes 0 point for no
b. Head turned to one side and slightly extended	Yes/no	
c. Baby's abdomen at the level of mother's stomach	Yes/no	
d. Baby's bottom supported by a sling	Yes/no	
<b>6. Is it possible to provide KMC in</b>		
a. In sitting posture	Yes/no	1 point for yes 0 point for no
b. In sleeping posture	Yes/no	
<b>7. Should the baby wear clothes (caps/socks/diaper/sleeveless front opened sleeves)?</b>		
	Yes/no	1 point for yes 0 point for no
<b>8. What is the expected daily weight gain of the baby?</b>		
	5-10 g	0 point 1 point
	10-20 g	
<b>9. When should KMC be discontinued?</b>		
a. When the baby reaches corrected gestational age of 9 months (term)?	Yes/no	1 point for yes 0 point for no
b. When the baby's weight is 2500 g	Yes/no	
<b>10. Why is KMC advantageous?</b>		
a. Helps baby grow	Yes/no	1 point for yes 0 point for no
b. Keeps baby warm	Yes/no	
c. Reduces hospital stay	Yes/no	
d. Protects baby from common illnesses	Yes/no	
<b>11. For how long should the baby be followed-up post discharge?</b>		
	Every month	1 point 0 point
	or	
	Every 6 monthly	
<b>12. What is the indicator that the baby is well?</b>		
a. Baby is active	Yes/no	1 point for yes 0 point for No
b. Hands and feet are warm	Yes/no	
c. Breathing is regular	Yes/no	

**[Table/Fig-2]:** Questionnaire regarding knowledge aspect of KMC [11].

Questionnaire regarding attitude aspect of KMC	Answers	Points
<b>1. How did you feel like while giving KMC?</b> Positive response taken as "felt nice"		
a Comfortable/nice	Yes/no	1 point for yes 0 point for no
b Shy/anxious/stressed		
<b>2. Did you feel that the baby is safe?</b>	Yes/no	1 point for yes 0 point for no
<b>3. Was it tiring for you? (Positive response taken as "no")</b>	Yes/no	1 point for no 0 point for yes
<b>4. Are you more confident of handling the baby after KMC?</b>	Yes/no	1 point for yes 0 point for no
<b>5. Does your family think that KMC is important for the baby?</b>	Yes/no	1 point for yes 0 point for no
<b>6. Do you think KMC helps to increase mother-baby bonding?</b>	Yes/no	1 point for yes 0 point for no

**[Table/Fig-3]:** Questionnaire regarding attitude aspect of KMC [11].

evaluated based on 6 questions [Table/Fig-4], with a maximum total score of 13. The total score, including KAP, was 44. A total score of less than 50% was graded as poor/low, 50% to less than 75% was graded as average, and more than 75% was graded as good/high for knowledge and practice [22]. A total score of attitude questionnaires more than 75% was graded as a positive attitude.

The duration of KMC (hours) per day was categorised as short (<4 hours), extended (5-8 h), long (9-12 h), and continuous (>12 h) [23]. The total duration of KMC stay, daily weight gain (grams per day), and feeding monitoring were recorded daily until discharge. Babies were followed-up three times in the Paediatric Outpatient Department and with the help of Accredited Social Health Activist

(ASHA) worker from the respective Primary Healthcare Centre (PHC) to assess their weight gain at the 1<sup>st</sup> month, 2<sup>nd</sup> month and 3<sup>rd</sup> month from the date of discharge from the KMC ward.

## STATISTICAL ANALYSIS

Data were recorded on a predesigned proforma, tabulated and the results were analysed statistically using SPSS statistical software version 23.0. The Chi-square test was used to compare percentages between cases and controls. As the data were not normal, a non parametric test (Mann-Whitney U test) was applied to observe the median difference between cases and controls. A p-value of <0.05 was considered statistically significant and <0.001 was considered highly significant.

Questionnaire regarding practice aspect of KMC	Answers	Points
1. a. For how many hours did you give KMC per day in the hospital?	(4-8 h)	Score 1
	(8-12 h)	Score 2
b. For how many hours per day will you give KMC at home?	(>12 h)	Score 3
2. Did you breastfeed the baby in KMC position? (Positive response taken as "yes")	Yes/no	1 point for yes 0 point for no
3. Could you express milk in KMC position?	Yes/no	1 point for yes 0 point for no
4. Are you able to keep the baby in KMC Position:		
a. While sleeping	Yes/no	1 point for yes 0 point for no
b. While doing small household chores	Yes/no	
c. Will you able to keep the baby in KMC position while traveling	Yes/no	
5. Did other family members (husband/grandmother/grandfather) help/participate in KMC?	Yes/no	1 point for yes 0 point for no
6. Are you able to perceive the baby's heart beats and breathing?	Yes/no	1 point for yes 0 point for no

**[Table/Fig-4]:** Questionnaire regarding practice aspect of KMC.

## RESULTS

The final study included 79 KMC mother-baby dyads, with 39 in the case group and 40 in the control group. There were no statistically significant differences in demographic characteristics between the two groups [Table/Fig-5]. The mean birth weight was 2.1 kg, and the mean gestational age was 34.48 weeks. 57% of babies were delivered by LSCS. In the present study, the majority of mothers (91%) were in the age group between 20 years and 30 years, and 92% of mothers had studied till SSLC/PUC. Family members were involved in providing KMC in 82% of cases and 60% of controls [Table/Fig-5].

In the current study, there was a statistically highly significant difference in KMC hours during hospital stay between the two

groups ( $7.76 \pm 2.11$  vs  $6.24 \pm 1.93$ ,  $p$ -value  $< 0.001$ ) [Table/Fig-6]. The majority of mothers from both groups administered KMC for extended hours (77% and 65%). None from the case group and 17% from the control group administered KMC for short hours. There was a statistically significant difference in the duration of KMC stay (days) between the two groups (7.8 vs 6.46,  $p$ -value=0.02) [Table/Fig-6].

In the present study, there was no significant difference in knowledge scores between the case and control groups at admission ( $20.83 \pm 1.89$  vs  $19.19 \pm 3.04$ ,  $p$ -value=0.06), but there was a statistically highly significant difference at discharge ( $23.9 \pm 0.38$  vs  $21.63 \pm 3.31$ ,  $p$ -value  $< 0.001$ ). There were statistically significant

Characteristics	Case (n=39)	Controls (n=40)	Total (N=79)	p-value
<b>Gender, n (%)</b>				
Male	13 (33.3)	18 (45)	31 (39)	0.174
female	26 (66.6)	22 (55)	48 (61)	0.277
Birth weight of babies (kg) (mean $\pm$ SD)	2.12 $\pm$ 0.27	2.08 $\pm$ 0.26	2.1 $\pm$ 0.265	0.489
Mean gestational age (weeks)	34.48	34.69	34.58	0.698
Maternal age (years) (mean $\pm$ SD)	22.68 $\pm$ 2.96	22.84 $\pm$ 2.60	22.76 $\pm$ 2.78	0.385
<b>Maternal age, (years), n (%)</b>				
<20	2 (5)	4 (10)	6 (8)	0.197
20-30	36 (92)	36 (90)	72 (91)	0.882
>30	1 (3)	0 (0)	1 (1)	
<b>Mode of delivery, n (%)</b>				
NVD	14 (36)	20 (50)	34 (43)	0.13
LSCS	25 (64)	20 (50)	45 (57)	0.08
<b>Parity of mothers, n (%)</b>				
Primi para	13 (33.3)	18 (45)	31 (39)	0.174
Multi para	26 (66.6)	22 (55)	48 (61)	0.277
<b>Educational status, n (%)</b>				
<SSLC	3 (8)	1 (2.5)	4 (5)	
SSLC/PUC	36 (92)	37 (92.5)	73 (92)	0.132
Graduate/Degree	0	2 (5)	2 (3)	0.941
<b>Family members involved in giving KMC apart from mother, n (%)</b>				
Yes	32 (82)	24 (60)	56 (71)	<b>0.03</b>
No	7 (18)	16 (40)	23 (29)	

**[Table/Fig-5]:** Demographic characteristics between cases and controls. NVD: Normal vaginal delivery; The p-value in bold font indicates statistically significant value

Variables	Cases (n=39)	Controls (n=40)	Total (N=79)	p-value
<b>Average KMC hours during KMC ward stay</b>				
Average KMC hours (hours: mean±SD)	7.76±2.11	6.24±1.93	7±2.0	<b>0.001</b>
Short (<4 hours), n (%)	0	7 (17)	7 (8.86)	
Extended (5-8 hours), n (%)	30 (77)	26 (65)	56 (71)	
Long (9-12 hours), n (%)	8 (20)	7 (18)	15 (19)	
Continuous (>12 hours), n (%)	1 (3)	0	1 (1.2)	0.314
<b>Duration of KMC stay</b>				
Duration of KMC stay (days)	7.8	6.46	7.13	<b>0.02</b>

**[Table/Fig-6]:** Duration of KMC hours and KMC stay.  
Mann-Whitney U test and Chi-square test

differences in attitude and practice scores between the two groups (6.98±0.16 vs 6.7±0.62, p-value=0.005 and 9.38±1.39 vs 6.0±1.97, p-value <0.001) [Table/Fig-7]. A total of 89.74% of the case group and 90% of the control group had good knowledge at admission [Table/Fig-8], while 100% of the case group and 95% of the control group had good knowledge at discharge [Table/Fig-9]. In terms of practice, 51.28% of the case group had good practice, with only 2.56% having poor practice, compared to the control group where 15% had good practice and 70% had poor practice, which was statistically significant in all grades [Table/Fig-10]. A total of 100% of

the cases and 97.5% of the control group had a positive attitude, which was not statistically significant [Table/Fig-11].

The mean weight gain (grams per day) during KMC stay and on follow-up after one month of discharge showed no significant difference between the two groups [Table/Fig-12,13]. However, there was a statistically significant difference in mean weight gain (grams per day) on follow-up at the 2<sup>nd</sup> month (25.32±8.09 g/day vs 22.43±4.99 g/day, p-value=0.005) and 3<sup>rd</sup> month (25.21±6.75 g/day vs 22.69±3.81 g/day, p-value=0.004) [Table/Fig-13].

Knowledge score (n, Mean±SD)	Cases (n=39)	Controls (n=40)	p-value
Admission	20.83±1.89	19.19±3.04	0.06
Discharge	23.9±0.38	21.63±3.31	<0.001
Attitude score at discharge(N; mean±SD)	6.98±0.16	6.7±0.62	0.005
Practice score at discharge (N; mean±SD)	9.38±1.39	6.0±1.97	<0.001

**[Table/Fig-7]:** Knowledge, attitude and practice scores of KMC between cases and controls.  
Mann-Whitney U test

Knowledge score at admission between cases and controls			Admission			Z score	p-value
			Cases (n=39)	Controls (n=40)	Total (N=79)		
Percentage	Scores (max=24)	Grading	No. of mothers n (%)	No. of mothers n (%)	No. of mothers n (%)		
>75%	18	Good/high	35 (89.74)	36 (90)	71 (89.87)	Z=0.04	1.0
50-75%	12-18	Average	4 (10.26)	2 (5)	6 (7.63)	Z=0.88	0.197
<50%	<12	Low/poor	0	2 (5)	2 (2.5)	Z=1.45	

**[Table/Fig-8]:** Knowledge scores percentage and grading at admission between cases and controls.  
Chi-square test

Knowledge score at discharge between cases and controls			Discharge			Z score	p-value
			Cases (n=39)	Controls (n=40)	Total (N=79)		
Percentage	Scores (max=24)	Grading	No. of mothers n (%)	No. of mothers n (%)	No. of mothers n (%)		
>75%	18	Good/high	39 (100)	38 (95)	77 (97.5)	Z=1.45	0.72
50-75%	12-18	Average	0	0	0		-
<50%	<12	Low/poor	0	2 (5)	2 (2.5)	Z=1.45	-

**[Table/Fig-9]:** Knowledge scores percentage and grading at admission between cases and controls.  
Chi-square test

Practice score at discharge between cases and controls			Discharge			Z-score	p-value
			Cases (n=39)	Controls (n=40)	Total (N=79)		
Percentage	Scores (max=24)	Grading	No. of mothers n (%)	No. of mothers n (%)	No. of mothers n (%)		
>75%	>10	Good/high	20 (51.3%)	6 (15%)	26 (33.14)	Z=3.7	<b>0.000009</b>
50-75%	6.5-10	Average	18 (46.1%)	6 (15%)	24 (30.37)	Z=3.19	<b>0.000072</b>
<50%	<6.5	Low/poor	1 (2.56%)	28 (70%)	29 (36.7%)	Z=8.78	<b>&lt;0.00000001</b>

**[Table/Fig-10]:** Practice scores with grading percentage and grading at discharge between cases and controls.  
Chi-square test



Attitude score at discharge between cases and controls			Discharge		Total (N=79)	Z-score	p-value
			Cases (n=39)	Controls (n=40)			
Percentage	Scores (max=24)	Grading	No. of mothers n (%)	No. of mothers n (%)	No. of mothers n (%)		
>75%	>5.25	Good/high	39 (100)	39 (97.5)	78 (98.75)	Z=1.01	0.887
50-75%	3.5-5.25	Average	0	1 (2.5)	1 (1.25)	Z=1.01	-
<50%	<3.5	Low/poor	0	0			-

**[Table/Fig-11]:** Attitude scores with grading at discharge between cases and controls.  
Chi-square test

Weight gain during KMC stay					
Mean weight gain during KMC stay (gram/day; mean±SD)	Cases (n=39)	Controls (n=40)	Total (n=79)	Test	p-value
	22.80±14.45	22.40±12.04	22.6±13.24	Mann-Whitney U test	0.959

**[Table/Fig-12]:** Weight gain during KMC stay.

Weight gain (gram/day) in follow-up days		Mean±SD	Median	IQR	Confidence interval for mean	z-value	p-value
1 month	Cases	24.61±12.82	28.67	18.33	20.45,28.76	1.801	0.072
	Control	22.62±7.54	23.83	12.67	20.18,25.06		
2 months	Cases	25.32±8.09	28.33	9	22.69,27.94	2.835	0.005 (S)
	Control	22.43±4.99	23.67	9.17	20.81,24.05		
3 months	Cases	25.21±6.75	28	8.33	22.99,27.43	0.915	0.004
	Control	22.69±3.81	23.33	6.22	21.46,23.93		

**[Table/Fig-13]:** Weight gain of babies (gram per day) in the follow-up days of KMC.  
Mann-Whitney U test

## DISCUSSION

The present study revealed that the majority (91%) of mothers were in the age group of 20-30 years, which was comparable to studies conducted by Roba AA et al., and Gulati P et al., with 92% and 93% respectively [24,25]. The majority (92%) of mothers in the present study had an educational status of SSLC/PUC, whereas it was 61% and 63% in studies by Urmila KV et al., and Gulati P et al., respectively [18,25]. The variation may be due to various factors such as literacy rates, cultural backgrounds and urban and rural areas among different states in India.

As there was no randomised control study similar to the present study, the average values (including case and control groups) were compared with other studies. In the present study, 57% of mothers delivered through LSCS, in contrast to studies by Jamie AH and Gulati P et al., with 33% and 32%, respectively [8,25]. The incidence of LSCS was high in the present study due to it being a tertiary/referral Institute. In the present study, 39% of mothers were primigravida, whereas it was 40.5% and 50% in studies by Urmila KV et al., and Gulati P et al., respectively [18,25].

In the present study, 71% of mothers were able to administer KMC for extended hours (5-8 hours), followed by 19% for long hours (9-12 hours), and 8.86% for short hours (<4 hours), whereas Gulati P et al., found that 45.6% and 37.8% of mothers administered long hours and short hours, respectively [25]. Mekala S et al., found that 44% of mothers administered short hours and 34.6% for extended hours [26]. In the present study, none from the case group followed short hours as compared to the control group (17%), which might be due to effective educational intervention using audiovisual aids in the case group. The mean duration of KMC hours in the present study was 7±2.0 hours/day, which was better than the study by Roba AA et al., where it was 2 hours/day [24].

The majority of mothers (89.87% at admission and 97.5% at discharge) had good knowledge regarding KMC, which was similar

to other studies by Kambarami RA et al., (84%), Jamie AH (82.53%), Chisenga JZ et al., (84%), Nguah SB et al., (90%), Bajaj S et al., (72.8%), Olawuyi O et al., (66.6%) [7-12]. In contrast, some studies have shown poor knowledge, such as Sharma K and Verma VL (33.3%), Ghale N and Mehta N (44.7%), Chamhene N and Moshi FV (62%), Yezengaw TY (34.1%), Todkar MM et al., (10%), Urmila KV et al., (4.6%) [13-18].

In the present study, the majority (98.7%) of mothers had a positive attitude, which was similar to studies by Jamie AH (82.53%), Bajaj S et al., (75%), Ghale N and Mehta N (97.7%), Urmila KV et al., (100%), Rosant C (86.7%) [8,11,14,18,27]. In contrast, a few studies had a lower positive attitude, such as Yezengaw TY (20.5%), Azene GK et al., (52%) [16,28].

In the present study, 51.3% of the mothers in the case group had good practice, which was comparable to studies by Ghale N and Mehta N (61.8%), Mekala S et al., (66.14%), Azene GK et al., (61.6%), and lower than the study done by Dawit A (84.6%) [14,26,28,29]. In the present study, 15% of the control group had good practice, which was comparable to studies by Jamie AH, Yezengaw TY and Solomon Emishaw et al., (32.12%), (18.4%) and (36.2%), respectively [8,16,30]. The level of knowledge in the case group was comparable to the control group at admission, but there was a statistically significant difference in KAP scores at discharge.

The mean weight gain (grams/day) on follow-up after one month of discharge showed no significant difference between the two groups. However, there was a statistically significant difference in follow-up at two months and three months after discharge. The significant weight gain in the case group might be attributed to their high knowledge received during the intervention, high level of positive attitude, and good practice in the case group. The mean weight gain (grams per day) in the case and control groups were 24.61±12.82 and 22.62±7.54, respectively, at one month after discharge, which was similar to other studies by Maurya A et al., (23.99 g/day), Rao S et al., (23.99 g/day), Samra NM et al.,

(22.1±2.5 g/day), Gupta M et al., (21.3 g/day), Ramesh S and Sundari S, (21.11±2.8 g/day), lower than Ramdin T et al., (37.6 g/day) but higher than Madhavi K et al., (19.6 g/day), Ramanathan K et al., (15 g/day), Compos M et al., (13.4 g/day), Mekala S et al., (13.87 g/day) [20,26,31-38].

The family involvement in giving KMC in the present study was 71%, which was comparable to Urmila KV et al., (85.4%), Parmar VR et al., (84%), Kadam S et al., (64%) [18,39,40].

### Limitation(s)

As the present study could not include the Very Low Birth Weight (VLBW) and Extremely Low Birth Weight (ELBW) babies, the impact of the improvised counselling could not be studied in the above group.

### CONCLUSION(S)

The KMC is a proven, cost-effective method of caring for LBW and preterm infants. The outcomes of KMC can be enhanced by improving the KAP. The present study utilised audiovisual aids as an interventional tool in counselling mothers on KMC and found significantly higher KAP scores. There was also significant weight gain observed during follow-up at the 2<sup>nd</sup> and 3<sup>rd</sup> months. Therefore, the authors recommend the use of audiovisual aids along with standard counselling.

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