Original Research Article

Growth, neuromotor, neurosensory and psychomotor development in babies receiving Kangaroo Mother Care- A cohort 1 year follow up study

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Abstract

Introduction: Low birth weight infants (LBWI) constitute a worldwide problem with high neonatal and infant mortality and morbidity. Millions of newborn death could be avoided if more resources were invested in proven, low cost interventions designed to address newborn's needs. Kangaroo Mother Care (KMC) is one such low cost and proven method of care of low birth weight babies but has not yet been widely used in India. In this method the infant is placed between mother's breasts in direct skin-to-skin contact, gives exclusive breast feeding and are discharged home early. It is particularly useful for care of stable LBW infants below 2000g. **Objective:** This cohort follow-up study was undertaken and had proved the beneficial effects of KMC to the LBW babies to study "Growth and neuromotor, neurosensory and psychomotor development in KMC NICU graduate. **Methods:** 24 hours KMC was offered to all babies included in the study and their Growth, neuromotor, neurosensory and psychomotor development was followed up up to 1 year of age. **Results:** KMC reduced mortality, improved breast feeding rates; KMC for 24 hours was possible with regular intensive counseling of mothers and other family members, The early discharge policy for low birth weight babies was possible and beneficial to achieve intrauterine growth accretion through regular follow up and monitoring of babies. **Conclusion:** In low resources setting in developing world like India KMC- reduces mortality, improves breast feeding rate & help in early discharge of low birth weight babies.

Keywords: Kangaroo Mother Care, Pre-term babies, Infant Mortality, Low birth weight infants, Growth and development.

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Introduction

Low birth weight infants (LBWI) constitute a worldwide problem with high neonatal and infant mortality and morbidity [1]. Care of low birth weight infants (LBWI) represents a major challenge for the health and social systems globally. In the developed countries, low birth weight rate and the associated mortality and morbidity has been reduced considerably, because of availability of expensive, sophisticated techniques and highly qualified health care professionals [2]. In less developed countries high rate of LBW are due to preterm birth and impaired intrauterine growth and their prevalence is decreasing slowly. Quality care for LBW infants could reduce neonatal mortality in developing countries, but it is expensive and not available in most of the rural and urban centers in India. In India over two thirds of deliveries occur at home [3]. Many LBW infants born

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in this setting do not get optimum treatment and die at home. Community based studies have shown that these infants tend to have very high mortality in the absence of any interventions [4,5]. Millions of newborn death could be avoided if more resources were invested in proven, low cost interventions designed to address newborn's needs. Kangaroo Mother Care (KMC) is one such low cost and proven method of care of low birth weight babies but has not yet been widely used in India.

Kangaroo mother care (KMC) is low cost, comprehensive method of care of LBW infants and has numerous benefits to the baby, mother, community and the nation. KMC is a unique method of caring for LBW babies. In this method the infant is placed between mother's breasts in direct skin-to-skin contact, gives exclusive breast feeding and are discharged home early. It is particularly useful for care of stable LBW infants below 2000g. The research has proved that babies nurtured in KMC have fewer incidences of hypothermia, hypoglycemia, sepsis, and apnea and have better growth and long term neurodevelopment outcome [6].

Global experience and randomized controlled trials have shown the benefits of KMC. Experience with KMC in India is relatively limited. KMC could help overcome most of the constraints of conventional methods of care (CMC). KMC does not need sophisticated equipment, and for its simplicity it can be applied almost everywhere, including peripheral maternity hospitals of very low-income countries like India. KMC could also contribute to the humanization of neonatal care and containment of cost [7]. KMC was first started in Bogotá, in 1978 by Edgar Rey Sanabria and Hector Martinez, in response to shortages of staff and equipment in their hospital [8,9]. KMC was initially introduced in stable babies. The classic KMC consisted of skin-to-skin care of LBW infants, exclusive breastfeeding and early discharge with an adequate follow-up [9]. There is considerable evidence on the beneficial effects of KMC from developing as well as from developed countries. Most of the evidence on the practice of KMC has come from hospital-based studies after the initial stabilization of sick preterm and low birth weight neonates.

Despite the many advantages of KMC it is still not a widely practiced method of care of LBWI in India [10]. Over 75% neonates are born and looked after in the domiciliary setting with no access to sophisticated, expensive and prolonged medical care [11]. Clear scientific evidences are needed to establish the safety and suitability of domiciliary KMC for babies born at home and hospital [1]. This simple method is found suitable and safe and need to be culturally acceptable. This new primary modality which is already incorporated into the essential newborn care package needs to be disseminated all throughout the country [12]. More evidence is also required for assessing effectiveness of KMC for LBW and preterm infants [11]. The present descriptive follow-up study was undertaken, as the randomized control trial and had proved the beneficial effects of KMC to the LBW babies to study "Growth and development in KMC NICU graduate". Methodology.

The follow up study in babies receiving Kangaroo Mother Care was carried out from October 2005 to January 2007 in a major tertiary teaching and referral center for high risk deliveries with a tertiary level neonatal intensive care unit (NICU) and Ambulatory kangaroo mother care center-"SishuGhar".

Inclusion criteria: All Inborn babies with birth weight ≤ 1800grams.

Exclusion criteria: Babies born outside and admitted in NICU.

- Mothers unwilling to participate and come for regular follow up.
- Babies requiring transfer to other hospitals.
- Chromosomal and life threatening congenital anomalies.
- Mothers left against medical advice
- Multiple pregnancy
- All eligible babies weighing ≤ 1800 g were enrolled for Kangaroo mother care. At the time of enrollment, detailed history was recorded on a pre-designed proforma. Gestational age was determined by performing New Ballard's scoring, within 24 hours of life.

Anthropometric assessment

- Babies were weighed naked on an electronic weighing scale (Conweigh, Zeal medical, Electronic weighing scale - accuracy of + 5 g) immediately after birth and daily till discharge. The weighing machines were calibrated daily with 5 g standard weight.
- The length was measured at birth, at discharge and at each follow-up visit by using an infantometer.
- The mothers provided skin to skin contact using "Kangaroo bag" made of soft flannel cloth. Babies were well dressed with front open shirt, cap, and preferably soak proof diaper or cotton in a polydrip sheet and socks before placing in kangaroo bag.

For the purpose of the study infants were divided in to two groups on the basis of duration of KMC –

- Inadequate KMC: KMC for ≤12 hrs
- Continuous KMC : KMC for ≥18 hrs

Individual and group health talks were given to KMC mothers. They and their family members were grouped together daily to educate regarding care of low birth weight infants and for breastfeeding. During the health talk importance of temperature maintenance, advantages of kangaroo mother care and breast milk were emphasized.

Feeding

All babies were exclusively breast fed two hourly along with calcium (100 mg/kg/d), phosphorus (50 mg/kg/d) and multi vitamin supplementation with zinc once they reached fifty percent feeds. Iron was started in prophylactic dose 2mg/kg at 2 weeks of life.

Discharge and follow up

Babies were discharged when they met the following criteria:-

- Weight gain for two or three consecutive days.
- Successfully breastfeeding or wati-spoon feeding.
- Maintaining temperature in KMC.
- No evidence of illness.
- Mothers confident of caring for her baby.
- Assurance of follow-up.
- Successful "In hospital adaptation" of mother and other kangaroo care provider.

Babies were followed up at the kangaroo ambulatory center called "ShishuGhar" situated away from NICU.

Before discharge from NICU relatives were asked to visit "Shishughar" for familiarizing with the follow-up center.

After discharge babies were asked to come on the next day at "Shishu Ghar", and then subsequently daily till there was weight gain for 3 consecutive days of 15-20g/kg/day and after that alternate day and then once weekly till a preterm baby attained a post-connectional age of 40 weeks of corrected date of birth (CDOB) and till the weight gain achieved up to 2500g for full term SGA babies. Later families were asked to bring babies every month and definitely at 3, 6, 9 and 12 months. At each follow-up the following parameters were assessed.

- Anthropometry- weight, length, head circumference, chest circumference and mid-arm circumference.
- Compliance with KMC (KMC charts) i.e., duration of KMC per day.
- Evidences of any illnesses.
- Continuation of exclusive breastfeeding up to 6 months.
- Neuromotor examination by INFANIB at 3, 6, 9 and 12 months [25]. Infant Neurological International Battery (INFANIB)) is a tool to predict neurological outcome in premature babies.
- Psychomotor examination done by Griffith developmental scale at 6 and 12 months [26}.

The Griffiths Scales of Mental Development (Griffiths Scales) are among the most widely researched tests for the assessment of infants and young children in the world. The Griffiths Scales (Griffiths, 1970) provide a general development quotient in addition to measures of six domains of functioning, each of which is assessed on a separate subscale.

These subscales are: Subscale A (Locomotor); Subscale B (Personal–Social); Subscale C (Hearing and Speech); Subscale D (Eye and Hand Coordination); Subscale E (Performance); and Subscale F (Practical Reasoning).

- Brainstem Evoked Response Audiometryat discharge (BERA) or within 2 month. In case of abnormality on screening test babies were subjected to diagnostic BERA.

Statistical Analysis

All data were recorded on a pre-designed proforma, tabulated and the results were analyzed statistically by SPSS statistical software (version 11.5).

Results

This prospective cohort follow-up study was conducted in ShishuGhar KMC follow-up center attached with a level III neonatal intensive care unit of a major teaching and referral hospital in the city of Mumbai (between October 2005 and January 2007). The babies' ≤ 1800g born between October 2005 to March 2006 were enrolled and followed up.

Table- 1: Baseline Characteristics.

	No.	%
Total live births	3865	
Total babies ≤ 1800g	289	7.4
Total babies included and enrolled for follow-up	176	
Subjects not enrolled and excluded	113	
Reasons for not enrolling		
• Died in NICU before enrollment	30	10.3
• Went against medical advice	13	4.4
• Babies requiring transfer to other hospitals or department	2	0.6
• Mothers refused for enrollment as they were planning to leave Mumbai in the near future and not willing to come	16	5.5
• Multiple birth	52	17.9
Babies followed-up till 6 month	145	90.34
Babies followed-up till 9 month	106	
Babies followed-up till 1 year	57	
Babies died in follow-up	14	7.9
Lost to follow-up as address and phone number given were wrong and could not be traced	17	10.9

There were 3865 deliveries during the study period, 289 (7.4%) babies were ≤1800 g. One hundred and thirteen (39.1%) babies were not enrolled and not meeting the inclusion criteria because of various reasons like, 30 (10.3%) babies died in NICU before enrollment, 13 (4.4%) babies were discharged against medical advice, 2 (0.6%) babies required transfer to other department or hospital, 16 (5.5%) mothers refused for enrollment as they were planning to go to native place after delivery and did not agree to come for continuous follow-up. There were 52 (17.9%) mothers with multiple gestations. Fourteen babies (7.9%) died during follow-up and 17 (10. 9%) babies lost to follow-up. One hundred forty-five babies were followed up to 6 month. Out of them 106 babies completed 9 month and 57 babies completed 12 month of age after CDOB. Of these 145 subjects; 56 were from inadequate KMC group (KMC for ≤12 hrs) and 89 were in Continuous KMC group (KMC for ≥18 hrs).

Table-2: Morbidity on follow-up according to study groups.

Parameters	Inadequate KMC n=56	Continuous KMC n=89	*p*
Apnea	2 (3.5%)	1 (1.1%)	0.53
Hypothermia	2 (3.5%)	0 (0%)	0.42
Hypoglycemia	7 (12.5%)	1 (1.1%)	*
Respiratory Infection	15 (26.7%)	0 (0%)	*
Readmission	4 (7.4%)	1 (1.1%)	0.31

(*statistical test couldn't be applied)

During follow-up morbidity, readmission rate and mortality were lower with continuous KMC group and Hypoglycemia and respiratory infection was not noted in continuous KMC implying that continuous KMC was good.

Table-3: Mortality during follow upaccording to study groups.

KMC Group	Inadequate KMC (n=56+12)	Continuous KMC (n=89+2)	*p*
Death	12	2	
%	17.64%	2.1%	≤0.001

Overall mortality rate in present follow up study was 8.8%. There were 12 (17.64%) deaths in Inadequate KMC group and 2 deaths (2.1%) in continuous KMC group, indicating continuous KMC reduced mortality (p≤ 0.001). Out of 14 deaths during follow up only 3 babies completed CDOB and rest all died before reaching CDOB. All the 3 babies who completed CDOB died before completing 3 months. In all 14 babies after enquiry cause of death was narrated as sepsis and / or pneumonia. Continuous KMC significantly reduced the mortality (P≤0.001).

Table- 4: Comparison: KMC group with mean GA, Birth wt, Day of enrollment and hospital stay.

KMC group	GA (wk) (mean ±SD)	Birth weight (g) (mean ±SD)	Day of enrollment (mean ±SD)	NICU Stay (mean ±SD)	Hospital stay (mean ±SD)
Inadequate KMC n=56	34.13±2.78	1461.64±246.38	5.46±4.83	12.21±16.33	15.14±15.93
Continuous KMC n=89	33.68±3.28	1454.29±243.01	4.09±2.67	8.02±6.32	10.10±6.15
Total 145(100 %)	33.96±2.98	1458.80±244.26	4.62±3.70	9.64±11.44	12.06±11.25
P	0.51	0.42	0.31	0.002	0.001

The babies in both groups were comparable in terms of gestational age, weight and day of enrolment for KMC.

The babies who received KMC for longer durations, the NICU stay (p=0.002) and hospital stay (p=0.001) had decreased significantly as compared to shorter duration of KMC but multivariate analysis revealed that the babies in inadequate KMC group were sicker with stormy NICU course.

Table- 5 Growth indices up to 12 months of corrected age (% of expected average for age), for infant receiving inadequate KMC and adequate KMC.

Age (month)	Wt for age (%of expected average wt for corrected age			Height for age(%of expected average Ht for corrected age			Head circumference for age (% of expected average HC for corrected age		
	Inadequate KMC (n=56)	Continuous KMC (n=89)	*p*	Inadequate KMC (n=56)	Continuous KMC (n=89)	*p*	Inadequate KMC (n=56)	Continuous KMC (n=89)	*p*
CDOB (n=145)	103.45	105.67	NS	95.57	95.76	NS	95.94	97.97	0.11
3month (n=145)	86.47	86.99	NS	99.30	99.48	NS	96.18	99.82	0.02
6month (n=145)	89.88	91.95	NS	101.21	101.63	NS	100.08	100.42	0.53
9month (n=106)	99.18	99.18	NS	101.57	100.49	NS	102.50	102.76	0.64
12month (n=57)	101.04	104.19	NS	100.97	101.29	NS	99.84	101.22	0.50

- All the expected anthropometric parameters up to CDOB were calculated as per the intrauterine accretion rate of 15g/kg for weight and 0.7cm/week for length and head circumference, subsequently for 3,6,9 and 12 month was calculated for each baby as per recommended by NRBC growth chart and then percentage of expected average weight, length and head circumference were calculated from observed value for corrected age.

- Growth indices were comparable for weight and leng that corrected age except for head circumference between CDOB to 3 month. The growth of head circumference expressed as a proportion of expected head circumference at 3 months of corrected age, was probably associated with KMC intervention (*P*≤0.02).

Table-6 Increment in anthropometry up to 1 year.

Parameters	Up to CDOB	CDOB to 3 mo	3-6 mo	6-9mo	9-12mo
Wt (g/d)	18.16	22.66	13.51	14.00	13.59
TL (cm/wk)	0.54	0.77	0.52	0.38	0.33
HC (cm/wk)	0.54	0.36	0.23	0.20	0.14
CC (cm/wk)	0.41	0.46	0.25	0.27	0.20
MAC (cm/wk)	0.27	0.20	0.07	0.06	0.04

- Increment in wt, TL, HC, CC and MAC up to CDOB reported to be 18.16g/d,0.54cm/wk,0.54/wk,0.41/wk and 0.27/wk respectively.
- Increment in wt, TL, HC, CC and MAC in first 3 month reported to be 22.66g/d,0.77cm/wk,0.36/wk,0.46/wk and 0.20/wk respectively.
- Increment in wt, TL, HC, CC and MAC 3 - 6 months reported to be 13.51g/d,0.52cm/wk,0.23/wk,0.25/wk and 0.07/wk respectively.
- Increment in wt, TL, HC, CC and MAC 6 - 9 months reported to be 14.00g/d,0.38cm/wk,0.20/wk,0.27/wk and 0.06/wk respectively.
- Increment in wt, TL, HC, CC and MAC 9 - 9 months reported to be 13.59g/d,0.33cm/wk,0.14/wk,0.20/wk and 0.04/wk respectively

Table-7 Comparison of sequel measured after completion of study.

6 months						12 months			
Variable		Inadequate KMC n=56		Continuous KMC n=89	P	Variable	Inadequate KMC n=22	Continuous KMC n=35	p
Tone abnormality		17(30.3%)		21(23.5%)	NS	Cerebral palsy	1(5.2%)	2(6%)	NS
Transient	Abnormal	17(30.3%)	0	18(20.2%)	3(3.3%)				
Abnormal Griffith 6 mo						Abnorma Griffith 12 mo			
≤50		0		0	NS	≤50	1(4.5%)	1(2.8%)	NS
51-70		2(3.5%)		2(2.2%)		51-70	2(9%)	1(2.8%)	
71-90		6(10.7%)		5(5.6%)		71-90	3(13.6%)	2(5.7%)	
>90		48(85.7%)		82(92.1%)		>90	16(72.7%)	31(88.5%)	
ROP screening at 4 weeks		9(16%)		6(6.7%)		Blindness	-	-	-
Deafness		2(3.5%)		2(2.2%)	NS	Deafness	-	-	-

No difference was found between the two groups in the proportion of infants with cerebral palsy, psychomotor delay or visual or hearing impairment at 6 month and 1 yr. of corrected age.

Table-8 Griffith score with Neurological outcome according to subgroups AGA/ASGA/SSGA

Month		AGA	ASGA	SSGA	Griffith DQ	
					6mo	12mo
3	An=8	5(62.5%)	1(12.5%)	2(25%)		
	Tn=36	18(50%)	12(33.3%)	6(16.6%)		
6	An=3	2(66.6%)	0(0%)	1(33.3%)	85	36.15
	Tn=35	22(62.8%)	8(22.8%)	5(14.2%)		
9	An=5	2 (40%)	0(0%)	3(60%)		
	Tn=19	12(63.1%)	6(31.5%)	1(5.2%)		
12	An=3	0(0%)	0(0%)	3(100%)	91	31.82
	Tn=2	0(0%)	1(50%)	1(50%)		

AGA: appropriate for gestational age, ASGA: Asymmetrical Small for gestational age, SSGA: Symmetrical small for gestational age. Abnormal Infanib at 3 months was noted to be higher in AGA 62.5 % in SSGA it was 25 percent. When these babies were examined at 6 months, DQ AGA babies were 85 and of SSGA were 36.5. At 12 month of assessment total 5 babies were abnormality, 2 were transient and 3 were having abnormal Infanib. All babies were SGA babies (100%).

Table-9 Griffith Quotients for psychomotor development at 6 and 12 month of CDOB.

Criteria	Age(month)					
	6 months			12 months		
	Inadequate KMC n=56	Continuous KMC n=89	P	Inadequate KMC n=22	Continuous KMC n=35	P
All	92.5	94.2	NS	96.7	98.8	NS
Locomotion	88.8	89.7	NS	92.2.	94.4.	NS
Personal, social	94.2	96.6	NS	95.4	97.1	NS
Hand eye coordination	94.1	96.4	NS	96.5	96.8	NS
Audition, language	90.5	91.4	NS	92.6	93.5	NS
Execution	94.9	97.1	NS	98.1	100.2	NS

No differences were found between the two groups in the different components of Griffith's psychomotor scale at 6 and 12 months and were comparable.

Table-10. Occupational Therapy requirements.

Infanib3mo	Occupational Therapy			Total n=145
	NR n=101	IRG n=13	REG n=31	
Normal	101	0	0	
Abnormal	0	3	5	8
Transient	0	10	26	36

44 babies received (30.34%) Occupational Therapy, out of them were 8 abnormal and 5 (62.5%) received regular OT and out of 36 transient, 26 (72.2%) received regular OT.

- Regular OT improved neuromotor performance

Discussion:

Preterm low birth weight baby does require warmth and nutrition for 24 hours a day for its optimal growth. Though studies in KMC are scanty, but recent studies did reveal the benefits of KMC in terms of morbidity and mortality. The present prospective follow up study was undertaken in a level III Neonatal Intensive Care Unit (NICU) to study growth, development, neuro-sensory, neuromotor and psychomotor development in babies receiving KMC. Despite educating mothers for 24 hours KMC the family had not provided KMC for 24 hours. The study therefore compared babies who received continuous KMC and with those receiving inadequate KMC.

In the present study a total of 176 new born babies met inclusion criteria and 145 (90.34%) babies were followed-up up to one year. The result of KMC follow up rate varying from 84 to 95% was comparable with studies carried out by Charpak [13,14], Rao [15] and Aloke et al [16]. The reason for not following up in the study by Lincetto et al [17] was lack of money to pay for transport, illness of the mother, staying far away, baby was healthy. In the present study 17 cases (10.9%) did not follow-up and the reasons for not following-up could not be found as the address and phone numbers given were wrong and could not be traced .

Our results were similar to the study done by Rao et al (89.2%) 15 and Charpak et al [13] with higher follow-up rate approximating 90 percent. Higher follow-up in KMC babies was probably due to repeated motivation and counseling during the stay in the hospital as well as after discharge. The mean gestational age at eligibility was comparable in the studies carried out by Sloan et al at 34.6wk [18], Charpak et al at 35.3wks [14], and 33.6 wks [13], Cattaneo et al at 33.7wks [19], Rao et al at

35.2wks [15] and Aloke et al at 34.2 wks [16]. The birth weight in later studies was <2000g and in the present study it was ≤1800 grams. In the present study the mean birth weight at enrollment was 1458.80g, which was lower than Sloan et al -1704g [18], Charpak et al-1696g [14] and 1705g [13], Rao et al -1683g [15] and Cattaneo et al -1622g [19]

In the present study 3 (2%) babies had apnea during follow-up, with two cases in inadequate KMC and one in continuous KMC group. Babies in inadequate KMC groups had stormy NICU course with birth weight of 1541g and 952g and gestational age of 32 weeks and 28 weeks respectively and baby in continuous KMC group was 758g with 27 wks gestational age. Rao et al [15] in their RCT had recorded a significant reduction in apnea in KMC babies (KMC Vs CMC; 4% Vs 11%) and the reduction was significantly higher in <1500g babies (KMC Vs CMC: 1% Vs 8%, P=0.0069).

In continuous KMC group no babies suffered from lower respiratory infection. Fifteen babies (26.7%) had proven lower respiratory infection with pneumonia during follow-up with inadequate KMC group. Respiratory infection was found to be 3.4% and 5% with Charpak [20] and Sloan et al [18] respectively in KMC group. The absence of respiratory infection in the present study with continuous KMC could be due to either parent informed the health personnel earlier during the visit so that the babies were treated earlier and did not suffer from lower respiratory infection or the parents did not inform the health personnel at the time of visit.

The Cochrane analysis [21] mentioned that KMC reduced nosocomial infection at 41 weeks' corrected gestational age (relative risk 0.49, 95% confidence interval 0.25 to 0.93) and severe illness (relative risk 0.30, 95% confidence interval 0.14 to 0.67). In present study babies in continuous KMC and inadequate KMC did not suffer from severe illness or diarrhea which was probably due to KMC intervention with exclusive breastfeeding and close supervision on follow up by health care personnel.

There were 12 (17.64%) deaths in Inadequate KMC group and 2 deaths (2.1%) in continuous KMC group, indicated that continuous KMC reduced mortality (p= 0.001).

Various authors Rey [22], and Bergmani [23] noted mortality ranging from 28 to 50% in KMC group which was higher than both continuous (2.1%) and inadequate (17.6%) KMC of present study. The higher mortality in their study was probably due to inclusion of babies with birth weight of <1500 g and KMC for shorter duration. Mortality reported by Charpak, Cattaneo, Lincetto [13,19,24,22] ranged from 1.6 % to 4.4% in KMC group which was comparable with the present study of 2.1%.In the present study the weight gain in continuous KMC group was 17.3g/day and 22.2g/d among preterm and term group respectively (average of both 18.16 g/d). Which was comparable with the various other studies [13,14,19].

The higher weight gain of 23.9g/d in the study by Rao et al [15] compared with the present study, despite having comparable average duration of KMC per day (13.5 hr/day in both the groups) could be because of larger basal weight of 1683 g and more mature babies of 35.29 wks in their study group as compared with the present study. (1458g and 33.9 wks).

Growth indices were comparable in inadequate and continuous KMC for weight and length for corrected age except for head circumference at CDOB and at 3 month. The growth of head circumference expressed as a proportion of expected head circumference at 3 months of corrected age, was probably associated with continuous KMC intervention (P=0.02)

It was noted from the present study that the neurological assessment at 3 month Infanib, out of 145 babies, 36 (24.8%) babies had transient neurological abnormality and 8 (5.5%) babies had abnormal Infanib with no difference in both KMC groups. It was found that all 8 abnormal babies had stormy NICU course. There were 70% babies were SGA having transient or abnormal and 20% AGA had transient or abnormal Infanib. Both transient and abnormal babies (30.34%) received occupational therapy.

In the present follow up study psychomotor assessment was evaluated by Griffith psychomotor scale at 6 months and 12 months. The mean Griffith score at 6 month CDOB was 93.9 and 99.9 among inadequate KMC and in continuous KMC group respectively (p=0.60) and at 12 month CDOB mean Griffith score was 91.7 among inadequate and 98.8 in continuous KMC group Present study noted that babies who received continuous KMC had higher Griffith score both at 6 and 12 month CDOB which was comparable to that by Charpak et al(48) (Table38) but it cannot be attributed to KMC because the sequelae identified probably seemed to have originated from the process that occurred before eligibility and it would be unrealistic to expect KMC could modify these outcomes.

Conclusions

While comparing with other studies it was revealed that in the present study the KMC reduced mortality. It could be concluded from the present study that KMC intervention improved breast feeding rates; KMC for 24 hrs was possible with regular intensive counseling of mothers and other family members. The early discharge policy for low birth weight babies was possible and beneficial to achieve intrauterine growth accretion through regular follow up and monitoring of babies while giving domiciliary ambulatory continuous KMC preferably 24 hrs.

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Contribution to existing knowledge:

In low resources setting in developing world like India KMC- reduces mortality, improves breast feeding rate & help in early discharge of low birth weight babies.

Abbreviations:

LBWI: Low birth weight infants
KMC: Kangaroo Mother Care
NICU: Neonatal intensive care unit
CMC: Conventional methods of care
CDOB: Corrected date of birth
BERA: Brainstem Evoked Response Audiometry at discharge.

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