20 million infants (15.5% of all births) are low birth weight worldwide
300,000 LBW’s (20% of all births) in the Philippines,.

Optimal care:

Balancing the benefits of using techniques and equipments v.s. the risks,

Goal:

Happy, healthy and intact infant to family

Universality:

All Neonates, should receive the best possible quality care.

Kangaroo Mother Care:

A Randomized Controlled Trial On Its Effects on Growth and Neonatal Stability For Low Birth Weight Infants ≤ 2000 grams In a Tertiary Government Hospital

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General Objective:

- To compare the effect of KMC versus conventional method on the growth and neonatal stability of low birth weight infants weighing ≤2000gm.

Specific Objectives:

- To evaluate the effect of KMC on growth in weight, length, and head circumference among low birth weight infants ≤2000gm at birth.
- To determine if KMC is associated with decreased neonatal morbidity and mortality.
- To determine if KMC is associated with early hospital discharge of the study population.
- To determine if KMC leads to decreased incidence of hypoglycemia and hypothermia among the low birth weight infants.

Methodology

Prospective randomized controlled trial

Level III NICU
March 2011 to July 2011
Neonates with birth weight ≤ 2000 grams

Stratified Random sampling

Kangaroo Mother Care

Skin to skin contact using a specially tailored “Kangaroo bag”

The mothers performed KMC for two hours six times a day.

Conventional Method of Care

Baby is managed in a cradle under hot lamps using a 5-watt incandescent bulb

Anthropometry:

- ✓ Weight
  done upon delivery then daily
- ✓ Length
  done upon delivery then weekly
- ✓ Head cricumference
  done upon delivery then weekly

Monitoring:

- ✓ Random Blood Sugar
  every 6 hrs until stable for 2 days
- ✓ Temperature
  every 4 hrs until stable for 2 days
- ✓ Morbidity
- ✓ Mortality

Population Sampling

Inclusion Criteria:

≤ 2000 grams delivered from month of March 2011 to July 2011.

Exclusion Criteria:

Critical babies requiring ventilator support.
With chromosomal abnormality
Life threatening congenital anomalies.
Mothers unable to breastfeed their babies.

Statistical Treatment:

Univariate analysis with student t-test

Pairwise correlation analysis

p-value of <0.001 is considered significant

RESULTS

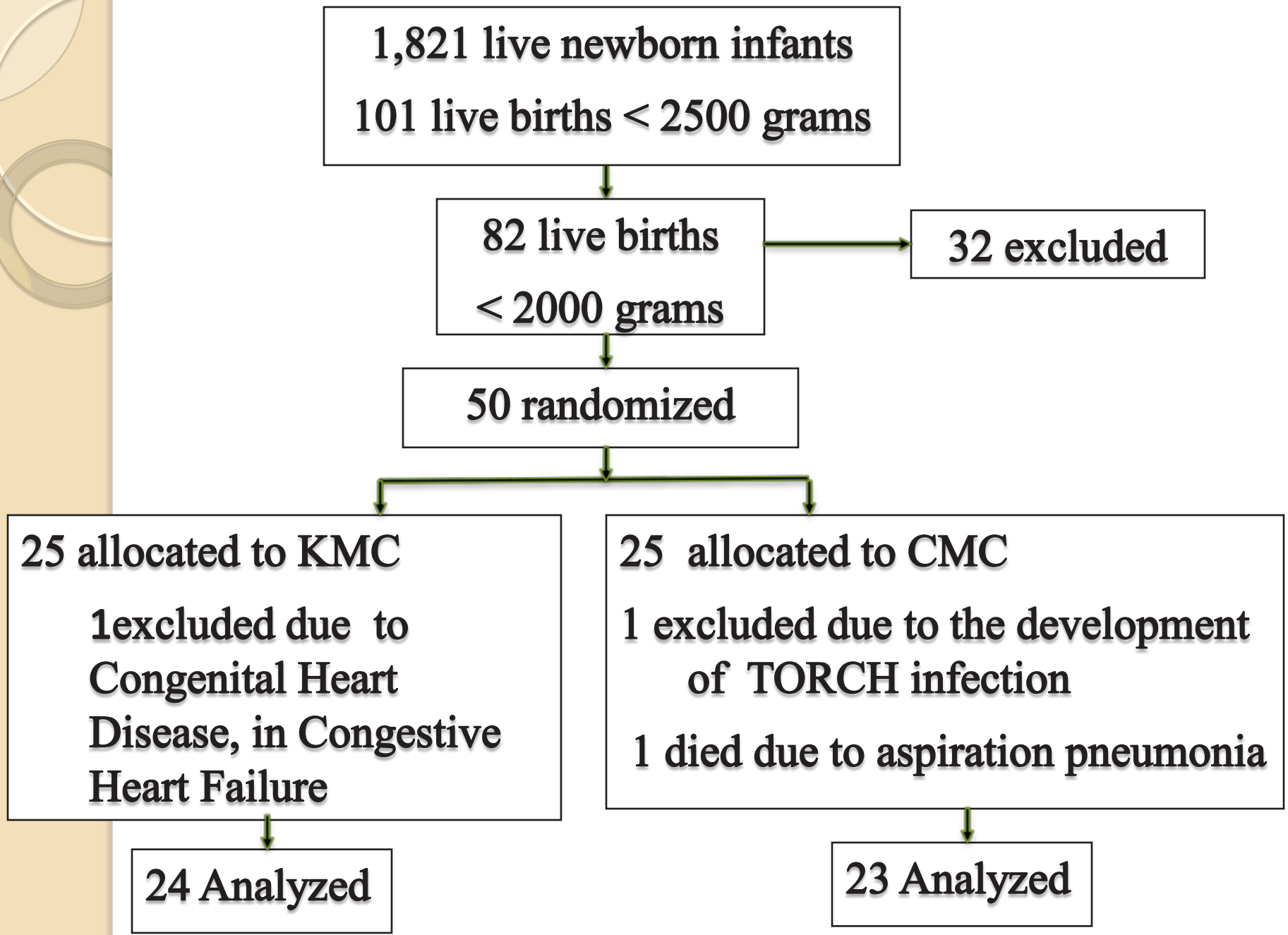

Fig. 1 Study flow chart

Table 1: Neonatal Baseline Characteristics

Development Indicators	Control (n=23)	KMC (n-24)	P-value
Weight at birth (g; mean ± SD)	1,744.3 ± 178.9	1,785.0 ± 170.9	<0.0001
Weight at enrolment (g; mean ± SD)	1,640.48 ± 197.28	1,689.79 ± 206.64	<0.0001
Birth Length (cm; mean ± SD)	40.8 ± 8.49	40.2 ± 0.53	NS
Birth head circumference (cm; mean ± SD)	29.1 ± 1.69	28.9 ± 1.33	<0.0001
Gestational age (wk; mean ± SD)	36.2 ± 1.8	35.2 ± 1.7	<0.0001
Age at enrolment (d; mean ± SD)	3.04 ± 2.06	2.46 ± 2.36	<0.0001
Male : Female ratio	13:10	14:10	NS
Birth weight groups [n (%)]			
< 1500 grams	3 (13.04)	2 (8.33)	<0.0001
1500 – 1799 grams	6 (26.09)	7 (29.17)	
1800 – 2000 grams	14 (60.87)	15 (62.50)	
Gestational age group [n (%)]			
< 32 weeks	0	2 (8.33)	<0.0001
33 – 34 weeks	5 (21.74)	15 (62.50)	
35 – 36 weeks	9 (39.13)	4 (16.67)	
> 37 weeks	9 (39.13)	3 (12.50)	
Lubchenco Classification [n (%)]			
Preterm SGA	13 (56.52)	14 (58.33)	<0.0001
Preterm AGA	1 (4.35)	7 (29.17)	
Term SGA	9 (39.13)	3 (12.50)	

Table 2: Effects of KMC on Weight

Growth Indicators	Control				KMC				Comparison Control / KMC	
	Mean	SD	95% CI		Mean	SD	95% CI		*Relative difference*	*P-value*
Baseline weight	1,530.9	195.2	1,513.9	1,548.0	1,651.0	202.2	1,624.4	1,677.6	*-7.3%*	*<0.0001*
Daily weight gain	2.6	6.7	2.1	3.1	7.5	13.2	6.5	8.4	*-65.0%*	*<0.0001*
Days to Ideal weight	22.0	4.3	21.7	22.4	9.3	2.0	9.2	9.5	*136.2%*	*<0.0001*
Weekly weight	2,231.3	388.4	2,163.1	2,299.5	2,253.4	311.9	2,187.3	2,319.4	*-1.0%*	*NS*
Average weekly weight gain	128.0	30.5	125.8	130.1	184.8	50.1	181.3	188.3	*-30.7%*	*<0.0001*

Table 3: Effect of KMC on Length

Growth Indicators	Control				KMC				Comparison Control / KMC	
	Mean	SD	95% CI		Mean	SD	95% CI		*Relative difference*	*P-value*
Baseline Length	**42.9**	**1.9**	**42.7**	**43.1**	**42.3**	**2.8**	**41.9**	**42.7**	***1.4%***	***<0.001***
Average daily length gain	**42.9**	**1.9**	**42.7**	**43.1**	**42.3**	**2.8**	**41.9**	**42.7**	***1.4%***	***<0.001***
Weekly length	**45.9**	**4.4**	**45.1**	**46.7**	**47.3**	**3.4**	**46.6**	**48.1**	***-3.0%***	***<0.05***
Average weekly length gain	**0.7**	**0.1**	**0.6**	**0.7**	**1.4**	**1.2**	**1.3**	**1.4**	***-51.7%***	***<0.0001***

Table 4: Effect of KMC on Head Circumference

Growth Indicators	Control				KMC				Comparison Control / KMC	
	Mean	SD	95% CI		Mean	SD	95% CI		*Relative difference*	*P-value*
Base Head circumference	**29.5**	**1.7**	**29.3**	**29.6**	**28.8**	**2.0**	**28.6**	**29.1**	*2.2%*	*<0.0001*
Average daily head circumference gain	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.4**	**0.1**	**0.2**	*-73.7%*	*<0.0001*
Weekly Head circumference	**31.5**	**3.1**	**30.9**	**32.0**	**32.2**	**2.2**	**31.7**	**32.6**	*-2.2%*	*NS*
Average weekly Head circumference gain	**0.3**	**0.1**	**0.3**	**0.3**	**0.9**	**0.2**	**0.8**	**0.9**	*-60.6%*	*<0.0001*

Temperature Control

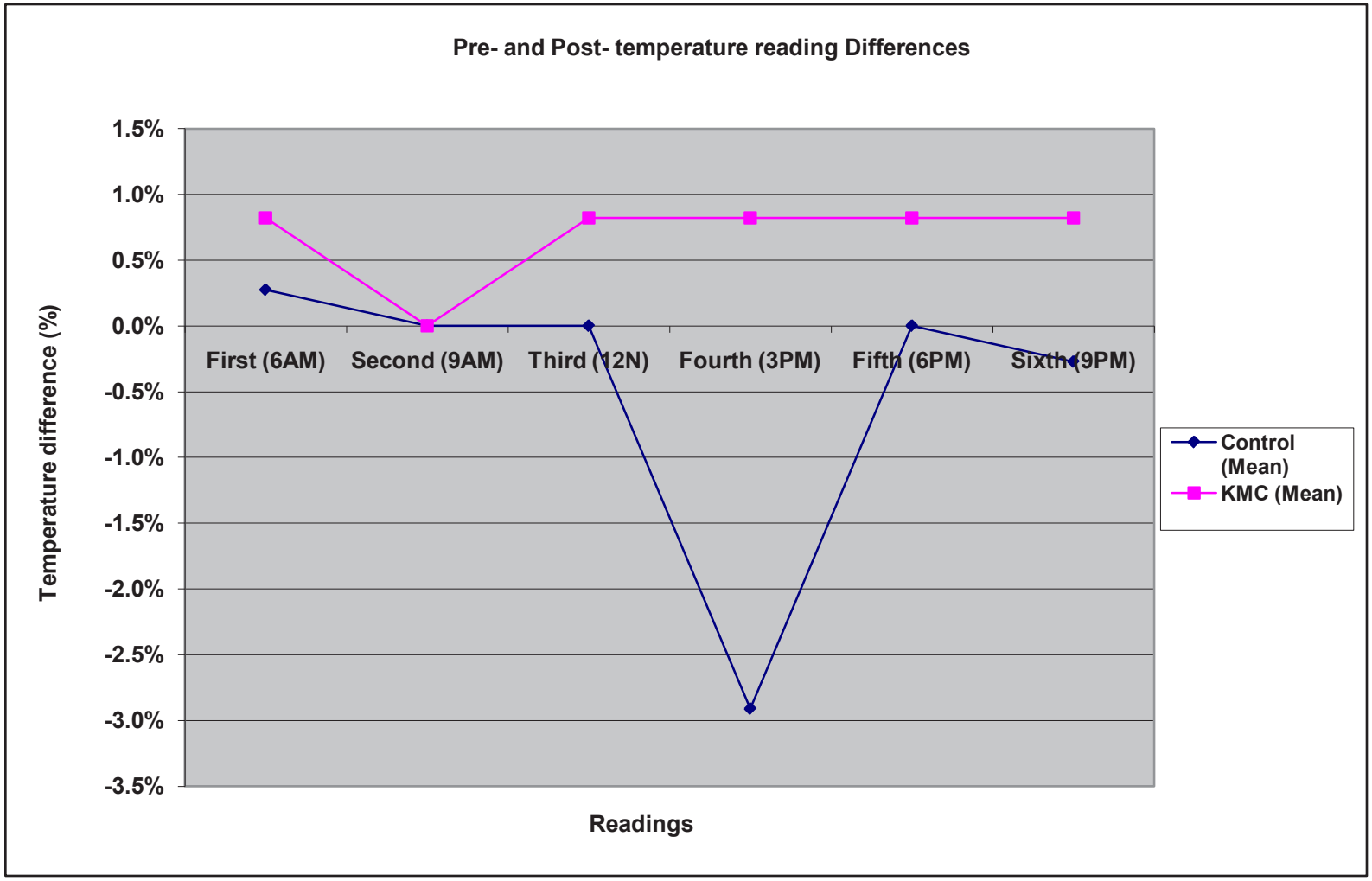

Table 5: Effect of KMC on the Random Blood Sugar

Stability Indicators	Control				KMC				Comparison Control / KMC	
	Mean	SD	95% CI		Mean	SD	95% CI		*Relative difference*	*P-value*
RBS										
Daily RBS average	**56.8**	**30.9**	**53.1**	**60.5**	**66.0**	**15.9**	**62.6**	**69.4**	***-13.9%***	***<0.01***
Average daily RBS gain	**2.3**	**1.1**	**2.2**	**2.4**	**4.4**	**8.5**	**3.8**	**5.0**	***-47.6%***	***<0.0001***
Days to ideal RBS	**11.6**	**3.3**	**11.4**	**11.8**	**3.6**	**1.3**	**3.5**	**3.7**	***220.2%***	***<0.0001***

Effect of KMC on Morbidity & Mortality of the two groups

Variables	Control	KMC	
	n=23	n=24	*P-value*
Hyperthermia [n (%)]	5 (21.74)	0	*<0.0001*
Hypothermia [n (%)]	16 (66.57)	0	*<0.0001*
Hypoglycemia [n (%)]	19 (82.61)	4 (16.67)	*<0.0001*
Neonatal pneumonia [n (%)]	3 (13.04)	0	*<0.0001*
Sepsis [n (%)]	5 (21.74)	0	*<0.0001*
Length of hospital stay (; ±)	20.458 ±1.305	9.24 ± 0.440	*<0.0001*
Mortality [n (%)]	1 (4.35)	0	*<0.0001*

Discussion

Significant greater weight gain, length and head circumference

Gathwala G, Trop Doct 2010;40:199-202

Better weight gain after 1st week of life

Ramanathan Indian Journal of Pediatrics, Nov 2001, Vol 68, No 11

Improvement of somatic growth

Gupta, Indian Journal of Pediatrics, Nov 2001, Vol 68, No 11

In this Study:
Significant gain in weight, length head circumference

KMC promotes faster cranial growth

Rojas, Trop Doct 2010;40:199-202

KMC Position: Significant direct effect on head circumference

Pediatrics, 2001. 108(5): p.1072-1079

In this Study:

Significant gain in head circumference indicating better cranial growth for KMC babies

Temperature Control

Temperature significantly higher after kangaroo position than incubators

Ludington-Hoe, Biol Res Nurs, 2000 Jul; 2(1):60-73

KMC babies have higher tympanic temperatures than control babies

Chwo, Indian J. Ped, 2005. 72; p35-38

Reduce incidence of hypoglycemia

Suman, Indian Journal of Pediatrics. 2008 Jan;45(1):17-23

In this study:

Lower incidence of hypothermia and hyperthermia as well as hypoglycemia

Morbidity & Mortality Risk

- Reduced risk of mortality and nosocomial infection/ sepsis. Condelo-Agudelo, The Cochrane Library 2005, Issue 3.

- Two-fold reduction in mortality risk in kangaroo infants Charpak, Pediatrics, 2001. 108(5): p.1072-1079

In this study:

Lower incidence of morbidity and mortality

Economic Advantage

Conventional Method of Care:

Infant <1500 grams:
NICU stay 21 days

Php 2,500.00 (per day)
X 21 days

Php 52,500.00

Kangaroo Mother Care:

Infant <1500 grams:
NICU stay 9 days

- Php 22,500.00 – 9 days

Php 30,000.00

SUMMARY

- ✓ Randomized controlled trial
- ✓ March 2011 – July 2011
- ✓ 47 met the inclusion criteria
- ✓ Divided into two different groups
- ✓ Monitored for weight gain, length and head circumference, neonatal stability
- ✓ Neonatal morbidity and mortality until they reached a weight of 2500 grams

RESULTS

KMC babies:

1. 65% higher weight gain

2. Higher weekly increments in length and head circumference

3. Higher RBS readings and faster attainment of normal RBS.

4. Better temperature control

RESULTS

KMC babies:

5. Significantly lower number of babies suffered from infection and nosocomial sepsis

6. Significant decrease in the time to discharge.

7. More cost effective and humanizing way of caring low birth weight infants.

CONCLUSION

Thanks to You…… Mom!