Original Research Article

Efficacy of Kangaroo Mother Care among low birth weight newborns at a tertiary care hospital: A cross-sectional study

Abstract

Aim: To assess the efficacy of Kangaroo Mother Care (KMC) among low birth weight neonates at a tertiary care hospital

Study Design: A cross-sectional study

Place and Duration. The Kangaroo mother care ward, CMC Children Hospital, Larkana from August 2019 to February 2020.

Methodology: Total 345 low birth weight patients were included. Newborns were kept in KMC position. Axillary temperature was measured during KMC position. Stratification of study variables was done while post-stratification chi-square test or independent sample student t-test was employed to see the impact of effect modifiers on the outcome (efficacy) considering p-value ≤ 0.05 as significant.

Results: Out of a total of 345 LBW neonates, there were 198 (57.4%) boys and 147 (42.6%) girls. The mean age of neonates was 12.01±7.68 days while majority 177 (51.3%) were aged less than or equal to 10 days. The mean body weight was 1997.22±243.48 grams. The mean gestational age was noted to be 35.35±1.37 weeks. There were 104 (30.1%) neonates who belonged to rural areas while 241 (69.9%) were from urban areas. The mean mother's temperature was 37.58±0.98 ^{o}C. The mean room temperature was 33.11±2.59 ^{o}C. The mean initial temperature was 35.40±0.48 ^{o}C. The efficacy of KMC was observed to be in 242 (70.1%) cases.

Conclusion: The KMC was found to be effective and useful in caring LBW neonates. Further advantages of KMC are low cost, promotion of exclusive breast-feeding and increased mother's confidence in handling LBW babies.

Keywords: Efficacy, Kangaroo Mother Care, Low Birth Weight, Newborns

Introduction

Kangaroo mother care (KMC) is also described as "skin-to-skin contact between a mother and her newborn".[1] The KMC is considered to be an alternate to incubator care with an additional advantage of no separation from the mother. For developing countries, significance of KMC was presented as a contributing feature for the attainment of "Millennium Development Goal" 4 which was aimed at 2/3rd lowering of death rates among children under 5 years of age from 1990-2015.[2] There are 2 types of KMC, continuous skin-to-skin contact done for 24 hours (day and night) and intermittent KMC which can be done as the infant is held skin-to-skin for a relatively short duration.[3]

Birth weight is a sensitive determinant and key factor for neonatal mortality.[4] Low birth weight (less than 2500 gram regardless of gestational age) is commonly linked with pre-term birth and taken as a major predictor of infant mortality within 28 days of life.[5] In Pakistan, LBW babies prevalence has been reported as 19-30% in various studies conducted in Pakistan.[6] Hypothermia often coupled with infections further aggravate the condition leading to poor outcomes among LBW and pre-term infants.[7]

To maintain a normal body temperature is of utmost importance for the appropriate body functioning of a newborn.[8] Regulation and controlling of body temperature in newborn is done by hypothalamus and through endocrine pathways. Neonatal hypothermia is known to be major issue globally but its burden increases significantly among developing countries among neonates. Researchers have presented hypothermia to be prevalent among LBW infants in as higher proportions as 58%.[9]

KMC has been found to provide warmth and helps in preventing heat loss because of radiation convection, evaporation and assists in provision of heat through conduction. Studies have found KMC to be more efficacious in terms of rewarming infants in comparison to other commonly adopted techniques like swaddled holding, radiant warmer, incubator, plastic shield, warming mattress, etc.[10] Data shows that KMC is linked with a reduction of 66% in terms of severe neonatal morbidity (relative risk: 0.3, 95% confidence interval: 0.2-0.7).[11]

In Pakistan, neonatal mortality rate is very high and most births occur at home and neonatal intensive care is virtually unavailable. Common causes of mortality among infants are low birth weight and hypothermia. Although international literature is available on outcomes of KMC but local literature is very limited as we are genetically and geographically different with other population and large number of population belongs to poor socioeconomic status. If results of this study show a better efficacy of KMC then this technique can be used for timely temperature maintenance and thus can potentially reduce the neonatal morbidity and mortality rates. This study was done to find out the efficacy of KMC among LBW neonates at Children Hospital, Larkana.

Methodology

This descriptive observational study was conducted at Kangaroo mother care ward, Chandka Medical College, Children Hospital, Larkana from August 2019 to February 2020. Approval from institutional ethical committee was acquired.

Sample size was calculated as 345 by taking WHO Sample size calculator, with efficacy of KMC as 66%.[10] Non-probability consecutive sampling technique was used. Inclusion criteria was newborns aged from 0 hours to 28 days of both genders with birth weight between 1500 grams to 2499 grams. Exclusion criteria was critically ill babies (hypoxic ischemic encephalopathy, central nervous system impairment, neonatal sepsis, urinary tract infection,

or one of twins or higher order multiples) that were confirmed via detailed history and relevant investigations. Mothers of newborns not willing to do KMC were excluded.

Mothers were explained about research protocol and written consent was taken from mothers and data was entered into study specific proforma. Detailed information was taken regarding gestational age, weight, gender, area of residence and temperature. The KMC position was explained to the mothers. The KMC was labeled as a skin-to-skin contact (SSC) between the mother and the infant in a strictly vertical position. The infant was placed between the mother's breasts and under her clothes. Axillary Temperature was measured with digital thermometer during continuous KMC position. Efficacy was labeled as positive, if after KMC patient having no hypothermia within 72 hours. Hypothermia was defined as per WHO as body temperature below the 36.5°C.

Data were analyzed on SPSS version 26.0. Percentage and frequency were calculated for categorical variables like gender of child, area of residence and efficacy. Mean and standard deviation were calculated for quantitative variables like age, weight and temperature. Effect modifiers like age, gender, area of residence, gestational age, body weight and initial body temperature of child were controlled through stratification. Post stratification chi-Square test was applied to compare qualitative variables while quantitative variables were compared using independent sample t-test. P value ≤ 0.05 was considered as significant.

Results

Out of a total of 345 LBW neonates, there were 198 (57.4%) boys and 147 (42.6%) girls. The mean age of neonates was 12.01±7.68 days while majority 177 (51.3%) were aged less than or equal to 10 days. The mean body weight was 1997.22±243.48 grams. The mean gestational age was noted to be 35.35±1.37 weeks. There were 104 (30.1%) neonates who belonged to rural areas while 241 (69.9%) were from urban areas. The mean mother's temperature was 37.58±0.98 ^{o}C. The mean room temperature was 33.11±2.59 ^{o}C. The mean

initial temperature was 35.40±0.48 ^{o}C. Table 1 is showing characteristics of the LBW neonates enrolled for KMC in the present study. The efficacy of KMC was observed to be in 242 (70.1%) cases (figure 1). Table 2 is showing that there was no significant association of efficacy of KMC with gender, age, gestational age, area of residence, initial body temperature or gestational age ($p>0.05$).

Table 1: Characteristics of LBW Neonates (n=345)

Characteristics of LBW Neonates		**Number (%)**
Gender	Boy	198 (57.4%)
	Girl	147 (42.6%)
Age (days)	≤10	177 (51.3%)
	>10	168 (48.7%)
Gestational Age (weeks)	<37	298 (86.4%)
	≥37	47 (13.6%)
Area of Residence	Rural	104 (30.1%)
	Urban	241 (69.9%)

Figure 1: Frequency of Efficacy of KMC among LBW Neonates

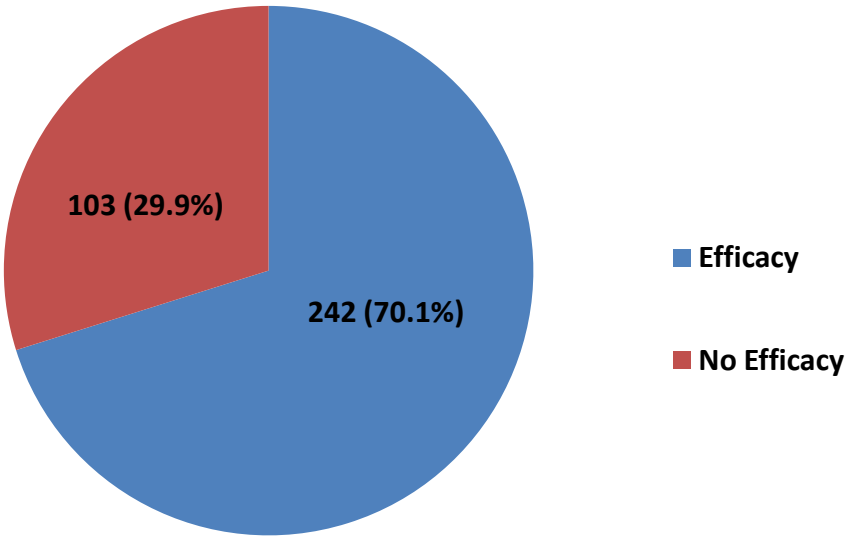

Table 2: Comparison of Study Variables with regards to Efficacy of KMC in LBW Neonates (n=345)

Study Variables		Efficacy		P-Value
		Yes (n=242)	No (n=103)	
Gender	**Boy**	140 (57.9%)	58 (56.3%)	0.791
	Girl	102 (42.1%)	45 (43.7%)	
Weight as grams (Mean±SD)		1999.32+238.31	1992.27+256.36	0.806
Age (days)	**≤10**	123 (50.8%)	54 (52.4%)	0.785
	>10	119 (49.2%)	49 (47.6%)	
Gestational Age (weeks)	**<37**	206 (85.1%)	92 (89.3%)	0.298
	≥37	36 (14.9%)	11 (10.7%)	
Area of Residence	**Rural**	79 (32.6%)	25 (24.3%)	0.121
	Urban	163 (67.4%)	78 (75.7%)	
Initial Body Temperature as ^{0}C (Mean±SD)		35.37±0.48	35.46±0.47	0.110

Discussion

Advanced tech neonatal care for LBW infants is considered to require considerable resource, financing and manpower in developing nations. The KMC has been postulated to be an efficacious and safe alternative to contemporary approaches for the care of LBW infants.[1,3]

We found that KMC played a key role for the promotion of maternal involvement with in the LBW infants yielding very positive results (70.1% efficacy). Results of the present study in terms of effectiveness of KMC are consistent with other studies done in other parts of the world.[12, 13] Researchers have found KMC to be effective in addition to "skin-to-skin" contact, exclusive breastfeeding as well as early discharge with acceptable follow-ups in care of LBW infants[14-15] but real challenge continues to be effectiveness and safety of KMC utilization at home or community settings as this has not been well studied.[19]

In the present study, mean age at the initiation of KMC was revealed to be 12.01±7.68 days while most of the neonates were ready 48 hours prior for KMC. A major reason behind delay was the hesitancy of the treating clinicians, support staff and mother in handling LBW babies for early KMC. Studies from India have found KMC to result in considerable weight gain in the 1st week of care.[20, 21] Hypothermia has also been less frequent in KMC infants as revealed by other researchers.[22, 23] We also noted that all babies were exclusively breast-fed while there was only a single episode of hypoglycemia noted. A study from Egypt by Samra NM et al revealed that in KMC group, mean age of attaining birth was significantly less (15.7 days versus 24.6 days) and weight gain was significantly high.[24] A recent local study found intermittent KMC to be efficacious in weight-gain.[25] Other researchers from Pakistan have

also proposed strengthening of KMC services in local healthcare settings as it can possibly reduce neonatal morbidity and mortality among preterm infants.[26, 27]

Our study had some limitations as well. Being a single center study with no randomization was one of the key limitations. It was done in an urban setting so our findings cannot be generalized.

Conclusion

The KMC was found to be effective and useful in caring LBW neonates. Further advantages of KMC are low cost, promotion of exclusive breast-feeding and increased mother's confidence in handling LBW babies. As the study was non-comparative, future studies with comparative study designs between KMC and other conventional method of care of LBW baby needs to be done for more reliable findings.

Permission

It was taken from the ethical review committee of the institute

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