

TO ASSESS THE ATTITUDE OF MOTHERS TOWARDS KANGAROO MOTHER CARE(KMC),BARRIERS TO KMC AND PRACTICES AT DEPARTMENT OF NEONATOLOGY IN A TERTIARY CARE HOSPITAL.

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ABSTRACT:

Background: The premature infant is kept warm in the maternal pouch and close to the breasts for unlimited feeding and it involves placing the newborn infant in close skin to skin contact with the mother. Kangaroo mother care as an early, prolonged, and continuous skin to skin contact between the mother and her baby helps to prevent prolonged separation of mother and LBW infants, resulting in insufficient breast milk, low growth, and improved the intact survival of LBW babies and reduce NMR to a great extent. **Objective:** To study the outcome of LBW babies <2kgs, preterm <37weeks who are on kangaroo mother care over a period of 18 months at NICU, Government general hospital, Kakinada. **Results-** A total of 498 preterms /low birth weight babies were taken into study of them 352(70.6%) were moderate to late preterm, and 232(46.6%) were weighing between 1.5-1.9kg. All 498(100%) participants in the KMC study perceived the baby's heartbeat and respiration during the procedure. The mean weight gain per day observed was 8.93(g/day) in 4 hours KMC group, 13.82(grams/day) for 8 hours KMC group, and 16.54(g/day) in the 12 hours KMC group. **Conclusion:** The study reported that KMC in preterm <37weeks and LBW <2kgs for a significant period per day, helps in increase in survival and overall outcome of the baby.

Keywords: KMC, LBW, NMR, Preterm

INTRODUCTION:

History of Kangaroo Care: The term Kangaroo mother care (KMC), presently also called Kangaroo care, was adapted from the kangaroos due to its functional similarities to marsupial care-giving, i.e., the premature infant is kept warm in the maternal pouch and close to the breasts for unlimited feeding. The mother's stable body temperature regulates the neonate's body temperature better than an incubator and allows for readily accessible breastfeeding in this position¹.

Global Burden: Globally, 44% of under-five deaths occur during the neonatal period, and the proportion of under-five deaths due to neonatal causes continues to rise. The leading cause of neonatal mortality is prematurity, which accounts for 29% of the 3.6 million neonatal deaths every year². Low birth weight [LBW] is an underlying factor in 60–80% of all neonatal deaths. Reducing NMR is the main goal to reduce the under-five mortality rate³. In the KMC position, the newborn exhibits breast crawl, i.e., crawling towards the mother's

nipple for feeding. In vertical positions, the vestibule is stimulated and reduces horizontal pressures on the head and body, thereby decreasing cranial flattening. KMC babies regarding correct KMC practices and its benefits, the implementation of KMC can be optimized. This study is conducted to assess the maternal attitude towards KMC, observe KMC practices, identify potential barriers to optimal implementation of KMC.

PATIENTS AND METHODS:

STUDY DESIGN:

A hospital-based observational study was conducted at the Department of Neonatology, Tertiary Care Hospital, Rangaraya Medical College in Kakinada, conducted over a period of 18 months from January 2019 to June 2020.

INCLUSION CRITERIA:

The postnatal mothers/caregivers of the following babies admitted at the Department of Neonatology, Low birth

weight babies- <2500 grams. Preterm babies- <37 weeks of gestation.

EXCLUSION CRITERIA:

Mothers who were not willing to provide Kangaroo Mother Care. Sick neonates-those requiring invasive or non-invasive mechanical ventilation, or babies with shock or apnea, and neonates receiving phototherapy. Mothers who were sick and discharged from the hospital.

STATISTICAL ANALYSIS:

Data entry was done in MS-EXCEL.2019. Statistical package for social sciences (SPSS) version 21 was used for data analysis. Chi-square test was applied, and p-values were calculated to find a statistical difference between categorical variables. Statistical analysis was carried out at a 5% level of significance, and a p-value <0.05 was considered significant.

Table 1: Distribution of the neonates according to birth weight

Birth weight in kgs	Number of babies	Percentage
< 1 kg	4	0.8
1-1.49 kg	75	15
1.5-1.9 kg	232	46.6
2-2.4 kg	187	37.6

In the present study, out of 498 babies, 232 (46.6%) were weighing between 1.5-1.9 kg.

Table 2: KMC Participants

KMC participant	Number	Percentage
Mother	288	57.8
Other Caregiver	34	6.9
Both mother and caregiver	176	35.3

In the present study, 288 (57.8 %) babies were given KMC by the mother. The mother and the other caregiver in the family participated in KMC in 176 (35.3%) babies, while other caregivers gave KMC to 34 (6.9%) babies.

Table 3: KMC Practices.

KMC Practices	Yes	No
Perceiving babies' heartbeat and respiration	498(100%)	0(0%)
Interaction with others practicing KMC	223(44.8%)	275(55.2%)
Clothing baby with cap, mitten, and socks	422(84.7%)	76(15.3%)

All 498 (100%) participants in the KMC study perceived the baby's heartbeat and respiration during the procedure. 223 (44.8%) of them interacted with the other KMC givers. The majority 422 (84.7%) clothed the baby with a cap, mitten, and socks during KMC.

Attitude of mothers towards KMC.

Chart 1:

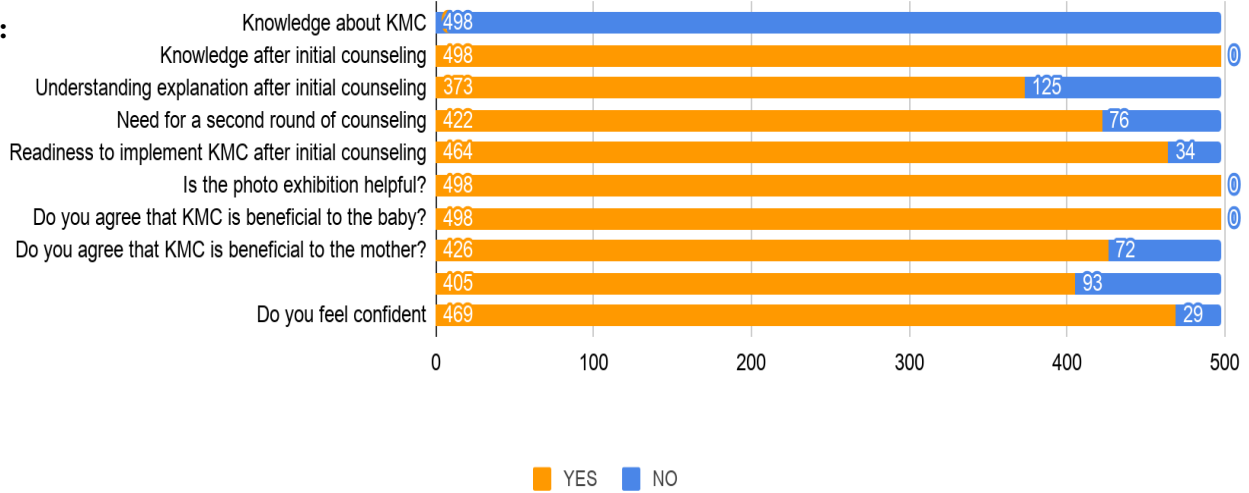


Chart 2: Barriers to KMC

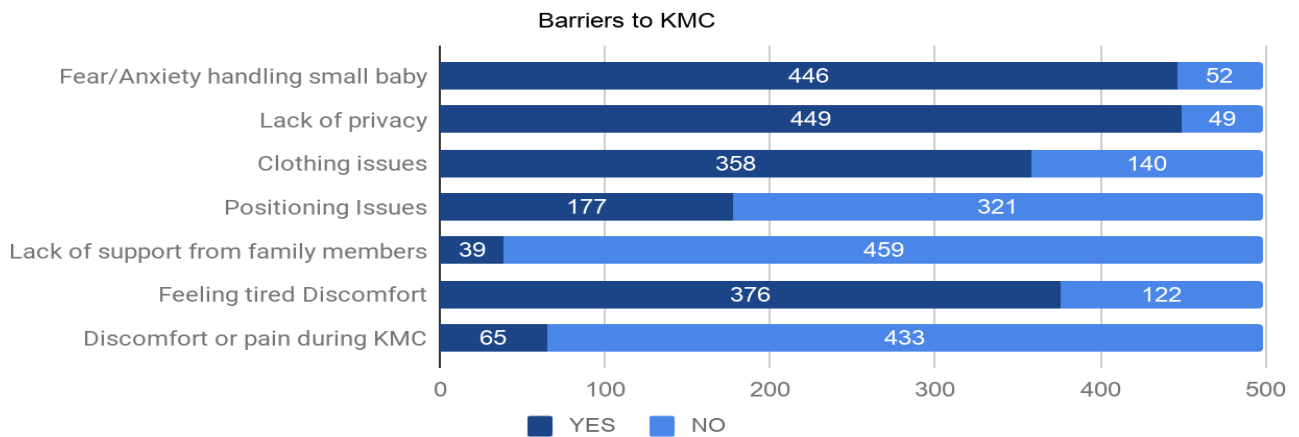


Chart 3: Distribution of babies according to the no.of days KMC given

Distribution according to number of days of KMC

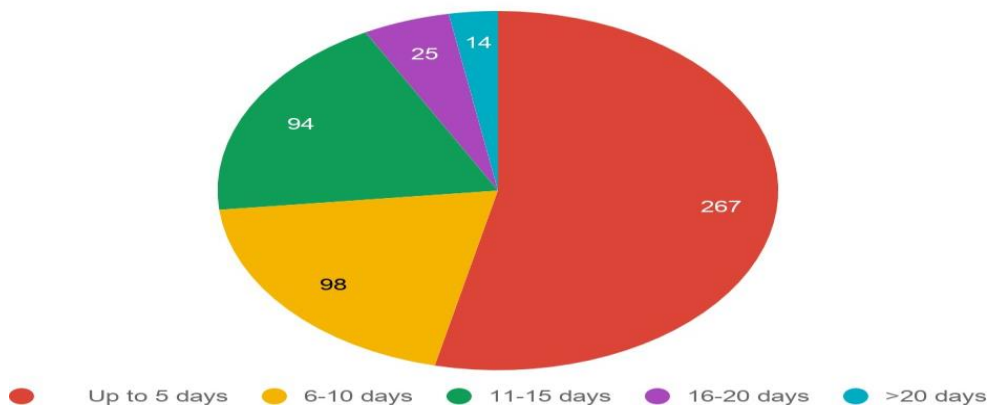


Table 4: Duration of KMC vs. Mean weight gain per day

Duration of KMC	Mean weight gain per day (grams/day)
4 hours	8.93
8 hours	13.82
12 hours	16.54

In the present study, the average weight gain per day observed was 8.93(g/day) in 4 hours KMC group, 13.82 (g/day) for 8 hours KMC group ,and 16.54 (g/day) in the 12 hours KMC group.

Table 5: Educational Qualification vs. KMC practices

EDUCATIONAL QUALIFICATION	KMC GIVEN BY			Total	Pearson Chi-square χ^2	df	P-value
	BOTH	MOTHER	OTHER CAREGIVER				
ILLITERATE	7(4.0%)	14(4.9%)	2(5.9%)	23	3.459 ^a	6	0.749
PRIMARY AND MIDDLE SCHOOL	51(29.0%)	68(23.6%)	10(29.4%)	129			
HIGH SCHOOL	65(36.9%)	127(44.1%)	13(38.2%)	205			
POST HIGH SCHOOL	53(30.1%)	79(27.4%)	9(26.5%)	141			
TOTAL	176	288	34	498			

In the present study, 127, 79, 68, 14 mothers who had the educational qualifications of highschool, post-high school, primary, middle school and illiteracy gave KMC to their babies.

Table 6: Inborn/Outborn babies vs. KMC practices

Inborn/Outborn	KMC GIVEN BY			Total	Pearson Chi-square χ^2	df	P-value
	Both	Mother	Other Caregiver				
EM	111(63.1%)	120(41.7%)	20(58.8%)	251	21.051 ^a	2	0.000
IM	65(36.9%)	168(58.3%)	14(41.2%)	247			
Total	176	288	34	498			

In the present study, out of 251 outborn babies, mothers gave KMC to 120 babies, both the mother and the other caregiver gave KMC to 111 babies and 20 babies by other caregivers. Inthe babies born at GGH, out of 247, mothers gave KMC to 168 babies, both the mother and the other caregiver gave KMC to 65 babies and 14 babies by other caregivers.

DISCUSSION:

Kangaroo mother care (KMC) is an effective way to meet a baby's needs for warmth, growth, breastfeeding, well-being, stimulation, protection from infection, safety, and

love. The main component of KMC is prolonged skin to skin contact of the mother with her preterm / low birth weight infant that provides multisensory stimulation involving emotional, tactile, proprioceptive, vestibular,

olfactory, auditory, and visual stimulation in a unique style. It promotes beneficial physiological conditions such as increased quiet sleep rate, more stable

thermoregulation, heart rate, respiratory rate, and oxygen saturation.

Table 7: Knowledge of KMC in various studies

Name of the Study	Percentage
Urmila K.V.et.al.study ⁴	4.4
Present Study	0

In the study conducted by Urmila K. V.et.al⁴, in 2018, among postnatal mothers in a tertiary care center of North Kerala, only 9 (4.47%) out of 201 mothers had prior knowledge of KMC. 95.6% of mothers did not know KMC before coming to the hospital. Out of nine, two knew it from relatives who had preterm babies and two from the internet; two from magazines; one from colleagues, and two from staff nurses⁵. In the present

study, none of the mothers had prior knowledge about KMC. The majority of the caregivers in the present study gained knowledge of KMC after an initial round of counselling session by the treating doctors regarding the technique of KMC, its benefits to both the baby and the mother. This shows the importance of health education prior to starting KMC.

Barriers to KMC:

Table 8: Barriers to KMC in different studies.

S.NO	Name of the Study	Important Barriers to KMC
1.	Meena Joshi et al. study ⁶	Lack of a supportive environment Lack of maternal time
2.	Shruti Bajaj et al. study ⁷	Heat Sweating, Discomfort
3.	Anita Singh et al. study ⁸	Lack of support to mother from other family members Fear of pieces of equipment and fear of touching babies
4.	Rasaily R, et al. study ⁹	Hot weather Lack of privacy Post-operative pain Twin gestation Afraid of small infants
5.	Lewis, T.P. et al. study ¹⁰	Postoperative pain. Afraid of infant size. Afraid of disturbing the medical equipment, tubes, and wire connections

		Unpaid/Limited maternal leave. Other children in the family
6.	Getinet Kassahun et al. study¹¹	Lack of adequate information and skill on KMC Difficult of handling small babies Maternal health problem Lack of time 2 (6.1%) and Painful breast.
7.	Jieya Yue et al. study¹²	Postpartum confinement Anxiety to touch small babies Lack of private space Maternal guilt associated with pretermbirth.
		5. Low nurse: preterm ratio
8.	Present study	Lack of privacy Fear/Anxiety handling small baby Feeling tired Clothing issues Positioning Issues Discomfort or pain during KMC Lack of support from family members

Despite the proven benefits of KMC, it is not being practiced in all eligible babies. This could be due to several barriers in its implementation, including those from the mothers, nurses, and institutions. These barriers were identified during the course of practicing KMC. KMC seems challenging to begin with for all the caregivers. They need constant support from both the family members and the hospital team to continue KMC. All the caregivers were observed throughout KMC practice, repeatedly interacted to identify and address the barriers needed to overcome. Most of the mothers expressed their difficulties during daily rounds while some felt hard to communicate their problems, and expressed after enquiring in detail. Some caregivers felt difficulty in communicating their problems with male doctors and expressed freely upon interaction with female hospital staff. In Getinet Kassahun, Aberash Efa et al. study¹¹ conducted in Hawassa, Southern Ethiopia, 2018, the reasons for not practicing KMC continuously in three health settings were lack of adequate

information and skill on KMC 14(42.4%), inappropriate handling of small infants 11(33.3%), maternal health problems 9 (27.3%), lack of time 2(6.1%) and pain in the breast 1(3%). In the study conducted by Lewis, T.P. et al.¹⁰, at a tertiary hospital in USA, neonatal intensive care unit in 2016, the problems identified were postoperative pain and discomfort associated with cesarean section, fear of infant's size, fear of disturbing the medicalequipment like tubes and wires connected to the baby in the incubator, unpaid, half paid or limited maternal leave, care of the other children in the family. In the study conducted by Meena Joshi, Tanushree Sahoo, Anu Thukral, et al.⁶ in 2018 at AIIMS Delhi, lack of a supportive environment and maternal time were the main barriers to implementing optimum KMC services. Support from family members is essential to continue KMC practice, and it is found to be one of the top-ranked enablers for KMC implementation, especially in low and middle-income countries. Specifically, support from mother-in-law and sister-in-law is crucial for the

recently delivered mother to practice KMC. In the study conducted by Shruti Bajaj et al.⁷ at KEM Hospital, Mumbai, heat, sweating, and discomfort concerns in more than half of the mothers. In the study conducted by Anita Singh et al., in a tertiary care hospital from North India in 2018, lack of support to mothers from other family members leading to their unavailability for KMC was a critical barrier followed by fear of pieces of equipment and fear of touching babies. Among nurses, duty schedule and inability to convince were significant contributing factors along with the fear of dislodgement of lines and tubes. While in the institutional domain, most nurses felt lack of privacy as a significant hindrance.

The attitude of mothers towards KMC:

Understanding the counseling and readiness of the caregivers to KMC implementation determine the successful KMC practice. None of the mothers in the present study had prior knowledge of KMC. All of the postnatal mothers, 498(100%), came to know about KMC after counseling, and 373 (74.8%) were able to initiate KMC after the initial round of explanation, but a majority of them, 422 (84.7 %), felt the need for a second round of counseling for the continuation of KMC and to follow proper technique. The photo exhibition of KMC was helpful to all (100%) of the participants. All the participants (498) agreed that KMC was beneficial to the baby and 72 (14.5%) were doubtful regarding its benefits to the mother. 405 (94.1%) agreed that KMC can be given by any family member. A total of 469 (94.1%) felt confident after practicing KMC. In the study conducted by Urmila K. V.et.al⁴, only 9 out of 201 mothers had prior knowledge of KMC from their relatives who had preterm infants, the internet, and magazines. Seven mothers thought that KMC was not beneficial. 39 (20%) mothers could not follow instructions in the first sitting, and 41(21%) needed another round of counseling.93.1% showed interest in KMC practice at night, and 99% to continue KMC at home. Kadam et al.¹³ ,conducted a study, and the interview findings were 86% of mothers were happy with

KMC, 79% were comfortable with KMC, and 73% stated that they intend to continue KMC at home. 64% of fathers agreed with this method of care. Ramanathan et al.¹⁴ conducted RCT and assessed acceptance of KMC by using the LIKERT scale, and 80% stated to continue KMC at home. In the study conducted by Veena Rani Parmar et al.¹⁵ in 2009 in NICU, Government Medical College Hospital, Chandigarh, out of 135 nursing mothers,96% of mothers understood the method very well, but 12% required more than one session.50% of mothers showed initial apprehension, but 98% were able to maintain their baby in KMC position comfortably and reported that they felt close to their baby. It also removed their stress of having been separated from the baby. The practice of KMC was accepted and supported by 82.5% of husbands, 84% of mothers-in-law, and 81% of other family members, and many substituted for the mothers as KMC providers.No baby developed cold stress, hypothermia, or apnea during KMC. The beneficial effects of KMC on the babies’ behavior and maternal confidence and lactation were 57%, 94%, and 80%, respectively. A decline in the use of heating devices in the NICU by 85% and 79% said it did not increase their workload. In the study conducted by Meena Joshi, Tanushree Sahoo, Anu Thukral, et al.⁶ at AIIMS Delhi fathers and other caregivers were allowed during night time to give KMC so that mothers can get rest. In the study conducted by Shruti Bajaj et al.⁷, at the Department of Neonatology, Seth GS Medical College and KEM Hospital, Mumbai, a large proportion of the mothers lacked the knowledge that their babies needed to be exclusively breastfed as a component of KMC. Most of the mothers had a positive attitude toward KMC. In a similar study conducted in the Indian set up by Muddu et al¹⁶, mothers reported positive feelings for their babies even after 1 hour of KMC. In another study conducted by Kadam et al¹³, 73% of the mothers intended to continue KMC at home, while 64% of the fathers agreed to administer KMC. A recent study by Muddu GK¹⁶, in India showed that over 90% of the mothers believed that their husbands could also participate in child care by providing KMC.

Table 9: Perception of KMC in different studies

S.NO	Study Title	KMC can be given by any other familymembers
1.	Veena Rani Parmar et al. ¹⁵	82.5%
2.	Muddu GK et al. ¹⁶	90%
3.	Present Study	405 (94.1%)

Involving the family members as part of routine maternal counseling makes them understand the problems of a postnatal mother and her low birth weight newborn. It will sensitize them to the need for mother's emotional and physical support by participating in KMC, during which the mother can get some rest. The caregivers can be grandmothers, husbands or any female family member. In the present study, 405 (94.1%) postnatal mothers agreed that any family member could give KMC. Most of the other caregivers were a mother in law, grandmother and female family member in the present study. Husbands or male family members did not participate in KMC in the present study. In the Muddu GK et al.¹⁶ study, over 90% of the mothers believed that their husbands could participate in child care by providing KMC. In the study conducted by Meena Joshi, Tanushree Sahoo, Anu Thukral, et al.⁶ at AIIMS Delhi, fathers and other caregivers were allowed during night time to give KMC so that mothers can get rest. In the study conducted by Veena Rani Parmar et al.¹⁵ 82.5% of postnatal mothers believed that any other family member can be involved in giving KMC.

Duration of KMC and the mean weight gain per day:

In the present study, as per the mother's convenience, KMC was given. The minimum duration of KMC given was 4 hours, followed by 8 hours, and the maximum duration KMC given was 12 hours. The mothers were counseled regarding the importance of KMC, and then they started giving KMC. The mean weight gain of the babies per day was taken. The babies' weight was recorded using an electronic weighing scale at the same time of the day daily with infants wearing no clothes at the time of weighing. The weights of the babies were recorded in a case sheet. If any problem was detected during KMC practice, it was addressed and rectified. The number of babies who were given KMC for a minimum duration of 4 hours was 248 (49.7%), 186 (37.4%) babies for 8 hours, and 64 (12.9%) babies for a maximum duration of 12 hours. The mean weight gain of babies per day in the present study for whom KMC was given for 4, 8, 12 hours was observed. And the babies who were given KMC for a duration of 4 hours had a mean weight gain of 8.93 grams/day, and the babies who were given KMC for a duration of 8 hours had a mean weight gain of 13.82 grams/day, and the mean weight gain of the babies who were given KMC for a period of 12 hours was 16.54 grams/day.

Table 10: Duration of KMC vs. mean weight gain per day in various studies

Name of the Study	Duration of KMC	Mean weight gain per day(in grams)
Madhavi et al study ¹⁷	4 hours	8.98
	8 hours	17.41
	12 hours	26.78
Present study	4 hours	8.93
	8 hours	13.82
	12 hours	16.54

It implies from the present study that the gain in weight was directly proportional to the duration of KMC given. Madhavi et al. 19 conducted a study and observed that babies who are given KMC for 4 hours, 8 hours, and 12 hours had a weight gain of 6-12 gm/day, 14-20 gm/day, 22-28 gm/day, respectively.

Table 11: Mean weight gain per day in different studies with 12 hours KMC.

S.No	Name of the study	Mean weight gain/day
1.	Ramanathan et.al ¹⁴	15.9 grams/day
2.	Suman rao et.al ¹⁸	21.3 grams/day
3.	Present study	16.54 grams/day

In a study conducted by Ramanathan et al ¹⁴, the weight gain of the babies was observed after the 1st week of KMC and found to be 16±4 grams/day. Suman Rao et al ¹⁸, conducted a study with a duration of around twelve

hours per day of KMC with good mean weight gain per day (21.3).

Table 12: Clothing during KMC in various studies.

S.NO	Study Title	Proper dressing of the child with cap, socks and diaper during KMC
1.	Getinet Kassahun et al. study ¹¹	57%
2.	Present Study	84.7%

Suitable apparel like Kangaroo bag, baby bag, sari, a binder that can retain the infant for an extended period can be adapted locally. It is not mandatory to have any unique dress, garment, or binder for KMC, and any clothing acceptable to the mother and the family can be used. The mother can dress the infant in a front-open sleeveless shirt, cap, socks, disposable diapers, or any soft fabrics. In the present study, 84.7% of the participants

covered baby well with a cap, socks, and diaper during KMC. This keeps the baby warm and helps in preventing hypothermia. This difference could be due to the fact that the caregivers were monitored closely during KMC and were often instructed to adequately cloth the baby even during KMC. Constant support and reinforcement from the health care personnel help the caregivers in providing KMC better.

Table 13: KMC Caregivers in various studies

S.No	Study Title	KMC Given by
1.	Getinet Kassahun et al. study ¹¹	Mothers-83.7% Grandmothers-11.6% Father-4.7%-
2.	Present Study	Mother-57.8% Other caregivers-6.9% 3. Both-35.3%

The mother, father, grandmother, or anybody who is willing, in good health, and free from any illness can participate in KMC. They should follow certain precautions while doing KMC. Due to the technique being novice involving a postnatal mother and her baby, most parts of the world adopt a female participant as a suitable substitute for the mother. Grandmothers or female attendees can understand the problems of the mother, provide necessary emotional support to the baby by talking, cuddling, showing love by a gentle touch, and nurturing care. In the present study, 288 (57.8 %) babies were given KMC by the mothers. The mother and the other caregiver in the family participated in KMC in 176 (35.3%) babies while other caregivers (6.9%) gave KMC to 34 babies. The preferred caregiver was grandmother, mother-in-law, or any female elderly member in the family. Male caregivers have not participated in KMC in the present study. Due to the limited space available in our NICU, to maintain strict aseptic precautions, participation was restricted to only female caregivers. Male attendees were not allowed into our NICU, hence were not a part of the present study. In Getinet

Kassahun, Aberash Efa et al.¹¹, study conducted in Hawassa, Southern Ethiopia, 2018, 72 (83.7%) mothers, 10 (11.6%) grandmothers, and 4 (4.7%) fathers employed KMC.

Inborn/Outborn babies vs. KMC practice:

In the present study, out of 251 outborn babies, mothers gave KMC to 120 babies, both the mother and the other caregiver gave KMC to 111 babies and 20 babies by other caregivers. In the babies born at GGH, out of 247, mothers gave KMC to 168 babies, both the mother and the other caregiver gave KMC to 65 babies and 14 babies by other caregivers. The postnatal mothers, as well as the other caregivers, participated in KMC for most of the outborn babies 111 due to a delay in discharge of postnatal mothers from the place of institutional delivery, transport, and arrival at our NICU.

Educational Qualification vs. KMC practice:

In the present study, 127, 79, 68, 14 mothers who had the educational qualifications of high school, post-high

school, primary, middle school, and illiteracy gave KMC to their babies.

SUMMARY AND CONCLUSIONS:

The following are the salient features in the present study.

- A total of 498 preterms/low birth weight babies were taken into study, who were hemodynamically stable and whose mothers/caregivers gave consent.
- Majority of the 205 postnatal mothers (41.2%) had a high school educational qualification and 127 of them directly participated in KMC without the help of other caregiver.
- Out of 498 newborns, 251 (50.5%) were outborn babies, referred for preterm/LBW care, and 247 (49.5%) were born at GGH, Kakinada.

Out of 498 babies, 352 (70.6%) were moderate to late preterm, and 232 (46.6%) were weighing between 1.5-1.9 kg. None of the mothers had prior knowledge of KMC. All of the postnatal mothers, 498(100%), came to know about KMC after counseling, and 373 (74.8%) were able to follow after the initial round of explanation. In contrast, most of them, 422 (84.7 %), felt the need for a second round of counseling. The photo exhibition of KMC was helpful to all (100%) of the participants. All the participants (498) agreed that KMC was beneficial to the baby and 72 (14.5%) were doubtful regarding its benefits to the mother. 405 (94.1%) agreed that any family member could give KMC. A total of 469 (94.1%) felt confident after practicing KMC. The mother gave KMC to 288 (57.8 %) babies. The mother and the other caregiver in the family participated in KMC in 176 (35.3%) babies, while other caregivers gave KMC to 34 (6.9%) babies. All 498 (100%) participants in the KMC study perceived the baby's heartbeat and respiration during the procedure. 223 (44.8%) of them interacted with the other KMC givers. The majority 422 (84.7%) clothed the baby with a cap, mitten, and socks during KMC. 248 (49.7%) babies were given KMC for 4 hours, 186 (37.3%) babies for 8 hours, and 64 (12.8%) babies for 12 hours. 267 (53.6%) babies were given KMC for five days, and 14 (2.8%) babies for more than 20 days. The mean weight gain per day observed was 8.93(g/day) in 4 hours KMC group, 13.82 (grams/day) for 8 hours KMC group, and 16.54 (g/day) in the 12 hours KMC group. Though there was a positive attitude of caregivers towards Kangaroo Care in the present study, due to various barriers during the practice, there were many lapses in the proper implementation of KMC. Hence, constant counseling from health care personnel like postgraduates, interns, and staff nurses, photo exhibition, and demonstration of the proper technique were vital factors for better Kangaroo Care in the present study. Being sensitive to caregiver's issues, early recognition of

barriers, and addressing them from time to time helped the caregivers practice Kangaroo Care efficiently. Kangaroo Care helped the low birth weight babies gain better weight and discharge early from the hospital in the present study.

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