Journal of Health, Medicine and Nursing www.iiste.org
ISSN 2422-8419 An International Peer-reviewed Journal DOI: 10.7176/JHMN
Vol.58, 2019

Knowledge, Attitude, Practice and Associated Factors of Kangaroo Mother Care for Neonatal Survival Among Care Takers of Preterm and Low Birth Weight Infants in Health Care Settings, Hawassa, Southern Ethiopia, 2018

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Abstract
Background: In Ethiopia**,** preterm and low-birth weight is the leading cause of neonatal morbidity and Mortality. Many of these deaths can be prevented using Kangaroo Mother Care (KMC) which has been proven and cost-effective intervention especially in low- and middle-income countries. However, there is presently a lack of KMC data in the region on the barriers causing a low record for KMC, is it attitude or knowledge. Hence, the purpose of this study was to explore the knowledge, attitude, practices and associated factors of KMC among caretakers of preterm and LBW infants. **Methods:** A facility-based cross-sectional study was done in KMC centers on 93 care takers in Hawassa health care settings from March 2018 to April 2018. Study participants were selected using a convenient random sampling technique. Data were collected through questionnaire interviews and extract information during review of records and observation. These data were cleaned, coded and entered using EpiData Version 3.1 statistical software then transferred to SPSS software package version 22 for analyses and explained with texts, figures and tables. Pearson chi-square was computed to test the association between independent and outcome variables. P-value of chi-square (X^2) <0.05 with 95% CI was confirmed as statistically significant. **Results:** Fifty nine (68.6 %) study participants were knowledgeable on Kangaroo mother care and 61.6 % had the good practice of KMC. Three variables **(**having delivery in KMC health care setting (p=0.018), being skilled birth attendant (p=0.0001) and getting KMC counseling (p=0.001)) had statically significant association with knowledge of caregivers regarding to KMC, whereas two variables (being knowledgeable on KMC (p=0.001) and being skilled birth attendant (p=0.006)) had statically significant association with caregivers' practice of Kangaroo mother care. **Conclusion:** Our study shows that overall knowledge and practice of care takers of premature and low birth weight infants regarding KMC was low**.** Some factors of care takers affect the knowledge and practice of KMC for caring in premature and LBW infants. **Recommendation:** *KMC counseling and education should be conducted during ANC follow up and delivery should be assisted by skilled birth attendant in KMC health care settings to improve their knowledge. Besides, knowledge of KMC should be generated to increase the practice of KMC.*
Keywords: KMC**,** knowledge, attitude, practice care takers, associated factors, Ethiopia
DOI: 10.7176/JHMN/58-01

1.0 Background

LBW and preterm birth account 60–80% of neonatal deaths worldwide. The three leading causes of neonatal mortality and morbidity are infections (35%), preterm birth and LBW (28%) and asphyxia (23%) [1]. globally, around 25 million and 15 million newborns were low birth weight and preterm newborns respectively. Of this, developing countries account 96% of preterm and LBW infants [2, 3]. Small infants related problems that can be fatal and disabling such as unable to control their body temperature and infection [4]. In developing countries, the risk of death in small infants is six-times greater than in developed countries [5].

In 2016, of all 1,897,829 institutional live births, 8,570 preterm live births (<37 weeks), 49,201 low birth weight (<2,500 grams), and 4,225 very low birth weight (<1,500 grams). In Ethiopia, these statistics is lower than the actual figures as under-reporting and lack of neonatal death registries at home. There are higher figure of premature and LBW infants in higher health facilities than primary health care settings. There are also greater proportion of premature and LBW infants in urban than rural [6].

Fortunately, kangaroo mother care (KMC) is cost-effective intervention in preventing neonatal death and disability especially in low- and middle-income healthcare settings. Based on the positive outcomes of KMC, it was also acknowledged in high-resource countries [7, 8]. KMC was introduced by Edgar Rey in Colombia in 1978 [3]. The safety, feasibility, acceptability and cost-effectiveness of KMC have been proven in countries such as Ethiopia [9], Ghana [10] and Madagascar [11]. The key components of kangaroo mother care (KMC) are kangaroo position (skin-to-skin contact of the infant on the mother's chest), optimal breast feeding (exclusive and frequent breast feeding) and support to the mother and infant. Skin-to-skin position for 24 hours per day (as long as possible) is defined as continuous KMC. Skin-to-skin position for a few hours a day is defined as

intermittent KMC. KMC have more advantages over conventional new born care for mother and infant such as effective thermal control, optimal breastfeeding, infection prevention, mother-infant bonding, early discharge, decreased death and less illness. It is also a response to the separation of mothers and infants [12-14].

To fight the mortality of small infants in Ethiopia, KMC is started at black lion hospital in 1996. Since then, KMC services have been expanded at community and health care settings [15]. The service is integrated in the 2015/16-2019/20 high-impact child survival intervention package along continuum of care with target of achieving 90% coverage by 2020. Despite the free charge of services, still the current coverage was low [16]. There is also discrepancy among regions (5% in Amhara, 2% in Oromia, and 2% in Somali and 1% in Southern region) [6]. The capital city of Southern region is Hawassa which includes KMC health care settings (two hospitals and MCH specialty clinic). These health care settings have been serving for more than 15 million people in southern Ethiopia and its neighboring regions of Oromia.

2.0 METHODOLOGY

2.1 Study area and Study design

An institution based cross-sectional study design was employed in hospitals and MCH specialty clinic (Hawassa University comprehensive specialized hospital, Adare general Hospital and Loke MCH specialty clinic) in Hawassa city, southern Ethiopia. Hawassa city is the capital city of southern Ethiopia and it is about 275 km from Addis Ababa (capital city of the country). According to 2007census report, southern region of Ethiopia is the home of 15,321,000 populations [17]. According to 2016 national EmONC assessment, of all 411,720 institutional live births of southern region, 875 preterm live births (<37 weeks), 6,282 low birth weight (<2,500 grams) and 583 very low birth weight (<1,500 grams). There is greater proportion of premature and LBW babies in urban, and hospitals and MCH specialty clinics. But, KMC coverage still remains low in study area [6]. The study was done between March and May 2018.

2.2 Study population, Sample size determinations and Sampling techniques

Study population for our study was all sampled mothers or care takers (grandmothers, father and other relatives) among those who gave care for small infants during the data collection period in three Hawassa health care settings. Inclusion criteria: all stable premature and LBW infants of caregivers were included in the study.

The sample size was determined using a single population proportion formula on the following assumptions: the prevalence of knowledge of care takers (11.4%) [10], 95% confidence interval, 5% margin of error and 10% non-response rate. Then, final sample size was 96 subjects.

This study included two hospitals and one MCH specialty clinic. These health facilities were providing KMC services in Hawassa City during the time of data collection. The sample size of each health facilities was proportionally allocated based on client load. Consecutive sampling technique was employed and each study respondent was interviewed consecutively until required sample size reached.

2.3 Operational definitions

Kangaroo mother care: It includes early, prolonged and continuous skin-to-skin contact, exclusive breastfeeding and support to the mother and infant.
Care takers: refers mothers or other family members (father, grandmother or relatives) who providing the care for premature/LBW infants in the mothers' absence or when she needs rest.
Small Infants: A baby who is born preterm with low birth weight.
Preterm birth: Delivery occurring before 37 weeks of gestational age.
Low-birth-weight: Birth weight less than 2500g (up to and including 2499g).
Intermittent: KMC is practiced two to three times in a day and not included the night.
Continuous: KMC is practiced continuously in a day and included night, interrupted only for changing diapers.
Knowledgeable: Those participants responded 50% and more knowledge questions correctly are categorized as knowledgeable.
Good practice: Those participants responded 50% and more practice questions correctly are categorized as having good attitude.

2.4 Data collection Instruments and procedure

An interviewer administered structured questionnaire was developed by reviewing different literatures and translated into local language (Amharic) then back translated to English language. Before conducting the study, pre-test was conducted on 5% in Yirgalem referral hospital which would not be involved in this study. But it is comparable set up. The questionnaire was assured for its clarity, understandability, completeness and consistence. The five BSc Midwifes were trained on how to conduct questionnaire interviews and extract information during review of records and observation to minimize information bias. Supervisor cross checked the collected data for its consistency and completeness on each day. Sociodemographics, knowledge and attitude related data were

collected through structured interviewer administered questionnaire. The obstetric and practice related data were extracted using a checklist from the patient record and observation respectively.

2.5 Data processing and analysis procedures

The collected data were cleaned, coded and entered using EpiData Version 3.1 statistical software then transferred to SPSS software package version 22 for analyses. Descriptive analysis was used to determine the frequency distribution on different variables. To test the association between explanatory variables and outcome variables, Pearson chi-square was computed. Before decision, chi-square assumptions were assured. Finally, P-value of < 0.05 with 95% confidence interval was confirmed as statistical significance.

2.6 Ethical considerations

Before conducting the study, ethical clearance was obtained from institutional review board of Hawassa University College of medical and health science and permission letter was taken from respective health facilities. Before taking informed consent, participants were informed regarding the purpose and importance of the study. Confidentiality was kept by using codes during data collection, analysis or thought process.

3.0 RESULTS

3.1 Socio-demographic characteristics of participants

A total of 86 respondents were included in the study with the response rate of 92%. The mean (±SD) age of the respondents was 29 (SD ±7) years and 68.6% of them were in the age group of
25-34 years. Most (73.3%) of them were Christian and the rest 23 (26.7%) were Muslim. Most (79%) of respondents were from urban areas. Majority of them were Illiterate by educational status and Employed by occupational status, 63(73.3%), and 34(39.5%) respectively (**Table 1**).

3.2 Obstetric related characteristics

Concerning obstetric characteristics, 50(58.1%) of them were multiparas and majority of respondents (69.9%) had KMC counseling during ANC follow up. Majority 66 (76.7%) of them delivered in KMC health care settings and most of labors 78 (90.7%) were assisted by skilled birth attendant. The mean (+SD) gestational age and birth weight 32.7(SD±1.9) weeks and 1984(SD±504.3) grams respectively. Majority of them were 33-36 weeks by gestational age group and 1500-2499 grams by birth weight group, 51(59.3%) and 57(66.3%) respectively. Majority 75 (87.2%) of deliveries were spontaneous vaginal deliveries (SVD) and 11(12.8%) by cesarean section deliveries (CS) (**Table 2**).

3.3 Knowledge of care takers about the KMC

Fifty nine (68.6 %) study subjects were knowledgeable on the benefits of kangaroo mother care (KMC) in health care settings, whereas 27(31.4 %) of them were not knowledgeable. Overall study participants have heard about kangaroo mother care (KMC). Among those, 72.7 % of respondents answered it means skin to skin contact of the infant on the mother's chest, whereas the rest of them did not know. The main sources of information were: health professional 74 (86%), media 56(65%), education campaign 20(23.3%) and posters 15(17.4%). Seventy two (83.7%) caregivers know at least one benefit of KMC. Study subjects are asked to their knowledge on the importance of KMC: 62 (72.1%) provides warmth to the baby, 58(67.4%) promotes exclusive breast feeding, 55(64%) improves weight gain and growth, 30 (34.9%) reduces hospital stay, 41(47.7%) reduce infection and 72 (83.7%) promotes baby-mother bonding and 20 (18%) less morbidity and mortality. 27 (31.4 %) of respondents listed three and below KMC benefits.

3.4 Attitudes of care takers on KMC

From the study subjects, 49 (57%) of them had willingness to accept kangaroo mother care (KMC) in health care settings. 45(52.3%) had positive feelings to learn KMC and 49(57%) of respondents had self-confident to continue KMC at home after discharge. 43(50%) of them had positive opinions to give information to family members regarding practical benefits of KMC and 47 (54.7%) of respondents would recommend KMC to other mothers. 36(41.9%) of participants had willingness to generate community awareness about the benefits of KMC. Majority 28(32.6%) of respondents had willingness to keep hygiene: daily bath, change of clothes and hand washing. 67 (77.9%) of them preferred grandmothers to implement KMC.

3.5 Practice of care takers on KMC

Fifty three (61.6%) study participants had a good practice regarding kangaroo mother care. Participants are asked and observed on the correct practice of Kangaroo mother care on kangaroo position, clothing during KMC, KMC initiation, length of KMC and breast feeding. About 47(54.7%) of respondents performed kangaroo position in setting or semi-reclined position appropriately, whereas the rest of respondents position was

inappropriate. Most 49(57%) of respondents dressed the baby with cap, socks and nappy appropriately, whereas the rest of them did not dress their baby properly. Majority 59(68.6%) of respondents implemented KMC as soon as the baby is stable and immediately following birth and 27(31.4%) initiated KMC after 24 hours of birth. Most 55(64%) of respondents performed KMC continuously and interrupted only for changing diapers, whereas the rest of them performed intermittently. About 70(81.4%) of them feed optimal breastfeeding immediately following birth and 9 (10.5%) of them feed exclusive breast feeding less frequently, whereas the rest 7 (8.1%) used formula feeding. Majority 72(83.7%) mothers, 10(11.6%) grandmothers and 4(4.7%) husbands employed KMC.

The reasons for not practicing KMC continuously in three health settings were: lack of adequate information and skill on KMC 14(42.4%), difficult of handling small babies 11(33.3%), maternal health problem 9 (27.3%), fear of babies becoming abusing to breast milk 3(9.1%), lack of time 2(6.1%) and pains in the breast 1(3%) (**Figure 1**).

3.6 Association of variables with knowledge and practice of KMC

Below table show the association between knowledge of caretakers on KMC and different variables. Three variables (having delivery in KMC health care setting (p=0.018), being skilled delivery attendant (p=0.0001) and getting KMC counseling (p=0.001)) had statically significant association with knowledge of caretakers regarding to KMC (**Table 3**). Two variables (being knowledgeable on KMC (p=0.001) and being skilled birth attendant (p=0.006)) had statically significant association with practice of caretakers (**Table 4**).

4.0 Discussion

Our study showed that the overall knowledge and practice of caretakers on kangaroo mother care were 68.6% and 61.6% respectively. This was in-line with other study [18] but it was lower than other study [10]. Reasons for these differences may be due to the cultural characteristics of the respondents, study methodology and set up of services. In this study 68.6% of the respondents started KMC immediately after birth and 31.4% started KMC after 24 hours of birth. But, our study finding was inconsistent with other studies [10, 19]. The possible reasons for these differences may be due to the lack of awareness, psychological readiness and comfortable immediately after birth. In our study 81.4% of mothers initiated breastfeeding within one hour after birth. But, this figure was greater than EDHS survey [20]. The possible reasons for these differences may be women may get adequate information access in health care settings.

In our study the participants reported the benefits of KMC such as protection from infection, warmth to the baby, exclusive breast feeding, weight gain and growth, early discharge from hospital, safety and love. These have been also reported by other studies [21-22]. However, in present study significant number of participants reported that the reasons for not practicing kangaroo mother care were: lack of knowledge and skill, maternal health problem, difficult of handling small babies, fear of babies becoming abusing to breast milk, lack of time and pains in the breast. These have been supported by other studies [23-24].

This study showed that 58% mothers have willingness to implement KMC. This finding was similar with other findings [18-19] but it was lower than other studies [11, 25]. In our study 47 (54.7%) of respondents would recommend KMC to other mothers with low birth weight infants. It was not comparable in other studies [10, 26]. In our study, 77.9% of them preferred grandmothers and rest preferred husbands were doing KMC. This reason may be due to grand mothers are known to have a strong commitment to give care for children in Africa including Ethiopia [27].

In our study the mode of delivery, attitude, gestational age and education status had not significant association with the practice of KMC in similar to other studies [28-29]. In general, being skilled birth attendant (p=0.0001), having delivery in health care settings (p=0.018) and having KMC counseling (p=0.001) had statically significant association with knowledge of caretakers regarding to KMC. Similarly, being knowledgeable on KMC (p=0.001) and being skilled birth attendant (p=0.006) had statically significant association with practice of caretakers on kangaroo mother care at health care settings.

5.0 Conclusion

The finding of this study on knowledge and practice of caretakers regarding kangaroo mother care showed that 68.6 % had good knowledge and 61.6 % had good practice. However, there were clear gaps in knowledge and practice in some of the small infants care intervention. The main reasons for not practicing kangaroo mother care were lack of knowledge and skill, difficult handling small babies and maternal health problem.

In this study, being skilled birth attendant, having delivery in health care settings and having KMC counseling were significantly associated with caretakers' knowledge on kangaroo mother care. Moreover, being knowledgeable on kangaroo mother care and being skilled birth attendant were significantly associated with caretakers' practices on kangaroo mother care.

6.0 Recommendations

Based on the findings of this study the following recommendations are made:

- Regional health offices should promote kangaroo mother care region wide through the media (television and radio).
- The mothers should get enough information about KMC during antenatal follow up and they should develop adequate skills to initiate KMC using a poster and actual case scenarios in a health care setting by health care providers.
- Furthermore, further studies should be done a more representative community based study on areas of kangaroo mother care to identify more gaps.

7.0 Strengths & limitations

The strength of this study included harmonizing methods: observation of care, review of records and interview of participants for data collection. This strength may be to minimize information bias. The limitations of this study included health care settings, cross sectional study design and convenient sampling method and thus the findings may not be generalizable for community, entire population and casual cause-effect relationship may not be proven. Another limitation of this study did not investigate enabling or restraining factors such as facility infrastructure, set up of services, management and policy issues.

Abbreviation

ANC: Antenatal care
EmONC: Emergency obstetric and neonatal care
KMC: Kangaroo mother care
LBW: Low birth weight
MCH: Maternal and child health
SD: Standard deviation
SPSS: Statistical package for social science
X2: Chi-square

Declaration

Ethics and consent

Ethical clearance was obtained from institutional review board (IRB) of Hawassa University College of medical and health science and permission letter was taken from respective health facilities.

Consent for publication

Not applicable.

Availability of data and materials

We send all which is available as there is not remaining data and materials

Competent interests

The authors declare no competing interests.

Funding and sponsor ship

The authors did not receive any specific grant for this research.

Authors' contribution

GK designed the study, participated in data collection, analysis, interpretation and drafted the manuscript. AE and HS approved the design, data collection, analysis, interpretation and critical review of the manuscript. All authors read and approved the final manuscript.

Acknowledgments

We are very thankful to Hawassa University for giving ethical clearance. We would like to acknowledge officials of respective health facilities for making accessible the needed data for this study. Finally we also want to appreciate study participants who gave their complete information and also data collectors and supervisors for their commitment to our study.

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Table 1: Socio-demographic characteristics of respondents in Hawassa health care settings, Southern Ethiopia, 2018.

Socio demographic variable (n=337)	**Number(Percentage)**
Age (in years)	
18-24	19(22.1)
25-34	59(68.6)
≥35	8(9.3)
Marital status	
Single	17 (19.8)
Married	38 (44.2)
Separate	31 (36)
Religion	
Christian	63(73.3)
Muslim	23(26.7)
Educational status	
Illiterate	63(73.3)
Literate	23(26.7)
Occupation	
Farm produce	19(22.1)
Business/Self employed	33(38.4)
Employed/Salaried	34(39.5)
Residence	
Urban	68(79%)
Rural	20(21%)

Table 2: Obstetrics characteristics of respondents in Hawassa health care settings, Southern Ethiopia, 2018.

Number of delivery	
Primi Para	36(41.9)
Multi Para	50(58.1)
Mode of delivery	
Vagina delivery	75 (87.2)
CS section	11 (12.8)
Skilled birth attendant	
No	18 (21)
Yes	68 (79)
Delivery in KMC health care setting	
No	16(18.7)
Yes	70 (81.3)
Gestational age	
Very preterm (<32 weeks)	35(40.7)
Moderate to late preterm (<37 weeks)	51(59.3)
Birth weight	
Very low birth weight (<1,500 grams)	29(33.7)
Low birth weight (<2,500 grams)	57(66.3)
Getting KMC counseling	
No	27(31.4)
Yes	59(68.6)

Table 3: Shows association of variables with caregivers' knowledge on Kangaroo mother care in Hawassa health care settings, Southern Ethiopia, 2018.

Variables	Status of knowledge on KMC		Chi-square	p-value
	knowledgeable	Not knowledgeable		
Skilled birth attendant				
No	5(27.8)	13 (72.2)		
Yes	54(79.4)	14(20.6)	17.617	0.0001
Delivery in KMC health care setting				
No	7(43.8)	9(56.3)		
Yes	52(74.3)	18(25.7)	5.638	0.018
Marital status				
Single	10(58.8)	7(41.2)		
Married	26(68.4)	12(31.6)	1.205	0.547
Separate	23(74.2)	8(25.8)		
KMC counselling				
No	12(44.4)	15(55.6)		
Yes	47(79.7)	12(20.3)	10.666	0.001
Religion				
Christian	42(66.7)	21(33.3)		
Muslim	17(73.9)	6(26.1)	0.441	0.521
Education				
Illiterate	40(63.5)	23(36.5)		
Literate	19(82.6)	4(17.4)	2.859	0.091
Occupation				
Farm produce	14(73.7)	5(26.3)		
Self employed	22(66.7)	11(33.3)		
Employed	23(67.6)	11(32.4)	0.300	0.861

Table 4: Shows association of variables with caregivers' practice on Kangaroo mother care in Hawassa health care Settings, Southern Ethiopia, 2018.

Variables	Status of practice on KMC		Chi-square (x^2)	p-value
	Practice	Not practice		
Knowledge status				
Not knowledgeable	5(18.5)	22(81.5)		
Knowledgeable	48(81.4)	11(18.6)	30.929	0.0001
Attitude status				
Unwillingness to accept KMC	15(51.7)	14(48.3)		
Willingness to accept KMC	38(66.7)	19()33.3	1.815	0.178
Marital status				
Single	11(64.7)	6(39.5)		
Married	23(60.5)	15(39.5)	0.089	0.956
Separate	19(61.3)	12(38.7)		
KMC counselling				
No	13(48.1)	14(51.9)		
Yes	40(67.8)	19(32.2)	3.024	0.082
Education				
Illiterate	16(69.6)	7(30.4)		
Literate	37(58.7)	26(41.3)	0.836	0.360
Skilled birth attendant				
No	6(33.3)	12(66.7)		
Yes	47(69.1)	21(30.9)	7.707	0.006
Occupation				
Farm produce	15(78.9)	4(21.1)		
Self employed	19(57.6)	14(42.4)		
Employed	19(55.9)	15(44.1)	3.114	0.221

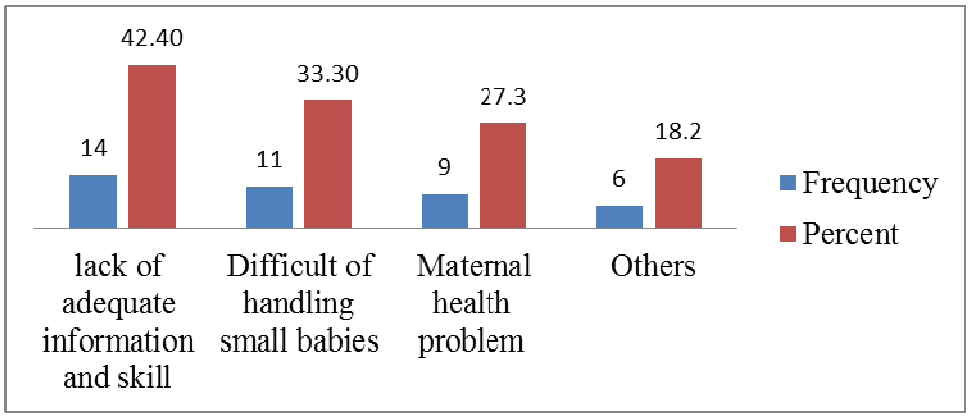

Figure 1: The reasons for not practicing Kangaroo mother care continuously in Hawassa health care Settings, Southern Ethiopia, 2018.