



## Perceived Benefits and Barriers of Mothers with Premature Infant to Kangaroo Mother Care

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### Abstract

#### Background

Kangaroo Mother Care (KMC) is an easy and emotional care that can reduce the mortality and morbidity in premature infants, but often the relationship between mother and her newborn is delayed due to some barriers. The aim of this study was to investigate perceived benefits and barriers of mothers in this regard.

**Materials and Methods:** In this descriptive cross-sectional study, 121 mothers with premature infants admitted to the Neonatal Intensive Care Unit (NICU) of Yazd Shahid Sadoughi Hospital, Iran, studied using convenience sampling method in 2018. Data gathering accomplished by interviewing mothers using researcher-made questionnaire included baseline characteristics of parents and their infant and items measuring perceived benefits and barriers of mothers to KMC. The data were analyzed using SPSS software version 22.0

**Results:** Strengthening of the emotional relationship between mother and infant and a greater sense of confidence were the main perceived benefits of mothers. Not being in good physical and mental condition, lack of relevant knowledge and fear of performing KMC were the most important perceived barriers of mothers to KMC. The perceived benefits differed only in mother's ethnicity and father's occupation ( $P < 0.05$ ). The perceived barriers did not differ by any of demographic variables of parents and infants ( $P > 0.05$ ).

#### Conclusion

According to the results though the high perceived benefits of mothers in performing KMC, it seems that planning for improving mothers mental condition, providing mothers with necessary knowledge and reducing fear of caring can effectively promote doing KMC by mothers.

**Key Words:** Barrier, Benefit, Infant, Kangaroo mother care, Premature.

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## 1- INTRODUCTION

Prematurity and Low Birth Weight (LBW) are one of the major health issues and also one of the most common causes of neonatal death (1). Despite the advances in medical science and comprehensive efforts to prevent early delivery and birth of preterm infants, the rate of preterm birth remains high (2). In addition to creating economic and psychological problems in the family, this health issue also leads to the waste of financial and human resources (3). Preterm infants are the infants that are born before 37 weeks of gestation or have a birthweight of less than 2,500 gr (1). Annually, 20 million LBW preterm infants are born across the world, and 96.5% of them are in developing countries (4), and the prevalence of LBW in Iran is estimated at 9% (5).

Kangaroo Mother Care (KMC) is an easy and emotional care method in which the baby's skin is exposed to the parent's (6). This method is a low-cost care method for low birth weight and preterm infants, which was first used in a hospital in Bogotá, Colombia in 1978 to care for low birth weight infants, and resulted in early discharge of preterm infants (7). KMC has numerous benefits, the most important of which include stabilization of the heart rate, more regular breathing, improvement of the diffusion of oxygen in the body, prevention of cold stress, reduction in crying, longer consciousness, provision of opportunities for breastfeeding, communicating between mother and baby, and increasing the likelihood of early discharge from the hospital (2, 8-14).

This method has led to a revolution the care of infants, especially preterm ones, because parent involvement in the care of the baby prevents many of the physical and emotional injuries resulting from the prolonged hospitalization of the baby and also strengthens the sense of involvement in the parent (6). However, despite the benefits of active parental involvement in

the care of the baby (15), when the neonate is born, communication between the parents and the baby is often delayed, which is worrying for parents. The presence of numerous Neonatal Intensive Care Units (NICU) is a major barrier to early communication between the baby and the parents (16). Perceived benefits and barriers are among the factors that influence the conduction of behavior (17-19); an assumption in most theories of health behavior as well as Health Belief Model (HBM) as one of the most effective and multipurpose patterns in health education is that an individual performs or does not perform a certain behavior based on the analysis of its benefits minus barriers to do it (20). It was originally developed as a systematic method around 1952 to explain and predict preventive health behavior. Some studies designed based on the HBM have shown effectiveness of training interventions on enhancing the preventive behaviors or reducing unhealthy behaviors (21, 22).

Accordingly, the mother must be able to reach the positive conclusion of performing kangaroo care in order to deal with the perceived benefits and barriers in order to do this well. Therefore, it seems that the perceived barriers and benefits of mothers with preterm infants regarding KMC seem to be of particular importance and can help physicians and staff related to baby care provide better conditions to do KMC. Because most studies in this area have investigated the effect of this care method on clinical variables in newborns such as improvement respiratory status and voluntary behaviors, weight gain (23), and body temperature regulation (24), heart rate, oxygen saturation (25), duration of hospital stay, incidence of jaundice (23), and pain relief (26), and no study has yet been conducted on the viewpoints of mothers regarding perceived benefits and barriers to KMC, this study was conducted to investigate the perceived benefits and

barriers to KMC among Iranian mothers with preterm infants admitted to the NICU.

## 2- MATERIALS AND METHODS

### 2-1. Study design and population

The study population of this descriptive, cross-sectional study consisted of mothers whose premature infants were admitted to the NICU of Shahid Sadoughi Hospital, Yazd city, Iran. In this referral hospital, preterm infants from nearby cities and provinces are admitted. The study samples were selected from the early 2018 within five months by using convenience sampling method. In this regard, according to previous studies and given  $d = 0.5$  and  $\alpha = 0.05$ , the sample size was determined to be 124, three of whom were excluded from the study due to incomplete completion of the questionnaire, and finally 121 people were enrolled in the study.

### 2-2. Method

The data collection instrument was a researcher-made questionnaire completed by interviewing the eligible mothers as they were accompanying their infants in the NICU in morning work shifts.

### 2-3. Measuring tools

The data gathering instrument included three sections. The first addressed the baseline characteristics of the parents, and the second part included the items on infant characteristics including gender, birth weight, and intrauterine age, and the third section included items related to the measurement of the constructs of perceived benefits and barrier. The instruments were developed according to the related studies, and the results of semi-structured interviews with mothers of preterm infants admitted to the NICU, nurses, and neonates working in the NICU. Finally, items with Content Validity Ratio (CVR) higher than 0.62, and Content Validity Index (CVI) higher than 0.78 were used in the questionnaire. Regarding

the quality, the grammar of the items was corrected, appropriate words were used, the items were placed in an appropriate order, and time necessary to complete the instrument was determined by experts. After the necessary revisions, internal consistency of the instrument of perceived benefits, and barriers to KMC was confirmed, with Cronbach's alpha 0.91 and 0.9, respectively. The perceived benefits questionnaire consisted of 15 items rated on a five-point Likert scale to rate each item with 1 absolutely disagree to 5 absolutely agree (score range:15-75). The perceived barriers questionnaire consisted of 14 items rated on a five-point Likert scale ranging from 1 never to 5 very much (score range: 14-70). While higher score represented a better perceived benefits and higher perceived barriers.

### 2.4-Ethical consideration

The ethics code IR.SSU.SPH.REC.1396.62 was obtained from the Research Ethics Committee of Yazd Shahid Sadoughi University of Medical Sciences for the study protocol. The researcher entered the NICU after making necessary coordination with the head of the hospital and the NICU, and the supervisor of the ward. Only one of the research team members entered the ward. To observe ethical considerations, while explaining the goals of the study to mothers, participants were assured that participation in the study was voluntary and they could withdraw from the study whenever they wished, and their information would be kept confidential. All of the women provided a written informed consent to participate in the study, and every effort was made to maintain their privacy throughout the study.

### 2-5. Inclusion and exclusion criteria

The inclusion criteria for mothers was physician's approval for KMC and giving birth to a preterm infant with gestational

age of equal to or less than 32 weeks, and a birthweight of less than or equal to 1.800 gr (27). Stability of the cardiovascular condition of the infant at the beginning of KMC, and parents' consent to participate and cooperate with the study were other inclusion criteria. Neonatal asphyxia, congenital anomalies, and intracerebral hemorrhage of grade 3 and 4 were considered the exclusion criteria from the study (28).

**2-6. Data Analyses**

The data were analyzed using SPSS software version 22.0 with descriptive statistics, correlation coefficients, and statistical tests to investigate the difference between mean values including Mann-Whitney and Kruskal-Wallis tests. P-value less than 0.05 were statistically significant.

**3- RESULTS**

The samples were 121 mothers with preterm infants admitted to NICU of Shahid Sadoughi hospital in Yazd (Iran), with a mean parity of  $2.5 \pm 1.3$ , and the mean number of living children  $2.2 \pm 1.1$ . The mean gestational of the infants was

( $30 \pm 1.9$ ) weeks, and their mean birth weight were ( $1,325 \pm 304.9$ ) grams. The education level of most mothers (33.1%, n=40), and their husbands (31.4%, n=38) was high school diploma; 86% (n=104) of the mothers were housewives, and 50.4% (n=61) the husbands were self-employed.

The religion of 88.4% (n=107) of the mothers was Shi'a and ethnicity of most mothers and fathers (83.5% and 85.1%, respectively) was Fars. Most of the parents were native the Counties of Yazd (39.7%, n=48). 81% (n=98) of the newborns were born by cesarean section, of whom 59.5% (n=72) were girls. The mean age of mothers and fathers were  $30.1 \pm 6.05$  and  $33 \pm 6.46$ , respectively (**Table.1**). Regarding perceived benefits, the mean score of mothers was  $67.4 \pm 6.9$  (range: 15-75). In this regard, the emotional relationship between the mother and the infant and peace of mind were the most frequently reported benefits, with the highest mean score (4.8). Reduced infections in neonates, with an average of 3.7, was derived as the least frequently reported benefit by mothers (**Table.2**).

**Table-1:** Frequency distribution and percentage of baseline characteristics of parents of studied preterm infants

Variables	Sub-group	Frequency (%)	Variable name	Sub-group	Frequency (%)
Mother's education	Illiterate	7 (5.8)	Mother's ethnicity	Fars	101(83.5)
	Elementary	12 (9.9)		Blouch	9 (7.4)
	Guidance school	18 (14.9)		Other ethnicities	11(9.1)
	Diploma	40 (33.1)	Father's ethnicity	Fars	103 (85.1)
	Higher than diploma	16 (13.2)		Blouch	7 (5.8)
	Bachelor	21 (17.4)		Other ethnicities	11(9.1)
	Master and higher	7 (5.8)		Religion	Shi'a
Father's education	Illiterate	5 (4.1)	Sunni		14 (11.6)
	Elementary	11(9.1)	Residential status		Native to Yazd
	Guidance school	23 (19)		Native the Counties of Yazd	45 (39.7)
	Diploma	38 (31.4)		Non-native	35 (28.9)
	Higher than diploma	20 (16.5)	Maternal Children type	Natural	23 (19)
	Bachelor	17 (14)		Cesarean	98 (81)
	Mother's job	Master and higher	7 (5.8)	Infant's gender	Girl
Employed		17 (14)	Boy		49 (40.5)
Housewives		104 (86)	Variables	Mean± SD	

Father's job	Employed	24 (19.8)	Mother's age (year)	30.1± 6
	Worker	31(25.6)	Father's age (year)	33.4±6.4
	Self-employed.	61(50.4)	SD: Standard deviation.	
	Retired	5 (4.1)		

**Table-2:** Frequency distribution of mothers in terms of their perceived benefits of Kangaroo Mother Care

Items	Absolutely agree	Slightly agree	Neither disagree nor agree	Slightly disagree	Absolutely disagree	Mean of item
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	
Holding your preterm baby will help improve his/her body temperature.	73(60.3)	48(39.7)				4.6 ± 0.49
KMC will help your baby begin breastfeed sooner.	75(62)	42(34.7)	4(3.3)			4.59 ± 0.55
Skin-to-skin contact between you and your baby improves his/her breathing.	72(59.5)	32(26.4)	16(13.2)	1(0.8)		4.45 ± 0.75
Your baby's weight gain is enhanced by KMC.	62(51.2)	40(33.1)	15(12.4)	2(1.7)	2(1.7)	4.31 ± 0.87
KMC strengthens the emotional relationship between the baby and the parent.	99(81.8)	22(18.2)				4.82 ± 0.38
KMC helps parents to feel more confident in keeping their babies.	98(81)	22(18.2)	1(0.8)			4.8 ± 0.42
KMC increases the quality of care in the neonatal intensive care unit.	77(63.6)	32(26.4)	12(9.9)			4.54 ± 0.67
KMC increases breastfeeding	68(56.2)	28(23.1)	19(15.7)	5(4.1)	1(0.8)	4.3 ± 0.93
KMC helps baby sleep quietly.	86(71.1)	29(24)	6(5)			4.66 ± 0.57
KMC will make your baby less likely to acquire infection.	43(35.5)	25(20.7)	40(33.1)	8(6.6)	5(4.1)	3.77 ± 1.13
KMC prevents mother's stress and anxiety.	90(74.4)	25(20.7)	1(0.8)	3(2.5)	2(1.7)	4.64 ± 0.77
KMC increases mother's confidence to take care of her baby.	94(77.7)	22(18.2)	3(2/5)	2(1.7)		4.72 ± 0.59
The baby is quieter and cries less frequently during KMC.	81(66.9)	36(29.8)	4(3/3)			4.64 ± 0.54
KMC is more beneficial than incubation for the infant.	70(57.9)	32(26.4)	17(3/3)	2(1.7)		4.4 ± 0.79
KMC saves excess costs by reducing the number of days of stay in hospital.	64(52.9)	31(25.6)	21(17.4)	5(4.1)		4.27 ± 0.89

Regarding perceived barriers with a score range of 14-70, the mean score of mothers was  $31.1 \pm 9.9$ . The lack of physical and mental health of the mother, lack of information and knowledge about how to perform KMC, and fear of performing it were reported as the most important perceived barriers to KMC by mothers, with a mean score of 3.4, 3, and 2.6, respectively. (Table.3). Based on the results of ANOVA test, the average score of perceived benefits of mothers was significantly different only in terms of

mother's ethnicity and father's occupation ( $P < 0.05$ ), so that this difference was observed between Fars and Balouch mothers and between self- employed and laborer fathers. The average score of perceived barriers of mothers was not significantly different with respect to any of the parents' demographic variables (education, occupation, religion, place of residence), and infant's demographic variables (gender and type of delivery) ( $P > 0.05$ ) (Table.4). Based on the results on Pearson correlation coefficient, there was

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no significant relationship between the perceived benefits and barriers by mothers and the parents' and infants' variables including parent age, parities, the number

of mothers' living children, gestational age, and birth weight of the infant ( $P > 0.05$ ) (Table.5).

**Table-3:** Distribution of mothers in terms of their perceived barriers to Kangaroo Mother Care

Items	Very much	Much	Partly	Slightly	Never	Mean of item
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	
Not having the information and knowledge about how to do KMC	10(8.3)	35(28.9)	43(35.5)	20(16.5)	13(10.7)	3.07 ± 1.01
The lack of mother's appropriate physical and mental conditions	29(24)	33(27.3)	34(28.1)	17(14)	8(6.6)	3.48 ± 1.19
The lack of a nurse or a physician who advises the mother to do KMC appropriately.	13(10.7)	20(16.5)	27(22.3)	25(20.7)	36(29.8)	2.58 ± 1.35
The lack of support of family members for KMC	9(7.4)	17(14)	26(21.5)	25(20.7)	44(36.4)	2.36 ± 1.3
Lack of facilities, such as special seats and attires, to do KMC.	5(4.1)	5(4.1)	10(8.3)	23(19)	78	1.64 ± 1.07
The lack of a safe and secure place for mothers to carry out KMC	5(4.1)	6(5)	6(5)	24(19.8)	80(64.5)	1.61 ± 1.06
Parents' feeling of embarrassment because of unclothed breasts while doing KMC	5(4.1)	4(3.3)	24(19.8)	16(13.2)	72(59.5)	1.79 ± 1.12
Interfering with the work of nursing staff due to the necessity of the presence of the mother at the NICU to do KMC.	4(3.3)	6(5)	15(12.4)	29(24)	67(55.4)	1.77 ± 1.06
Lack of tending to do KMC.	13(10.7)	3(2.5)	22(18.2)	14(11.6)	69(25)	1.98 ± 1.35
Fear of KMC because of lack of skill in doing it.	10(8.3)	24(19.8)	28(23.1)	27(22.3)	32(26.4)	2.61 ± 1.29
Not having adequate time to do KMC.	7(5.8)	12(9.9)	28(23.1)	20(16.5)	54(44.6)	2.16 ± 1.25
Lack of a special order for KMC in the neonatal unit.	7(5.8)	18(14.9)	35(28.9)	19(15.7)	42(34.7)	2.41 ± 1.26
Inadequate cooperation of nursing staff with mother to do KMC.	3(2.5)	14(11.6)	20(16.5)	28(23.1)	56(46.3)	2.01 ± 1.15
Regarding the works related to KMC as useless	3(2.5)	4(3.3)	15(12.4)	23(19)	76(62.8)	1.64 ± 0.99

**Table-4:** The mean of mother's perceived benefits and barriers in parents-infant's variables

Variables	Maternal Children type	Infant's gender	Religion	Mother's education	Father's education	Residential status	Mother's ethnicity	Father's ethnicity
Perceived benefits	0.82	0.77	0.17	0.51	0.21	0.6	0.01	0.08
Perceived barriers	0.71	0.55	0.67	0.33	0.17	0.95	0.16	0.61

**Table-5:** Correlation between perceived benefits, barriers and parents-infant's variables

Variable	Mother's age	Father's age	Total maternal pregnancy	Number of mothers' living children	Gestational age	Birth weight
Perceived benefits	- 0.07	- 0.03	- 0.01	- 0.07	- 0.09	- 0.15
Perceived barriers	0.1	- 0.01	- 0.02	- 0.15	- 0.07	- 0.07

#### 4- DISCUSSION

The aim of this study was to investigate the perceived benefits and barriers to KMC among mothers with preterm infants admitted to the NICU of Shahid Sadoughi Hospital in Yazd, Iran. Based on the findings, none of the parents' and infants' baseline characteristics were significantly associated with perceived barriers of mothers. This finding could indicate that hospital care was the same for all mothers, with any education, occupation, place of residence, ethnicity and religion, and there was no difference in delivery of services to the mothers. Therefore, it can be argued that all the obstacles are real and cannot be changed by changing the demographic conditions of the infants and mothers.

Regarding perceived benefits, strengthening the emotional relationship between mother and infant, and a greater peace of mind in the maintenance of the baby by conducting KMC was reported as one of the most important perceived benefits by the mothers in our study. Several studies have shown that the separation of the infant from the mother and hospitalization in the NICU creates a sense of lack of power and frustration, sin and uncertainty in the mother, most of which are due to the fact that the mothers feel unattached to her baby, inability to take decision on the baby, and lack of involvement in his/her care (29, 30).

According to Sterm and Bruschiweiler-Sterm, a mother's feeling is not developed at once, and takes several months to occur. This condition often occurs during pregnancy, and prepares the mother to give birth to a healthy baby. Exposure to conditions in which the baby was born with abnormal conditions and needs to be hospitalized, leads to interference in the mother's natural course of the process (31). According to Nelson, the hospitalization of the newborn in the NICU may interfere with playing maternal role, and mothers in

this unfamiliar situation do not pass through the motherhood era very well (32). However, according to a study by Feldman et al., skin-to-skin contact between the mother and the infant strengthens emotional attachment between them (33). This emotional attachment increases the mother's self-esteem and compliance with her maternal role (34). Based on the results of this study, mothers had a high perceived benefit regarding alleviated stress and anxiety of the mother and increased self-confidence to conduct kangaroo care for the baby. In this regard, a study in 31 American women whose newborns were hospitalized in NICU showed that most of their stress was due to the abnormality of the baby's appearance, the fear of the future of the baby, and the inability to perform maternal role (35).

According to the results of the present study, the baby's being calmer and crying less frequently during KMC was one of the benefits that most mothers reported. Ellet has emphasized that KMC reduces the duration of crying and restlessness of the baby, and increases the duration of his/her sleep (36). The study of Amini et al. also showed that hugging the preterm infant by the mother could affect his/her sleep/wake cycles and improve his/her sleep (37).

Based on the results of this study, since 81% of the mothers delivered by cesarean section, and were still experiencing post-cesarean delivery complications, such as back pain and suture-related problems, one of the main barriers facing mothers in conducting KMC was lack of appropriate physical and mental conditions. This finding highlights the need for paying more attention and collaborating with mothers who have just begun to conduct KMC and experience the early stages of KMC. The lack of information and knowledge about how to perform KMC and care of preterm infants was the second most frequently reported perceived barrier to conducting KMC by mothers. This

finding is consistent with the results of studies conducted in Sweden (38, 39), Bangladesh (40), Egypt (41, 42), Ghana (43), India (44), South Africa (45), and Zimbabwe (46) regarding the lack of knowledge of mothers about KMC. In addition, in the review article of Seidman et al., lack of knowledge about KMC and infant health was reported as the biggest barrier in mothers in low- and middle-income families (47). The fear of conducting KMC was the third leading perceived barrier to conducting this type of care by mothers. This fear can be due to inadequate maternal skills to conduct KMC, and the fear of the baby's becoming sick and difficulties created for him/her during KMC. In this regard, the study of Ghasemi et al. showed that only 10% of mothers did KMC appropriately (2).

Therefore, since most mothers do not have the experience of having preterm infants and are unprepared to accept them (48), and the implementation of educational programs on KMC at NICU does not require modern equipment (49), educating mothers on different conditions of care for preterm infants and the proper way of performing KMC can greatly prevent the costs of improper care and complications of prematurity and behavioral problems. Another important perceived barrier by mothers was the absence of a nurse or a medical staff to advise the mothers to do KMC appropriately.

Due to special mental and physical conditions of the mothers in the first days after childbirth, they were expecting KMC courses to be held to provide the necessary information and emotional support for them, because the mental stress of the mother due to her early delivery and admission of her baby to the NICU are likely to lead her to doing inappropriate interactive behaviors (50). The lack of a specific order for KMC in the neonatal unit was another barrier perceived by mothers. Most mothers expected the ward

to specify some time intervals to conduct KMC so that mothers, as with any other baby care, would be required to take care of their babies according to a specific plan. It also seems that the observation of mothers who are hugging their infants and KMC at the scheduled time can encourage other mothers with similar conditions to perform KMC. Lack of facilities, such as special seats and proper clothing, to perform KMC, or the lack of safe and secure place to carry out KMC, were among comparatively less important barriers. Therefore, it seems that the hospital has largely provided the physical facilities needed for mothers to carry out this type of care. In contrast, Seidman et al. in their review article, argued that the biggest barrier for mothers to carry out KMC was the lack of facilities and the appropriate environment for care (47).

Feeling embarrassed due to unclothed breasts while doing KMC, interfering nursing staff works due to the necessity of presence of the mother at the NICU for KMC, and considering KMC to be useless were among the other, yet less important, barriers to doing KMC. Therefore, this finding can be considered a strength for promoting the status of the KMC in the NICU. Overall, since the NICU of Shahid Sadoughi Hospital in Yazd city, as a referral health center, admits patients, including infants, from other provinces especially in the south of the country, and the mothers were native and residing in the Counties surrounding Yazd, capital of the Province (39.7%), and also non-native and living in other provinces (28.9%), then it seems that paying attention to their other problems, such as traveling, accommodating accompanying family members, caring for other children, and related heavy costs, can greatly influence the improvement of the mental status of mothers and their families, and therefore make KMC easier for them.



#### 4-1. Strange and Limitation of study

One of the strengths of this study was its exploratory approach to the design of the research instrument. By measuring CVI and CVRs, an attempt was made to develop an adapted valid and reliable instrument to the conditions of the study population to objectively reflect mothers' perceptions; therefore, its application in similar studies is suggested. In addition, because Shahid Sadoughi Hospital in Yazd city is a referral health center, the results of our study can be applied to plan for improving the status of KMC in other hospitals. However, the study of this number of samples lasted approximately five months given the specific characteristics of the mothers and their preterm infants, which could be considered a problem facing this study.

#### 5- CONCLUSION

Although the mothers showed high perceived benefits of performing KMC and benefits such as emotional relationship between mother and infant and feeling more confident in keeping babies were the most important perceived benefits, there were prominent barriers to KMC that seems planning for managing them can effectively promote KMC by mothers. In this way, improving maternal mental condition, providing mothers with necessary knowledge, reducing fear of caring and providing sufficient helping nurses and medical staff are the most important strategies that regarding them in related programs is necessary.

**6- CONFLICT OF INTEREST:** None.

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