Original Article

The effect of kangaroo mother care on mental health of mothers with low birth weight infants

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Abstract

Background: The mothers of premature infants are at risk of psychological stress because of separation from their infants. One of the methods influencing the maternal mental health in the postpartum period is kangaroo mother care (KMC). This study was conducted to evaluate the effect of KMC of low birth weight infants on their maternal mental health.

Materials and Methods: The study was conducted in the Department of Pediatrics of Isfahan University of Medical Sciences, Isfahan, Iran. Premature infants were randomly allocated into two groups. The control group received standard caring in the incubator. In the experimental group, caring with three sessions of 60 min KMC daily for 1 week was practiced. Mental health scores of the mothers were evaluated by using the 28-item General Health Questionnaire. Statistical analysis was performed by the analysis of covariance using SPSS.

Results: The scores of 50 infant-mother pairs were analyzed totally (25 in KMC group and 25 in standard care group). Results of covariance analysis showed the positive effects of KMC on the rate of maternal mental health scores. There were statistically significant differences between the mean scores of the experimental group and control subjects in the posttest period ($P < 0.001$).

Conclusion: KMC for low birth weight infants is a safe way to improve maternal mental health. Therefore, it is suggested as a useful method that can be recommended for improving the mental health of mothers.

Key Words: Kangaroo care, maternal mental health, neonate, premature, skin-to-skin care

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INTRODUCTION

Preterm birth rates have been reported to range from 5% to 7% of live births in some developed countries, but are significantly higher in developing countries.[1] With increasing survival rate of premature infants, there will be a greater number of parents experiencing the difficulties adjusting to parenthood in the neonatal intensive care unit (NICU).[2] Whatever the period

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and time of caring of infants in the NICU are more, the anxiety and stress of mothers will be more and maternal mental health will be more affected. The mothers of premature infants experience high stress levels and feeling of helplessness in the NICU.[3] They also have higher rate of anxiety and depression compared to the mothers of full-term infants.[4] Moreover, persistent maternal stress, depression, and anxiety can result in detrimental effects on infant development, both during pregnancy and postnataly.[5]

Traditional methods of caring preterm infants in the incubator led to the separation of the infant from the mother. Separation of mother and baby immediately after birth delays the mother-infant attachment and maternal role identity.[6] This separation can cause problems such as uncertainty of the baby's health, continued uncertainty regarding the infant's life, the lack of perception of positive parenting, and maternal mental pressure and stress.[6,7]

On the other hand, the usual methods of caring the low birth weight (LBW) infants are expensive, requiring experienced personnel and permanent logistic support. In developing countries, there are many limitations in economically human resources for caring these babies. Furthermore, the hospital wards are often crowded. Therefore, methods that can be useful in reducing the neonatal mortality and morbidity with less cost have become more and more important in the field.[8]

Skin-to-skin contact or kangaroo mother care (KMC) was described for the first time in 1978 in Mother and Child Institute in Bogotá, Colombia as an alternative method for LBW infants' care. It was considered and welcomed in the developed countries.[9] Studies suggest that skin-to-skin contact, which takes place in the first hours after birth, makes the mother and baby ready to establish a pattern of mutual interaction and coordination.[10] It has been shown that KMC for LBW infants could reduce mortality, severe illness, infection, and the length of hospital stay.[11] Furthermore, KMC can reduce the pain and lead to better tolerance of pain in preterm infants.[12] In addition, KMC facilitates mother-infant bonding, improves the acquaintance, and causes the mother to be more comfortable.[13] The purpose of this study was to determine whether the implementation of KMC (which requires the physical presence of the mother) would improve maternal mental health.

MATERIALS AND METHODS

The study was performed on 50 literate mothers who had been referred for delivery to the Al-Zahra (SA) and Shahid Beheshti university hospitals in Isfahan, Iran. The inclusion criteria were as follows: Having premature infants of less than 37 weeks gestational age and birth weight of 1500-2500 g; infants being admitted in the NICU; mother's awareness and willingness to participate in the research; mother being the primary caregiver; and mother having no prominent disorders or problems such as chronic depression and anxiety disorders, and having had no medical interventions. We excluded from the study neonates with major congenital malformation. The hospitals were selected by multi-stage sampling method. Then, the mothers were selected randomly from those eligible for the study from May to November 2010. They were then assigned to two groups, experimental (n = 25) and control (n = 25).

Premature infants of mothers in the control group received standard caring in the incubator, and the premature infants of mothers in the experimental group received three sessions of 60 min KMC each day for 1 week. The test was performed on both groups of mothers in order to collect information on maternal adjustment as pretest on the first day of hospitalization and as posttest on the day of discharge from the hospital.

The General Health Questionnaire (28 items), developed by Goldberg and co-workers, was used.[14] This questionnaire has four subscales, each of them containing seven questions.

The first subscale: The scale of physical symptoms, including feelings of people about their health and tiredness, and encompasses physical symptoms. This subscale was used to evaluate the physical and sensory intake, which was associated with emotional excitation.

The second subscale: The scale of symptoms of anxiety and sleep disorders, including the items associated with anxiety and insomnia. Seven items in this questionnaire were related to this subscale.

The third subscale: The scale for measuring the social functioning which evaluated the ability of individuals in coping with the demands of professional and everyday life issues. It revealed their feelings about how to cope with common life situations. Seven articles in this questionnaire were related to this subscale.

The fourth subscale: Depressive symptoms encompassing the issues that are associated with severe depression and suicidal tendency. Seven questions were also relevant to this subscale.

The total score obtained for each individual was the sum of the scores of all the subscales.

Reliability of General Health Questionnaire-28 has been confirmed in all threads of translations

in different cultures. For example, Sheigmi and colleagues reported a reliability coefficient of more than 0.9 (Cronbach's alpha) for this questionnaire.[15] The validity of this questionnaire has been studied in various researches and in different ethnic groups. In Iran, Taghavi investigated the validity of the questionnaire in Iranians using test- retest reliability, split-half reliability and Cronbach's alpha. The values of 0.70 (test- retest reliability), 0.93 (split-half reliability), and 0.90 (Cronbach's alpha) were obtained.[16] The questionnaire has also been confirmed in Brazil.[17]

The mental health of mothers of premature infants during their hospitalization was evaluated on two occasions: Once on the first day of hospitalization and then at the time of discharge from the hospital. The variables were demographic data, information about the delivery and pregnancy, and information about the newborn infant. For the assessment of these characteristics, a self-made questionnaire of maternal and infant demographics was used.

Statistical analysis

Descriptive and inferential statistical methods were used for data analysis. According to the research project and due to the assumptions and obtained data, we used analysis of covariance (ANCOVA) single variable method and multivariate analysis of covariance (MANCOVA) method.

RESULTS

The mean age of mothers in the experimental group was 28.46 years and in the control group was 25.84 years. The lowest age in the experimental group was 21 years and the maximum age was 41 years. The lowest age in the control group was 20 years and the maximum age was 39 years. The mean birth weights of the newborns in the experimental and control groups were 2100 and 2013 g, respectively. There was no significant difference in the mean birth weight of the experimental and control groups. In this study, the number of male premature infants was more. Most of the premature babies were the first child of their parents. The statistical indicators for two groups of mother in the mental health questionnaire and its subscales pretest and posttest are shown in Table 1. The main aim of the present study was to assess the effect of KMC of LBW babies on maternal mental health.

Univariate ANCOVA was used to analyze the results. Levene's test result was 0.19, indicating that the variances among variables were homogeneous. As seen in Table 2, there was a significant difference between the mean scores of experimental group and control subjects in the posttest process ($P < 0.001$). Therefore, the KMC of LBW babies affected the maternal mental health. Also, considering the 95% square of Eta, these changes were the result of KMC. The statistical power of "1" revealed high accuracy of the test and adequacy of the sample size.

According to the results shown in Table 3, there was significant difference between the mean scores for the

Table 1: Statistical indicators for two groups of mothers in the mental health questionnaire and its subscales pretest and posttest

Variable	Experimental group (*n*=25) mean (SD)		Control group (*n*=25) mean (SD)	
	Pretest	Posttest	Pretest	Posttest
Physical disorders	9.46 (3.84)	8.56 (3.24)	8.96 (3.50)	8.73 (3.72)
Anxiety symptoms and sleep	9.43 (3.60)	5.96 (3.10)	10.23 (3.73)	9.96 (4.06)
Social health	9.30 (3.29)	7.93 (3.55)	8.96 (3.31)	8.66 (2.94)
Depression	5.86 (4.77)	4.96 (4.24)	5.40 (4.77)	4.96 (4.24)
Total score of general health	33.50 (9.99)	25.63 (8.74)	32.60 (12.67)	31.20 (12.31)

SD: Standard deviation

Table 2: Results of covariance analysis of group membership on the scores of two groups on mental health

Source of variation	SS	DF	MS	Significance level	Eta coefficient	Test power
Pretest	6292.7	1	6292.7	0.001	0.65	1.00
Group membership	611.1	1	611.1	0.001	0.95	1.00

SS: Sum of square, DF: Degree of freedom, MS: Mean of square

Table 3: MANCOVA analysis of the obtained data related to the subscales of mental health

Variables	Source	SS	DF	MS	Significant level	Eta coefficient	Test power
Pretest diffraction variables	Physical	518.41	1	518.41	0.001	0.06	0.44
	Anxiety	363.68	1	363.68	0.001	0.53	1.00
	Social	303.86	1	303.86	0.001	0.44	0.67
	Depression	546.28	1	546.28	0.001	0.38	1.00
Group	Physical	5.29	1	5.29	0.068	0.86	1.00
	Anxiety	163.87	1	163.87	0.001	0.71	1.00
	Social	15.01	1	15.01	0.017	0.69	1.00
	Depression	62.14	1	62.14	0.001	0.84	1.00

SS: Sum of square, DF: Degree of freedom, MS: Mean of square, MANCOVA: Multiple analysis of covariance

experimental group and control subjects in the posttest phase of mental health subscales, including anxiety and sleep symptoms, the level of social interaction, and depressive disorders ($P < 0.001$). Consequently, the KMC practices improved symptoms of anxiety and sleep disorders, the level of social interaction, and depression of the mother. On the other hand, as shown in Table 3, there was no significant difference between the mean scores for the experimental group and control subjects in the posttest phase in the subscales of physical disorders ($P = 0.068$). Therefore, this method had no effect on mothers' physical disorders.

DISCUSSION

The quality of the relationship between parent and child has a considerable impact on mental, social, and emotional health of individuals. In the present study, the KMC approach was found to have considerable impact on maternal mental health, in comparison to other common methods of caring for premature infants.

Mori and colleagues, in their research performed on mothers and their premature infants, concluded that skin-to-skin contact or KMC could be fruitful for newborn infants and their mothers.[18] Studies have shown that the separation of mother from her infant due to clinical conditions and the rules of the NICU may have negative effects on mothers and premature infants. The contact between mother's and baby's skin led to receiving all threads of sensory stimuli, and apparently, this contact had a role in the mood and behavior of the mother.[19] This contact decreases the maternal stress and results in a better relationship between mother and baby.[20] Another study showed that the fathers' participation in KMC and closeness to their infants caused them to perform their role better.[21] Ahn and colleagues in South Korea performed a study to investigate the effects of KMC on newborns and their mothers. Overall, this study showed the positive effects of KMC on the growth of premature infants, maternal attachment, and postpartum depression. The method was a support for premature infants and their mothers.[22] In another study, de Macedo and colleagues reported that KMC played an important role in mood changes and reduction of maternal depression.[23] Our study result was also consistent with that of the aforementioned research, which showed the positive effect of KMC on the growth of premature infants, maternal attachment, and postpartum depression. In the present study, KMC reduced severe maternal depression and promoted the primary physical, emotional, and intellectual relationship of the mother and the child. This could be seen as a reason for improvement in maternal mental health. In Sweden, Blomqvist *et al*. conducted a research on 23 infants of 31-41 weeks and their mothers. They used the method of KMC as a supporter of the role of parents as the primary care of premature infants. They used this method to minimize the separation period of parents and their newborns during the infants' stay in the NICU. The assessment of mothers was mostly positive from this method. Mothers' negative comments were mainly due to lack of information about the practical application of the method. Some mothers described that applying the KMC method was boring at night.[24] Bad conditions of delivery could lead to psychological maladjustment, depression, and anxiety in the mothers. Therefore, the KMC could help to break this vicious circle and provide better conditions and closer and more effective relationship of the mother and her baby. They could overcome the stress and negative emotions through this method. Another research showed that KMC method had positive effects on the mothers' feelings toward their infants and in the mother-infant interaction. Since this method of caring is a facilitator for breastfeeding, the self-confidence of the mothers can be increased by this method. Thus, when the postpartum grief reaches a peak, the skin contact of the mother and infant prevents the development of depression.[25] Hunt, in his report, stated that KMC allowed the mother and baby contact earlier and in a normal way. It increased the mothers' confidence in caring of their premature infants and, in general, was beneficial for both infant and mother.[26] Charpak and colleagues also believed that the skin-to-skin contact caused better recognizing of the parents by their baby. Hence, they were responsive to the needs of the children, which was an incentive in order to improve the quality of infant attachment to the family.[27] Feldman and colleagues compared 76 premature infants who were cared for in incubators with 76 infants who were cared for with KMC. They understood that KMC had a significant positive impact on the infants' perceptual-cognitive, motor development, and on the parenting process. They concluded that KMC had both a direct impact on infant development by contributing to neurophysiological organization and an indirect effect by improving parental mood, perceptions, and interactive behavior.[28] In a systematic overview study, it was shown that KMC reduced the maternal unhappiness about the method of childcare. The score of the mother's feeling about her maternal competence and the score of having a sense of social support were higher in the group that had used the KMC method.[8]

It should be mentioned that this study had some limitations such as the limitation in the research tool with respect to the variables that measured the mental health by using the 28-item questionnaire and

lack of attention to other mental health components. However, according to the present study results, the KMC practices could be offered as an effective and desirable method in improving the mental health of mothers and infants in the NICU. Among the reasons for the lack of effectiveness of KMC in improving the maternal health disorders in this study, the authors can point to the pains of childbirth and postpartum in mothers. People who experienced long-term pain might feel victimization, depression, isolation, and loneliness. After delivery, the pain of cesarean, episiotomy, breast congestion, associated with insatiable needs of the infant, probably have caused KMC not to affect the physical disorders in mothers after childbirth.

CONCLUSION

KMC not only gave the mother a chance to hug her child in order to be able to process the emotional connection with the baby, but also reduced the maternal anxiety and stress which was an obstacle for this connection. In this study, the mothers declared that among all threads testing the methods of infant care, the KMC method was more effective in controlling and reducing the feelings of fear and anxiety of having premature and sick newborns. They even found that a sense of tranquility has passed to the child's father. After considering the above results, it could be concluded that the KMC method is suitable for reducing the mother's stress during the postpartum period.

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REFERENCES

1. Lawn JE, Cousens SN, Darmstadt GL, Bhutta ZA, Martines J, Paul V, *et al.* 1 year after The Lancet Neonatal Survival Series - was the call for action heard? Lancet 2006;367:1541-7.
2. Evans T, Whitthingham K, Boyd R. What helps the mother of premature infant become securely attached, responsive and well-adjusted. Infant Behav Dev 2012;35:1-11.
3. Cusson RM. Factors influencing language development in preterm infants. J Obstet Gynecol Neonatal Nurs 2003;32:402-9.
4. Padovani FH, Carvalho AE, Duarte G, Martinez FE, Linhares MB. Anxiety, dysphoria, and depression symptoms in mothers of preterm infants. Psychol Rep 2009;104:667-79.
5. Redshaw ME, Harris A. Maternal perceptions of neonatal care. Acta Paediatr 1995;84:593-8.
6. Van den Bergh BR, Mulder EJ, Mennes M, Glover V. Antenatal maternal anxiety and stress and the neurobehavioural development of the fetus and child: Links and possible mechanisms. A review. Neurosci Biobehav Rev 2005;29:237-58.
7. Holditch-Davis D, Miles MS. Mothers' stories about their experiences in the neonatal intensive care unit. Neonatal Netw 2000;19:13-21.
8. Conde-Agudelo A, Belizán JM. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants (Review). Cochrane Database Syst Rev 2003;2:CD002771.
9. Aagaard HR, Elisabeth OC, Hall RN. Mothers' next term Experiences of Having a Preterm Infant in the Neonatal previous term Carenext term Unit: A Meta-Synthesis. J Nurs Pediatr 2008;23:26-36.
10. Anderson GC, Moos E, Hepworthy J, Bergman N. Early skin-to-skin contact for mothers and their healthy newborn infants. Birth 2003;30:206-7.
11. Jefferies AL. Canadian Paediatric Society, Fetus and Newborn Committee. Kangaroo care for the preterm infant and family. Paediatr Child Health 2012;17:141-6.
12. Conga X, Ludington Hoe SM, McCain G, Fu P. Kangaroo Care modifies preterm infant heart rate variability in response to heel stick pain: *Pilot study.* Early Hum Dev 2009;85:561-7.
13. Roller CG. Getting to know you: Mothers experiences of kangaroo care. J Obstet Gyecol Neonatal Nurs 2005;34:210-7.
14. Goldberg DP, Gater R, Sartorius N, Ustun TB, Piccinelli M, Gureje O, *et al.* A scaled version of general health questionnaire. Psychol Med 1997;27:191-7.
15. Shigemi J, Mino Y, Ohtsu T, Tsuda T. Effects of perceived job stress on mental health. A longitudinal survey in a Japanese electronics company. Eur J Epidemiol 2000;16:371-6.
16. Taghavi MR. Evaluation of validity and reliability of General Health Questionnaire. Psychiatry 2002;5:381-98.
17. Mari J, Williams P. A comparison of the validity of two psychiatric screening questionnaires in Brazil using ROC analysis. Psychol Med 1985;15:651-9.
18. Mori R, khanna R, Pledge D, Nakayama T. Meta- analysis of physiological effects of skin-to-skin contact for newborns and mother. Pediatr Int 2010;52:161-70.
19. Venancio SI, Almeida HD. Kangaroo mother care: Scientific evidences and impact on breastfeeding. J Pediatr 2004;80:173-80.
20. Rapisardi G, Vohr B, Cashore W, Peucker M, Lester B. Assessment of infant cry variability in high-risk infants. Int J Pediatr Otorhinolaryngol 1989;17:19-29.
21. Blomqvist YT, Rubertsson C, Kylberg E, Jöreskog K, Nyqvist KH. Kangaroo mother care helps fathers of preterm infants gain confidence in the paternal role. J Adv Nurs 2012;68:1988-96.
22. Ahn HY, Lee J, Shin HJ. Kangaroo care on premature infant growth and maternal attachment and post-partum depression in South Korea. J Trop Pediatr 2010;56:342-4.
23. de Macedo EC, Cruvinel F, Lukasova K, D'Antino ME. The Mood Variation in Mothers of Preterm Infants in Kangaroo Mother Care and Conventional Incubator Care. J Trop Pediatr 2007;53:344-6.
24. Blomqvist YT, Nyqvist KH. Swedish mothers' experience of continuous Kangaroo mother care. J Clin Nurs 2011;20:1472-80.
25. Chiua SH, Anderson GC. Effect of early skin-to-skin contact on mother -preterm infant interaction through 18 months: Randomized controlled trial. Int J Nurs Stud 2009;46:1168-80.
26. Hunt FH. The importance of kangaroo care on infant oxygen saturation levels and bonding. J Neonatal Nurs 2008;14:47-51.
27. Charpak N, Ruiz-Pelaez JG, Figueroa de CZ, Charpak Y. A randomized controlled trial of Kangaroo mother care: Results of follow-up at 1 year of corrected age. Pediatrics 2001;108:1072-9.
28. Feldman R, Eidelman AI, Sirota L, Weller A. Comparison of skin-to-skin (kangaroo) and traditional care: Parenting outcomes and preterm infant development. Pediatrics 2002;110:16-26.

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