Original Article

Comparison of short "abdominal skin to skin and Kangaroo-Mother Care's contact" on Successful breastfeeding

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Abstract

Background: Breast milk is the best and most complete food for children in the early months of life and the key to supplying and maintaining health. Currently, "kangaroo Mother Care" is known as a significant but long and time-consuming factor in promoting breastfeeding; will the benefits of Kangaroo Care on breastfeeding stay intact if it is done in a shorter time? For this reason, a study was conducted for comparison of short "abdominal skin to skin and Kangaroo-Mother Care's contact" on successful breastfeeding". **Method:** This single-blind clinical trial was accomplished on 68 qualified pregnant women, in Torbat Heydariyeh, Iran, in 2015. Women were randomly divided into two groups: experimental (Kangaroo skin contact) and control (abdominal skin contact). Questionnaire about demographic, fertility, medical, mother and infant's information, and the exclusive breastfeeding were completed for two groups after 2 months of birth. After encoding, the data were analyzed with SPSS software version 20, Mann-Whitney tests, t-test, and chi-square; 0/05>p was considered significant. **Results:** The results showed that nutritional behaviors and success in breastfeeding after two months from delivery in both groups were similar. **Conclusion:** Short-term skin to skin contact (kangaroo care) on exclusive breastfeeding has the same effect as abdominal skin to skin contact.

Trial Registration Number: IRCT2014090419039N1.

Keywords: Kangaroo, Care, Breastfeeding

Introduction

According to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), breast milk is the best and most complete food for babies up to the first six months of their lives and is also considered as the main pillar of supply, preservation, and survival [1]. The UNICEF announced in 2007 that breastfeeding would prevent the death of 3.1 children in the world every year. In developing countries, infants have 3 times more chances of survival than other children [2]. In addition to providing the child's desired growth and development, breastfeeding reduces the prevalence and severity of several acute and chronic diseases, including diarrhea, lower respiratory tract infection, urinary tract infection, allergic diseases such as asthma, chronic non-communicable diseases in later life such as obesity, type 1 diabetes, and lymphoma [3].

According to the WHO, only 35% of infants among 94 countries are fed exclusively with breast milk for up to four months. The exclusive breast milk feeding (BMF) incidence up to the fourth month has been 35.1% in Uganda, 51.6% in Ghana, 27.3% in Saudi Arabia [4], 42.2% in Japan in the first month, and 38% in the next three months [5]. According to the Ministry of Health and Medical Education (MOHME), the exclusive BMF rate in Iran is 84.1% until one year of age and 51.1% until two years of age, which has decreased in 2010 compared to 2005 [6]. Despite the advantages of the exclusive BMF, there is a decrease in breastfeeding today, which has become one of the most important reproductive health

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How to cite this article: Adeli, M., Ashrafizaveh, A., Alirezaei, S., Aradmehr, M. Comparison of short "abdominal skin to skin and Kangaroo-Mother Care's contact" on Successful breastfeeding. Arch Pharma Pract 2020;11(S!):144-50.

problems [7]. The infant mortality rate in 67 countries indicates that countries with the lowest mortality rate have the highest infant mortality rate [8].

Given the importance of breastfeeding, governments seek developmental strategies to give priority to this issue [9]. Breastfeeding promotion strategies are well-known but limited in scope. A list of these strategies includes (1) access to parents in the neonatal intensive care unit at any time; (2) specialized knowledge and breastfeeding training by training packages in baby-friendly hospitals; (3) support groups in the hospital; (4) Kangaroo Mother Care (KMC); and (5) use of electronic pumps for milking [7]. Precise studies on the implications of breastfeeding, such as the health status and the different degrees of evolutionary, physiological, and psychological maturity as well as mental and social positive consequences, are supported by breastfeeding support technologies [10]. Many of these advanced technologies help to improve breastfeeding and neonatal care, but they are not always available, especially in poor or middle-class countries, in which 99% of infant mortality occurs. As a result, governments seek low cost and effective alternative care methods [11]. One of these methods is Kangaroo Mother Care (KMC). KMC was developed by a Colombian pediatrician, Edgar Rey, because of the problems caused by the effects of early mother-infant separation at birth [12].

KMC typically has three main components: (1) skin to skin contact; (2) exclusive BMF; (3) mother-baby support. This method is a cure for all babies, especially for weight loss and immature categories. Kangaroo status (skin-to-skin contact on the mother's chest) causes temperature adjustment, physiological stability, proper stimulation, increased emotional communication, and breastfeeding [13]. Kangaroo nutrition depends on breastfeeding and kangaroo care policy depends on the empowerment of families and facilitating early hospital discharge and follow-up [14]. For KMC, the babies' legs are maintained in a state of flexion, which is associated with an intrauterine position [15] and can result in better heart rate, respiration, and oxygen saturation for the baby. It also stimulates milk production through the skin to skin contact and reduces baby's cries by creating a sense of calm in the baby and eliminating hunger [16]. For a calm baby, a better food is absorbed in the stomach and therefore grows faster. KMC strengthens the child's mental and potential sensation by hearing the mother's heartbeat, touching, and hearing and olfactory communication when fed [17]. In past meta-analyses, KMC reduced the risk of neonatal mortality [18], as well as in clinical trials, skin to skin contact improved lactation, cardiovascular status and response to painful neonatal techniques [19]. The beneficial effect of KMC at the start of breastfeeding may be due to the ability of the baby to smell breast milk, calm, body movement, and reaching the nipple [20]. Korja et al. (2008) stated that the longer the duration of the skin to skin contact, the more positive the effects of the relationship between mother and child, and conversely, the shorter the duration of the skin to skin contact, the more negative the effects of the relationship between mother and child [21]. Despite there is evidence for the effects of KMC, there are still contradictory results, for example, Roberts et al. argued that KMC does not improve breastfeeding more than hugging a baby [22].

Despite there is strong evidence provided by WHO on approving the benefits of kangaroo care for the mother and baby in poor and middle-income countries, KMC implementation is still limited. A systematic review has identified the bottlenecks of health systems in these countries as an impediment to KMC. One of these impediments is the problem of providing financial health, sufficient workforce, long-term KMC, providing proper services, health information systems, etc. [23]. In Iran, spending too much time on the one hand, and a shortage of workforce and the busy time of the midwife in the delivery room, on the other hand, makes KMC difficult and in many maternity wards, the abdominal contact should be considered, and KMC is rarely done [24]. Now, after delivery, the skin-to-skin contact between mother and newborn is done in two forms: mother's abdomen and KMC. According to KMC, the baby is naked and is placed on the mother's bare chest [25], and while keeping the baby warm, he/she crawls up the mother's chest to find her nipples so that the breastfeeding begins [26]. However, for the abdominal contact, which is most commonly seen in neonates and immediately after birth, the naked baby is placed on the mother's abdominal skin for a short time. In this kind of contact, face-to-face communication between mother the infant will not be established, and will only bring the benefits of skin contact for the baby. During KMC, contact, warm, and olfactory receptors can release oxytocin in the mother; the oxytocin secretion increases milk production. Abdominal contact has fewer benefits than KMC, but it has better performance for health workers in terms of time and practice [27]. The question now arises: if KMC is done in a shorter timeframe, do the benefits of KMC remain in terms of persistence and promotion in contrast to short-term abdominal contact? Forasmuch as no study on this topic has been done so far, we have decided to do research aimed at comparing the short-term abdominal contact and KMC based on the postnatal lactation status.

Materials and Methods

The present study was a single-blind randomized clinical trial that was conducted in teaching hospitals, health centers, and healthcare houses in Torbat Heydarieh, Iran in 2015. The sample size was 68 using the following formula, with reliability coefficient of 95% and power of 80%.

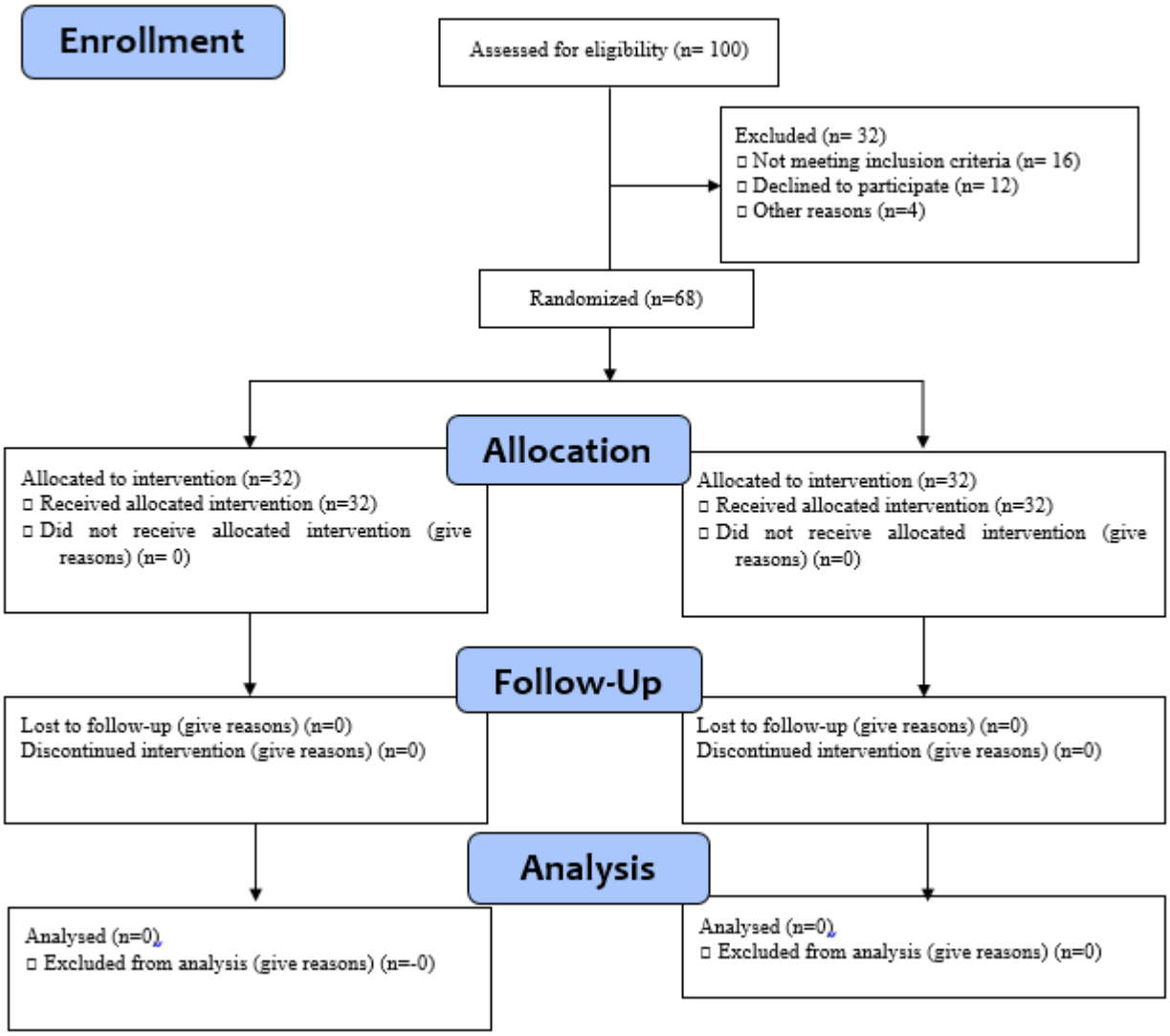
$$N= (z1-\alpha/2 + z1-\beta)2\ (s12+s22)/(x1-x2)\ 2=68$$

The sample size consisted of 100 caregivers. After reviewing the list, the eligible accessible population, 68 women were included. They were randomly divided into two groups using the computer program, Random Allocation Software, version 1.0: Participants were randomized at 1:1 ratio to 32 women in the intervention group and 32 in the control group using a random allocation sequence and block randomization with block size=4 (Figure 1). The inclusion criteria for the

pregnant women included age range of 18–40 years old, Iranian nationality and Persian language, full-term pregnancy with a normal fetus, wanted the pregnancy, normal delivery, Apgar score of 8-10, infants weighing 2500-4000 grams. The inclusion criteria included a medical history of pregnancy and childbirth, tobacco and drug addiction, female sexual problems, the history of high-risk behaviors in mothers and her husband (prison, addiction), taking antidepressants, mental and physical problems, infant death, neonatal illness after birth, and mother's reluctance to continue cooperation. The data collection tools included questionnaires related to demographic, fertility, and medical information, information about the first, second, and third stages of labor, maternal information, and a researcher-made questionnaire on the exclusive BMF. The exclusive BMF questionnaire included 16 questions arranged by studying the latest books and papers on the topic of research under the guidance of professors and counselors. Then, seven experts and professors of Torbat Heydarieh University of Medical Sciences, Iran, were asked to give their comments and corrective suggestions on the final tools. Since the tools contained clear questions that were commonly used in similar studies, they were confirmed in terms of reliability. The reliability of the questionnaires related to (1) fertility and medical information; (2) maternal information; and (3) infant information was calculated using the re-test and the intraclass correlation coefficient. The approved coefficients, respectively, included ICC = 0.87, ICC = 0.80, and ICC= 0.90. The reliability of the information form for the first, second and third stages of labor was measured by the simultaneous observation test, so that the researcher and her colleague separately recorded the mother's behaviors in the checklist and then calculated the correlation between the results. Consequently, the reliability of the tools was approved (ICC= 0.83). The method was followed by obtaining written permission from the University Ethics Committee and presenting it to the relevant center, and then the study objectives were explained to the participants and the eligible subjects were selected using convenience sampling. After obtaining written consent, the participants were assigned into two intervention and control groups based on the randomized block design. Questionnaires on demographic, fertility, and medical information were completed for both groups. Pre-natal care was the same for both groups. In the intervention group, the naked baby was placed on the mother's bare chest and between her breasts immediately after taking postpartum care (cleansing the airway if necessary, clamping the cord and drying the baby). The body of the baby was in contact with the skin of the mother and eye contact was created. To prevent hypothermia, a warm and dry shawl was placed on the infant, and the baby's head was covered with an appropriate hat, and the mother was asked to caress her baby and look at his/her face. The duration of the contact was 5-10 minutes, during which the breastfeeding was not done. The baby was then placed under a radiant warmer and other care was taken. In the control group, the delivery of a full-term newborn done was according to the routine of the hospital, so that immediately after birth, the infant was placed on the abdomen, irrespective of the position, and cares such as opening the airway, cord clamping and drying the baby were taken. The baby was then shown to the mother and placed under a radiant warmer. For all of the participants, a questionnaire related to information about the first, second, and third stages of labor, and maternal and neonatal information was completed. After transferring the mother to the postpartum care room and giving the same breastfeeding training during the first hour after delivery, breastfeeding was done by the mother. After discharge from the hospital and 2 months after birth, when the mothers referred to the health centers for the baby's second vaccination, coordination was done by phone in order that the research assistant met the mother in the health center. In each health center, a suitable space was considered for mothers to complete the exclusive BMF questionnaire in the presence of the research assistant. Since access to some mothers was difficult after discharge and the research assistant could not meet them in the health center, the research assistant referred to the house of the participants with the previous coordination. After collecting and coding the data, they were analyzed using SPSS software (version 20). The indices of central tendency and dispersion were used to express the characteristics of participants. A Chi-square test was used to compare the qualitative variables. Mann-Whitney U test was used to compare the non-normal quantitative variables and an independent t-test was used to compare normal quantitative variables. In all tests, the confidence coefficient was 95%.

Ethical clearance for the study was obtained with code 16.1 from the Torbat Heydariyeh University of Medical Sciences, Iran, and in the Iranian Registry of Clinical Trials (IRCT) with a code of IRCT2014090419039N1.

CONSORT Flow Diagram



Results

The data analysis showed that the mean age was 26.82 ± 5.42 in the skin to skin contact group and 25.67 ± 6.30 in the abdominal contact group. Most of the participants in the intervention group (16 people (23.5%)) and in the control group (9 people (27.3%)) had high school education and also the majority of the participants (94.1% in the intervention group and 87.9% in the control group) were housewives. Most of the participants had a great deal of satisfaction with their marriage (17 in the intervention group and 18 in the control group). According to chi-square, independent t-test, and Mann-Whitney U test, there was no significant difference between two groups in terms of their personal characteristics (such as age, educational level and the job of mother and her husband, family income, divorce history, marital satisfaction), fertility and medical information (such as the number of pregnancies, abortions and stillbirths, the sex of the infant, the conduct of prenatal care and the time of the first visit, the feeling of mother and her husband in relation to pregnancy), information about the first, second and third stages of labor (such as the use of analgesia and type of analgesia, medications used during delivery, and postpartum perineum status), maternal information (such as the degree of satisfaction with delivery, the feeling after skin contact with the infant), information about the infant (such as sex, weight, height, and head circumference) and other intervening variables ($p>0.05$) (Table 1). According to the variables, the questionnaire related to the exclusive BMF in two months after birth showed that there was no significant difference between the two groups (Table 2).

Table 1: Some demographic variables between the two groups.

Variable	Skin to skin contact group	Abdominal contact group	P Value
	Mean ± SD	Mean ± SD	
Mother's Age (y)	26.65 ± 6.30	26.82 ± 5.42	*0.49
Newborn's Weight (Kg)	3.27 ± 5.16	3.09 ± 0.41	*0.19
Newborn's HC (Cm)	34.42 ± 1.39	43.36 ± 4.12	*0.11
Length of Active Phase (Min)	148.2 ± 11.64	172.02 ± 9.94	↑ 0.38
Length of Second Phase (Min)	28.69 ± 4.52	42.94 ± 3.21	*0.071
Length of Third Phase (Min)	6.51 ± 4.23	9.58 ± 1.72	*0.876
Length of Delivery to Contact (Min)	1.43 ± 5.57	4.10 ± 1.60	*1.00

* Mann-Whitney ↑t-Test

Table 2: Some variables of successful breastfeeding.

Variable	Skin to skin contact group	Abdominal contact group	P Value
	Number (Percentage)	Number (Percentage)	
EBF (Exclusive Breast Feeding)	31 (91.2%)	31 (91.2%)	1.00
Formula	4 (11.58%)	3(8.8%)	0.69
Other liquids	2(5.9%)	6(17.6%)	0.13
Weight Loss	1(2.9%)	5(14.7%)	0.08
Baby growth curve in normal range	33(97.1%)	33(97.1%)	1.00

Chi-Square

Discussion

The WHO considers breastfeeding as the fourth step out of the 10 steps towards successful breastfeeding in child-friendly hospitals [28]. According to the American National Academy of Sciences, the breastfeeding is considered as the most desirable nutrition for infants in all countries with every economic and health status because it has many benefits during infancy and childhood and for mothers. Skin to skin contact is one of the most important primary care in the physiological and emotional development of newborns [29], which, according to the WHO recommendation, can be considered as the important component of the proper definition of the exclusive BMF in the early, long, and continuous manner [30]. The results of this study showed that breastfeeding behaviors in two months after birth do not have a significant difference between the two groups in the short-term skin contact. For example, there were 31 infants out of 34 who were exclusively breastfed after 2 months of skin contact in both groups.

De Almeida et al. (2010) conducted a study on the effect of KMC on the exclusive BMF. For this purpose, they divided 43 infants into two groups containing 23 cases and stated that the level of the exclusive BMF in the KMC group is greater than the control group (82.6% versus 73.95) This increase was also true at the time of discharge, 40th day, 3 months of age, and 6 months of age [31]. They concluded that KMC increases the exclusive BMF rate up to 6 months after the birth of the baby. The difference between their study and the present study was that they had done KMC for at least 7 consecutive days. One of the other results was the examination of the child's growth curve at the age of three months, but there was still no significant difference. Therefore, 97.1% of children in both groups were well on their healthy growth path and were normal. Gathwala et al. (2010) used the clinical trial design to investigate the effect of KMC on physical growth and breastfeeding in newborns. After 3 months of follow up, they concluded that KMC improves lactation rate and physical growth indices and it is well accepted by mothers and nurses [32]. It should be noted that they continued to conduct KMC at birth for a period of 6 hours, and this may be the reason for the difference in their result. Nevertheless, the findings of Dani et al. were consistent with the results of the present study. In 2015, they sought to confirm the effect of KMC on the feeding behavior in neonates. As a result, the sequences of the feeding behavior in neonates was visualized during the skin to skin contact but did not reveal any relationship between the skin to skin contact, its duration, and breastfeeding. Thus, they concluded that the result of breastfeeding is affected by consequences such as the skin to skin contact between mother and baby [33]. Boundy et al. reported that there is no difference between KMC neonates and control neonates in terms of the parameters of physical growth [11]. Similarly, Jayaraman et al. (2017) concluded that the growth rate of newborns who receive KMC is not significantly different from the control group during one month after birth [34]. Perhaps, a reason for the breastfeeding success in the continuous skin to skin contact is the motivation for mothers. According to another study, positive results between KC and breastfeeding may be due to the higher flexibility of mothers in this group because the mothers usually have higher performance for breastfeeding [30]. Anderson et al. also stated that in spite of the difficulty of KMC, it entirely depends on the mother's willingness and health employees' support [35]. According to Radtke, during the hospitalization period, KMC did not have an effect on the duration or quality of breastfeeding, but the presentation and collaboration of mothers in the KMC group for breastfeeding was greater than the control group. They also continued to receive more exclusive breastfeeding after discharge from the hospital because they found that KMC is one of the main supporting and contributing methods for breastfeeding and should be continued [36]. Vila-Candel et al. argued that environmental and social factors are effective in

this issue [37]. White et al. (2012) confirmed it. They investigated the effect of skin to skin contact on breastfeeding for 982 mothers who had given birth at the Maela refugee camp in the first hour after birth. The results showed that a group of women who did not have skin to skin contact was as successful as the experimental group in breastfeeding [38]. Thus, it could be said that in a population with a strong culture of breastfeeding, even in the absence of skin contact, the amount and length of breastfeeding is high. Traditions and native culture and beliefs play a crucial role in supporting breastfeeding. Muddu et al. (2013) designed a researcher-made questionnaire to assess the knowledge of mothers about KMC and its benefits in neonates. He investigated 46 neonates from June to August 2009 in the neonatal ward of a teaching hospital. The mothers were asked to give their information about KMC. Then, they explained how to perform it. After an hour from performing KMC, the mothers were asked to answer the questionnaires to express their feelings, difficulties, and opinions about the possibility of breastfeeding. The results showed that most mothers are able to breastfeed based on KMC. In fact, KMC can be understood and performed with simple instructions. Positive emotions were created in mothers even during an hour and breastfeeding was emphasized during the KMC implementation [39, 40].

Conclusion

Our studies showed that the difference between the effects of KMC and normal skin contact is still not clear. There were some constraints to performing KMC, such as start time and duration [11]. Breastfeeding is known as an essential component of KMC, but in the present study, there was no significant difference between KMC and normal care. In spite of the belief that KMC had a positive effect on the development of children [41], this issue was proven in the present study. The study also had some limitations, including a small number of teaching hospitals in Torbat Heydarieh, a limited selection of places for research, crowding in the maternity wards (research environment) of these hospitals, an insufficient number of midwifery workforce, and regulations in the maternity ward. Forasmuch as the basis of nourishment in KMC is based on breastfeeding and the KMC policy depends on family empowerment and follow-up [14], it is suggested to carry out more studies on this issue.

Acknowledgment

Authors wish to thank all participants, the University of Torbat Heydariyeh of Medical Sciences, Iran, for approval of this project and financially support our study. The authors alone are answerable, for the content and writing of the paper.

Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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