

Effect of a Supportive-Training Intervention on Mother-Infant Attachment

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Abstract

Background: The need for hospitalization of a premature infant in neonatal intensive care unit (NICU) is a risk for the mother-infant attachment and nursing support is essential for the family of such infants. Aim of the present study was to investigate the effect of supportive-training intervention of fathers of premature infants on mother-infant attachment.

Methods: The present clinical trial was conducted in the NICU of 29 Bahman hospital, Tabriz. Sixty fathers of hospitalized premature infants were divided into intervention and control groups. Before the intervention, the mother-infant attachment was measured by the AVANT cheek list. The training intervention was applied to the parents of the intervention group for 2 days and the fathers were conducted to bedside of their infants to visit them and exchange ideas with their wives. The control group only received the routine cares in the unit and ultimately, the mother-infant attachment was re-measured in both groups.

Results: No significant difference was observed in the attachment score before and after the intervention in the control group. The attachment score was significantly different in the intervention group (12.8 ± 4.55 vs 2.1 ± 3.90).

Conclusions: The supportive-training intervention for the fathers of the premature infants and facilitation of the relationship of the parents with each other led to increased mother-infant attachment rate.

Keywords: Object Attachment, Infant, Premature, Fathers

1. Background

Hospitalization of a sick or premature infant in neonatal intensive care unit (NICU) separates the infant from the family (1, 2); therefore, the attachment factor is limited and the process of the mother-infant emotional bond and attachment is disrupted (3). Attachment refers to an adjustment system within an individual, which is aimed to adjust the behaviors leading to closeness and contact with a distinct and supportive individual called the supporter (4). Evolutionary theorists emphasize the importance of the formation of mutual trust and safety between infants and others, and believe that attachment is an interactive and bilateral system between mothers and infants, in which both participate actively and infants receive responses from their parents (5). In this regard, unnatural or delayed attachment due to the mother or infant's illness, prematurity, birth disorders or family stress can affect infant's development or the mother's ability to care for the infant (6). According to John Bowlby, attachment is one of

the fundamental needs of human beings (7). A study conducted by Zelikovitz (2009) indicated that sense of tension reduces attachment and dependence behaviors, is associated with disorders in parental behaviors (8) and affects the relationship between parents and other members of the family (2, 3, 9). Although father and mother are two major pillars of the family (10), they react differently to the birth of a premature infant and the baby's hospitalization in NICU (11). Furthermore, immediately after the infant's birth, the father is the first one to visit the infant in the NICU as he feels that he should play the role of a supporter in the new condition. Fathers are also considered as a key element in supporting the mother and infant (12, 13). This issue has been emphasized in many studies (2, 10, 14), indicating that mothers who are deprived of the support of the infant's father have less positive interaction with the infant than those receiving such support (15). Studies suggest the positive impact of creating opportunities for parent empowerment (COPE) programs on parents' mental health; however, more studies are recommended on all aspects of

mental health with further involvement of fathers (16).

According to the father's role, family-centered care and family support are of special importance for identifying the concerns and tensions of parental roles (17). Anderson et al. (2016) found that the primary interactions between mothers and infants influence the psychological health of mothers, and family-oriented interventions stimulate the evolution of infants and improve mother-infant relations (18). In this regard, Ann and Kim (2007) stated that improving the quality of family-centered care and helping parents play vital role in reducing parents' tensions in the NICU (19). A review of the literature showed that during the process of infants' hospitalization, parents often try to support each other; however, they sometimes cannot play their roles properly due to encountering unfamiliar and critical conditions (20). Kengult believed that although the birth of a premature infant might change the relationship between parents, nurses can enhance parents' relationship by providing relevant programs (21). Furthermore, Guillome (2013) pointed out that the relationship between parents and the premature infant is rooted in their relationship with caregivers, and both parents need to make contact with caregivers before the delivery, during the delivery and in the NICU (22). A study conducted by Ghaderisfat et al. (2016), entitled "relationship between mother-infant attachment and parents' satisfaction with supportive care of nurses", showed that the improved mother-infant attachment is related to the increased parental satisfaction with nurses' supportive cares (23). Furthermore, a systematic study conducted by Ramezani et al. (2014) demonstrated that family-centered care is a holistic care approach in the NICU; therefore, family-centered care is strictly emphasized for changing the approach and philosophy of the current cares and providing better facilities (24). Since relations are the main component of family-oriented care, improving care in NICUs is an inexpensive method in the implementation of child-friendly care. Thus, it is essential to perform studies on the outcomes of mother-infant attachment as the result of family-oriented nursing care. Further, nurses have a vital role in the implementation of family-oriented care (25). According to studies, parents in Iran receive low support from nurses and thus, it is important to particularly focus on these issues in providing interventions to meet the needs of Iranian parents (26). On this basis, nurses need to have more appropriate interaction with parents in addition to being sensitive to infants' care needs. In addition, it appears necessary to plan for improving nurses' supportive roles in the NICU (27). Thus, mothers and their infants need more support by fathers, which can be facilitated by the nurses through providing the required conditions. This is because nurses have important duties and

sensitive positions in the NICU and can facilitate execution of the family-centered care and provide appropriate positions and roles for fathers' support from the families. As a result, the present study was aimed to investigate the supportive-training intervention of fathers of premature infants and its effects on the mother-infant attachment.

2. Methods

This interventional clinical trial was conducted at the 29 Bahman hospital, Tabriz, in the first half of 2016. The study population included 60 fathers with the inclusion criteria, whose premature infants were hospitalized in the NICU. The sample size was estimated as 23 individuals, regarding the data in Shahkolahi's study, at the confidence level of 95% and test power of 90%. Furthermore, regarding the 20% loss of the sample, 30 individuals were selected in each group, who were assigned to one control group and one intervention group using blocks with the size of 4. The inclusion criteria for the infants were 34 - 37 weeks of pregnancy, Apgar score of 5 at 7 minutes, lack of major congenital malformations, two days of hospitalization, lack of intubation, oral feeding, and being born to primiparous mother. Moreover, the parents of the selected infants declared their agreement to participate in the study by signing an informed consent form. They were selected as the research samples in case of having no psychological problems, meeting the minimum elementary education demanded and living with the spouse. The samples were excluded from the study in case of any unfortunate incident during the intervention (infant death) or absence and unwillingness of the father to continue the study.

Data collection tools in the present study included the demographic characteristics form (personal-social information of infants and parents) and Avant's mother-infant attachment behavior questionnaire (28). This scale included three groups of mother-infant behaviors including emotional behaviors (looking, touching, kissing, talking and smiling), proximity-maintaining behaviors (holding the infant, encompassing the infant in both arms and having close contact with the infant) and care-taking behaviors (changing the clothes, burping, changing the infant's nappies and massaging the infant's body). In total, the above-mentioned 12 behaviors were observed and recorded (once per minute), and the total behaviors recorded within the 15 minutes period were considered as the overall score with the scores of 1 and 0 being given to the preformed and non-performed behaviors, respectively.

The behaviors were observed and recorded every minute; accordingly, in each minute, the behaviors were observed in the initial 30 seconds and recorded in the final 30 seconds. To this end, a stopwatch was used by the

researcher to keep track of time. In Avant's mother-infant attachment behavior questionnaire, the range of scores in the behavioral, proximity and care-taking fields was 0 - 75, 0 - 45 and 0 - 60, respectively, which totally ranged between 0 and 180. The validity of the research tools was investigated using face and content validity methods in cooperation with 10 professors from a faculty of nursing and midwifery as well as psychologists and pediatricians, and the necessary changes were applied. Moreover, the reliability of the tools was investigated through simultaneous observation so that in the first 10 samples, the mothers' behaviors were recorded in the checklist by two individuals and then, the correlation coefficient was determined ($r = 0.98$). As previously mentioned, the tools were reviewed by 10 professors and the necessary changes were observed and applied to the tools and total scores of the tools were considered as the final score.

On the second day after the premature infants' hospitalization in the NICU, the assistant researcher met the parents and explained the purpose of their participation in the study. After obtaining the form of consent from the fathers in both the intervention and control groups and filling out the demographic characteristics form of the parents and infants, the researcher measured the mother-infant attachment using Avant's mother-infant attachment behavior questionnaire by observing the emotional, proximity and care-taking behaviors while the mothers were taking care of the infants in the unit. The control group received no intervention during the study except for the routine cares in the unit including the daily appointments at visiting hours and the trainings provided by the unit; however, in the intervention group, in addition to the routine cares provided by the unit, the supportive-training intervention was performed for the premature infants' fathers. The intervention was carried out in two phases, the training-observational phase and the supportive phase. The training phase was composed of two 60-minute sessions of individual and face-to-face training held at the conference room of the hospital for the fathers of the premature infants. Subsequently, the supportive phase was performed one day after finishing the training phase in the presence of the parents. In the first training session, some information was provided by the researcher on the working environment, staff and equipment of the ICU using Power Point slides and a series of questions and answers was exchanged between the researcher and fathers on the provided information. Then, a training package (a color manual and CD) along with required instructions for its use was given to the fathers. By the end of the training in the observational phase, the fathers paid a visit to the unit in order to see the unit, become familiar with its equipment and staff, and receive the necessary

trainings. Furthermore, the researcher's phone number was given to the infants' fathers in the intervention group so that they could contact the researcher in case of having any question. The next day, in the second training session, some information was provided by the researcher on the premature infants (behaviors and physical symptoms), the father's role in supporting and taking care of the mother and infant, and the post-delivery physical and emotional changes in mothers using Power Point slides and also, the questions were answered. The training program provided in the sessions as well as the content of the training packages were prepared using articles and reference books, scientific validity of which was approved by a neonatologist and two professors from the faculty of nursing and midwifery. One day after the end of the training phase the supportive phase was initiated. Accordingly, in order to exchange ideas and transfer information between the parents, they talked and exchanged their thoughts and ideas in an appropriate room next to the unit at certain hours other than visiting hours (with prior coordination with the head of the unit) for three days and each time for half an hour. Then, they stood next to the infants' beds for 30 minutes to observe, take care and cuddle the infants. One day after finishing the supportive phase, in both the intervention and control groups, the mother-infant attachment behaviors were re-observed and re-completed by the researcher in three steps using Avant's mother-infant attachment behavior questionnaire within 12 hours (morning and evening shifts of the same day with 4-hours intervals) and the mean of the total scores of the three questionnaires was considered as the mother-infant attachment score. At the end of the study, for observing the ethical principles, an educational package, similar to the one given to the intervention group, was given to the control group.

After the data collection, the obtained data were analyzed using SPSS version 11. In the present research, the descriptive statistical methods, including frequency distribution tables, mean and standard deviation were used to describe the samples. In order to investigate the homogeneity of the two groups in terms of qualitative variables, to compare the mean of the variables between the two groups before and after the intervention and also to compare each group in the two pre- and post-intervention phases, Chi-square, independent and paired t-tests were run, respectively. In all the analyses, $P < 0.05$ was considered as statistically significant. The ethical interventions were taken into account in the present research; further, the study was conducted after obtaining the approval of the University's committee of ethics with the ethical code IR.TBZMED.1395.99 and registering in the Iranian registry of clinical trials (registration No. IRCT2015080613691N4).

3. Results

The mean age of the studied fathers in the intervention and control groups was 32.04 ± 5.23 and 33.34 ± 4.85 , respectively; thus, there was no statistically significant difference between the two groups in this regard ($P = 0.30$). While, the mean age of the mothers in the intervention and control groups was 26.43 ± 4.00 and 28.95 ± 4.64 , respectively, with a significant difference between the two groups in this regard ($P = 0.03$). However, there was no significant difference in terms of other demographic variables of the parents (Tables 1 and 2). Table 3 shows that, despite the lack of difference between the scores of the two groups before the intervention, the statistical difference between the groups in terms of emotional and caring behaviors was significant ($P = 0.00$), while no statistically significant difference was observed in terms of proximity-maintaining behaviors ($P = 0.23$). Furthermore, the results of the independent t-test showed a significant difference between the attachment total scores of the intervention and control groups after the intervention ($P = 0.00$). Moreover, the paired t-test results indicated a significant difference between the attachment before and after the intervention in the intervention group ($P = 0.00$), while such a difference was not significant in the control group ($P = 0.54$).

Moreover, investigating the difference in the total mean scores of the attachment before and after the intervention indicated that the increase of the mean score of the attachment behaviors was significant in the intervention group (12.8 ± 4.55); however, no significant difference was observed in this regard in the control group before and after the intervention (2.1 ± 3.90) ($P = 0.000$).

4. Discussion

Attachment leads to an effective relationship between mothers and infants, which is specialized to themselves; as a result of this relationship, both mothers and infants can feel secure and this can lead to emergence of first social relationship patterns in infants (29).

A part of the infant's natural development is related to emotional responses between the mother and infant, which relate them to each other both psychologically and physiologically; this relation can become stronger by the father's support as a facilitator (6).

The results of the present research showed that the supportive-training intervention of the fathers of the premature infants hospitalized in the NICU led to the significant increase in the mean score of the mother-infant attachment behaviors among the mothers in the intervention group compared to the control group. A study conducted by Melnyk showed that empowering parents had

no significant effect on the mother-infant interaction (30), which was not consistent with the results of the present study; such a difference can be attributed to the reasons such as accessibility of information, constant repetition of training through manuals and presence of supportive nurses.

However, in the studies conducted by Bergmana (2010) (31), Borimnejad (2012) (32) and Karbandi (2014) (33), performing training interventions on mothers could increase the mother-infant attachment, and involving fathers in the infant caring process as well as having a family-centered view on the subject could cause a reduction in fathers' stress and positive effects on infants' maternal cares, which were consistent with the results of the present study.

The findings of the present study also showed that the maximum mean score in the emotional behaviors in both the intervention and control groups belonged to "looking". Similarly, in the studies conducted by Alaie et al. (2005) (34), Borimnejad et al. (2012) (32) and Vakilian et al. (2007) (35), the maximum mean score in the emotional behaviors in both intervention and control groups belonged to "looking". Moreover, in the present study, the mothers in the intervention group demonstrated more emotional behaviors in interacting with the infants than those in the control group so that the difference was statistically significant. In their study entitled "study of the effect of a mother empowerment program on attachment of mothers to infants hospitalized in a neonatal intensive care unit", Karbandi et al. (2014) reported that the empowerment group demonstrated more emotional behaviors (33), which was consistent with the results of the present study. It seems that the training process, as a family-centered care, could increase the infant-mother interactions.

In the present work, the proximity-maintaining behaviors in the both groups obtained the maximum mean score compared to the emotional and caring behaviors; however, the findings of Alaie et al. (2005) showed that caring behaviors were more than proximity-maintaining and emotional behaviors (34), which is not consistent with the findings of the present investigation. In the present study, no significant difference was observed between the groups in terms of proximity-maintaining behaviors, while in the study by Ahn et al. (2010), mothers in the intervention group demonstrated more proximity-maintaining behaviors and the mean score of attachment behaviors in the intervention group was significantly higher than the one in the control group (36). The reason for this inconsistency can be due to the type of applied intervention that increased the mother-infant skin contact.

In this investigation, there was a statistically significant difference between the two groups in terms of the total mean score of the care-taking behaviors, while the study

Table 1. Comparing Individual-Social Characteristics of Mothers in the Intervention and Control Groups (n = 28)

Variable	Intervention Group, No. (%)	Control Group, No. (%)	Statistical Test
Occupation			0.211 ^a
Housewife	26 (92.9)	23 (82.1)	
Employed	2 (7.1)	5 (17.9)	
Level of education			0.313 ^b
Under high school diploma	13 (47.0)	10 (35.7)	
High school diploma	9 (32.1)	6 (21.4)	
Academic education	6 (21.4)	12 (42.9)	
Post-delivery maternal care			0.579 ^a
Mother	12 (42.9)	14 (50.0)	
Mother and mother-in-law	6 (21.4)	6 (21.4)	
Mother-in-law	2 (7.1)	4 (14.3)	
Others	8 (28.6)	4 (14.3)	
Favorite infant gender			0.500 ^a
Yes	26 (92.9)	27 (94.4)	
No	2 (7.1)	1 (3.6)	
Marital satisfaction			0.211 ^a
Satisfied	26 (92.9)	23 (82.1)	
Dissatisfied	2 (7.1)	5 (17.9)	
Spouse's post-delivery support rate			0.211 ^a
Yes	26 (92.9)	23 (82.1)	
No	2 (7.1)	5 (17.9)	
Type of delivery			0.775 ^b
Caesarean section	20 (71.4)	18 (64.3)	
Natural delivery	8 (28.6)	10 (35.7)	
Pregnancy			0.500 ^a
Wanted	28 (100.0)	27 (94.4)	
Unwanted	0 (0.0)	1 (3.6)	

^aFisher's test.^bChi-square test.

conducted by Vakilian et al. (2009) indicated no significant difference in this regard (35).

4.1. Conclusion

The results of the present research indicated that performing family-centered interventions and engaging fathers in the infant caring process could have outstanding effects on the improvement of their support for mothers. It was also revealed that expanding the father's support would result in increased mother-infant attachment behaviors, the beneficial results of which can improve the infant care quality. Based on the results of the

present research, in order to improve the quality of family-centered interventions, nurses and health caregivers are recommended to provide supportive-training interventions from the beginning of the infant's hospitalization in the unit, thereby empowering fathers to support and take care of mothers and infants. The present study was conducted in a hospital affiliated to the Social Security Organization; thus, it is suggested to conduct a more comprehensive study including hospitals that serve wider social classes

Table 2. Comparing Individual-Social Characteristics of Fathers in the Intervention and Control Groups (n = 28)

Variable	Intervention Group, No. (%)	Control Group, No. (%)	Statistical Test, No. (%)
Occupation			0.699 ^a
Self-employed	15 (53.6)	17 (60.7)	
Clerk	4 (14.3)	4 (14.3)	
Worker	9 (32.1)	6 (21.4)	
Unemployed	0 (0.0)	1 (3.6)	
Level of education			0.610 ^a
Under high school diploma	14 (50.0)	12 (42.9)	
High school diploma	11 (39.3)	11 (39.3)	
Academic education	3 (10.7)	5 (17.8)	
Favorite infant gender			0.665 ^a
Yes	25 (89.3)	25 (89.3)	
No	3 (10.7)	3 (10.7)	
Income level			0.768 ^a
Income equal to expense	8 (28.6)	3 (10.7)	
Income exceeding expense	1 (3.6)	0 (0.0)	
Income less than expense	19 (67.9)	21 (75.0)	
Residential home			0.868 ^b
Rental	6 (21.4)	7 (25.0)	
Paternal house	9 (32.1)	9 (32.1)	
Ownership	13 (46.4)	12 (42.9)	

^aFisher's test.^bChi-square test.**Table 3.** Comparing Attachment Mean Scores of Mothers Before and Three Phases After the Intervention (n = 28)

Variable	Range	Intervention Group, Mean ± SD	Control Group, Mean ± SD	P Value ^a
Emotional behaviors				
Before intervention	75 - 0	14.9 ± 3.5	14.8 ± 5.4	0.907
Total mean of three phases	75 - 0	22.7 ± 4.6	17.2 ± 4.5	0.000
Statistical result (P) ^b		0.000	0.021	
Proximity-maintaining behaviors				
Total mean of three phases	45 - 0	36.0 ± 15.5	36.6 ± 14.1	0.712
Total mean of three phases	45 - 0	34.4 ± 8.0	33.2 ± 9.1	0.239
Statistical result (P) ^b		0.228	0.005	
Care-taking behaviors				
Before intervention	60 - 0	7.9 ± 5.2	7/0 ± 8/1	0.515
Total mean of three phases	60 - 0	12.9 ± 4.4	10.2 ± 4.2	0.000
Statistical result (P) ^b		0.000	0.002	
Total attachment behaviors				
Before intervention	180 - 0	58.8 ± 4.3	58.6 ± 4.6	0.549
After intervention	180 - 0	70.0 ± 3.1	60.7 ± 3.7	0.000
Statistical results (P) ^b		0.000	0.114	

^aPaired t-test.^bIndependent t-test.

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