

The Effect of Empowerment Program on Mother-Infant Interaction and Weight Gain in Preterm Infants

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Article information	Abstract
<p>Article history: Received: 9 Oct 2011 Accepted: 6 Nov 2011 Available online: 16 Oct 2012</p> <p>Keywords: Neonatal Intensive Care Unit Empowerment program Premature newborn Mother-neonate interaction Weight gain</p> <p>*Corresponding author at: Department of Hematology, School of Medical Sciences, Tarbiat Modares University, Tehran, Iran. E-mail: l.bormnejad@gmail.com</p>	<p>Background: The hospitalization of premature newborns in neonatal intensive care unit causes the family to experience a sense of loss and to disturb the emotional connection of the mother with the newborn. The present study aimed to determine the effect of empowerment programs on mother-infant interaction and the weight gain of premature infants hospitalized in neonatal intensive care unit.</p> <p>Materials and Methods: In this clinical trial, after obtaining written consent, a total of 140 mothers with infants hospitalized in neonatal intensive care units were randomly divided into two experimental and control groups. The empowerment program was performed on mothers of the experimental group and then mother-infant interaction was assessed through the observation form of attachment behavior and the measurement of neonate weight in both groups and the data were analyzed by SPSS-16 software</p> <p>Results: The mean of the total maternal attachment behaviors in the experimental and control groups were 52.01 ± 6.65 and 36.28 ± 28.09, respectively. The result of the independent <i>t</i>-test ($p=0.001$) showed that there was statistically a significant difference between the two groups and the mean weight of infants two months after the intervention were 3620 ± 877.31 and 3200 ± 824.85 grams in experimental and control groups, respectively. The result of the independent <i>t</i>-test ($p=0.005$) showed that there was statistically a significant difference between the experimental and the control groups.</p> <p>Conclusion: Regarding the increase of mother-infant interaction and the weight gain of premature infants, it is recommended to provide the necessary training to parents, especially to mothers, in order to appropriately confront and communicate with the newborn and to empower mothers in order to care for premature neonates.</p> <p>Copyright © 2012 Zahedan University of Medical Sciences. All rights reserved.</p>

Introduction

According to the latest report of the World Health Organization in 2006, 31% of infant mortalities in Iran is merely due to prematurity [1]. Meanwhile, it should be noted that despite the decline in infant mortality, those low-weight newborns who survive are more susceptible to problems such as severe disabilities, mental retardation, cerebral palsy, epilepsy, visual and hearing loss, and weight loss [1, 2].

Thus, the hospitalization of newborns is inevitable in most cases; it is even possible to hospitalize them in neonatal intensive care units for long time, which leads to experiencing a sense of loss by family members and impairing emotional connection of mother and baby, after premature birth of the neonate. In fact, there are mothers who suffer a lot of stress [3].

The early stages of newborn hospitalization are a major crisis for parents. Mothers of premature infants have less confidence in their parental role. They must adapt themselves to a baby who needs special care. These mothers doubt their ability to detect and fix newborn's problem [4]. This issue causes disability and stress, especially in mothers. Mothers of immature infants may also show symptoms of depression. Depressive symptoms

may intervene in mother-infant attachments and in the quality of care given by mother to the newborn [5]. In this situation, it seems essential to perform efforts to support the mothers, during the acute phase of the hospitalization of the baby in the intensive care unit. There is an agreement in parents' need to be supported by carers in order to improve the newborn care, child-parents relationship, and family function in short and long term [6].

Rising tensions of parents may interfere with child-parents interaction during early childhood and subsequently increase the risk of delayed behavioral problems. Reducing parents' stress may increase the sensitivity of parents to various signs and symptoms of their child and may improve child-parents relationships [7]. Nurses of the NICU, who care for premature newborns and their families, have a particular situation in supporting parents as neonate care providers and controllers, because of their special knowledge and constant presence in the NICU. Therefore, they should provide parents with the expected guidance [8, 9].

The most important needs of parents whose children are hospitalized in the NICU are communication and

information requirements. Parents wish to obtain information about their baby and his/her progress during hospitalization in the NICU. This need for information is derived from the need to have control over the situation which causes the parents to seek obtaining information. Searching for information is a way to be involved in their newborn's care [10].

Emotional and information support on behalf of the hospital for parents will not only help the family to adapt with their infant's hospitalization, but also give parents the ability to continue the treatment at home after the discharge of the child [11]. The results of Melnyk et al. study on the effect of a behavioral training interventional program (creating opportunities for parents' empowerment) showed that mothers who participated in this program had less stress in the NICU than mothers of the control group. In addition, their newborn cognitive development score was higher than infants of the control group at 6 months of age [3]. Therefore, this study aimed to determine the impact of the empowerment program on child-mother interaction and the weight gain of premature neonates, hospitalized in the NICU].

Materials and Methods

This research was a double-blind randomized clinical trial on two groups; and based on its objectives, the researcher analyzed the empowering program effect on the stress of mothers of premature infants, child-mother interaction, and the weight gain of premature newborns hospitalized in the neonatal intensive care unit, in two groups including the experimental group that received the empowerment program and the control group who received the regular program of the ward.

Sample size was assessed using the following formula, at a 95% confidence level and a test power of 80%, with an expected 20% sample drop of mothers interaction, at least $d=0.3$ units, in order to have a significant effect in statistical terms. Having put the amounts in the formula, the sample size in each group was calculated to be 70 persons.

After obtaining the approval of the Ethics Committee of Tehran University of Medical Sciences, sampling was carried out consecutively. This study was conducted in the neonatal intensive care units of the medical and educational centers of Tehran University of Medical Sciences, including Shahid Akbar Abadi, Hazrat Rasoul, and Ali Asghar hospitals, in 2010. Thus, the researcher went to the NICU every day, and randomly collected the samples of the intervention group and the control group from mothers who had the required characteristics of the research subjects and expressed their willingness to participate in the study, having been explained the research objectives and completing the consent form. To prevent information contamination between the experimental and the control groups, a time schedule was used; in the first phase, the researcher randomly selected the experimental group among the samples who had the conditions for participating in the study. After the completion of this group, sampling was stopped for 4

weeks to be sure of their discharge. Then a sample was selected for the control group in exactly the same way. Sampling took 5 months to be completed.

It should be noted that trained researchers who were blind to the study helped to observe mother-infant interactions. The inclusion criteria of mothers to be involved in the research were: being healthy in terms of chronic physical and mental diseases; not having a baby with chromosomal abnormalities; not having a baby with severe crisis like intraventricular hemorrhage, Apgar scores below 7, and cardiopulmonary arrest at birth; the mother not being employed in the field of health care, having a CD device or a computer and the knowledge of their application.

In case of any of the following situations, samples were excluded from the study: newborns developing incurable diseases, mothers developing physical or mental illnesses, hospitalization length of infants being less than one week or more than a month.

Avant's mother-infant attachment behaviors observation questionnaire was used to measure these behaviors. This tool includes three mother-infant attachment behaviors: loving behaviors (staring, fondling, kissing, talking, laughing, rocking), keeping close behaviors (curling tightly the arm around baby and sticking him/her to herself, close body contact of mother and baby), and caring behaviors (hitting the baby's back to cause stomach air out, changing nappies and baby clothes).

The mother and baby interact for 15 minutes. In the first 30 seconds of each minute, the behaviors were observed and in the second 30 seconds, they were recorded. Thus, each behavior observed in a minute was recorded only once. The total number of recorded behaviors in 15 minutes was considered. Therefore, each behavior was observed up to 15 times in 15 minutes. The researcher observed and recorded the behaviors by means of a stopwatch. The sum of the scores represented the mother and baby's attachment.

Newborns' weights were measured by a digital scale (Seca, German model) with an accuracy of ± 10 g, at birth and 2 months after discharge, in both experimental and control groups.

The content validity was used to determine the scientific validity of the tension tool. For this purpose, the tool that had already been translated into Persian was corrected with comments by the supervisor, the advisor, and statistics professors; then, its validity was confirmed by 8 faculty members of the Nursing Faculty.

Regarding the scientific reliability of Avant's questionnaire about mother and infant attachment behavior, this tool has been frequently used in Iranian studies [12]. The reliability of the instrument was evaluated through concurrent observation and was 0.98, which confirmed its reliability. The scientific reliability and validity of the educational content of the empowerment program, including the educational manual and the CD have been determined using credible books and papers and approved by a neonate subspecialist physician and the head nurse of the NICU and two professors of the Nursing and Midwifery Faculty.

The first phase: After selecting the samples, the demographic information of the mother and the newborn were recorded and the newborn's weight was measured with a digital scale that was calibrated in the same conditions (without clothes and diapers). Then, the premature infant care programs were expressed through direct and face-to-face training in the mother's room in two- or three-person groups (depending on the number of samples) for 20 minutes and theoretical and practical aspects of care tips were provided.

A training package was given to the educational units of the experimental group, which included a CD about the NICU and its equipment as well as the characteristics and behavior of the child and the role of the parents in the care of premature infants, and an educational booklet about the contents of the CD that contains appropriate information about premature infants' characteristics, infant development, and specific details about newborns' conditions and the best time to interact as well as the role of parents in preparation for the transition of the baby from the hospital to home and how to establish an ongoing and effective relationship and the mode of newborn care. At the end of each session, 20 minutes were considered for questions and answers.

The second phase: When the baby was well and was given to mother for the first time, the observers blinded to the intervention, observed mother-infant attachment behaviors. Thus, maternal behaviors were observed during the first 30 seconds of every minute, and the second 30 seconds was recorded for one time. The seconds were counted by a stopwatch and the observations were carried out for 15 minutes. In the end, mothers were told that they were under observation.

The third phase: On the day before discharge, mothers were asked about the points they had learned; any ambiguities were resolved, and the mother practically did baby care in the presence of the researcher. The researcher's phone number was given to mothers to call her when necessary.

The fourth phase: Two months after discharge, the parents were called and an appointment was scheduled in the NICU of the hospital, and the infants were weighed by a co-researcher who was blinded to the study.

After collecting information, the data were analyzed by SPSS-16 software. To describe the samples, descriptive statistics including frequency distributions, mean value, and standard deviation were used in this research. In addition, paired and independent *t*, and χ^2 tests were used in order to achieve the objectives and hypotheses of the study.

Results

The study sample consisted of 140 mothers; 70 persons in the experimental group and 70 persons in the control group. The age range in the control group was 18-41 with a mean age of 27.1 ± 5.7 , which was 18-37 in the experimental group with a mean age of 26.6 ± 4.6 . The pregnancies were voluntary in 81% of the mothers of the

control group and in 86% of the mothers of the experimental group.

Forty-one percent of the mothers were in their first delivery; this number was 60% in the experimental group. In the control group 47% of the mothers and in the experimental group 64% were having their first children. The educational level was below diploma in 85.8% of the control group and in 97.1% of the experimental group. About 54% of mothers in the control group had cesarean sections and 32% had normal labor. These numbers were 59% for cesarean sections and 41% for normal delivery in the experimental group. In the control group, 97% of the mothers were housewives and 3% were employed. In the experimental group 93% of the mothers were housewives and 7% were employed. In the control group, 54% of the mothers lived in Tehran, 33% in the suburbs of Tehran and 13% in other cities. In the experimental group, 31% lived in Tehran, 20% in the suburbs of Tehran and 49% in other cities. In the control group, about 29% of the mothers were hospitalized already, whereas 71% were not. In the experimental group 27% were hospitalized already, whereas 73% were not. In the control group, about 47% of the newborns were boys and 53% were girls. In the experimental group, 64% were boys and 36% were girls. The average birth weight was 1810 and 1718 grams in the control and experimental groups, respectively. The minimal and maximal gestational ages in the control group were 28 and 37 months, respectively. There was no significant difference between the mentioned variables in the experimental and control groups. In addition, the results of the independent *t*-test showed no significant difference between the experimental and control groups in terms of premature newborns' birth weight. Table 1 indicates that among mother-infant attachment behaviors, loving behaviors had the highest average and keeping close behaviors and caring behaviors were the next, while in the control group, keeping close behaviors had the highest average and loving behaviors and caring behaviors came next.

Table 1. The mean and standard deviation of the total and different aspects of mother-infant attachment behaviors in the first breastfeeding after the intervention in experimental and control groups

Mother-infant attachment behaviors	Experimental group Mean±SD	Control group Mean±SD	Statistical test results
Loving behaviors	25.36±5.19	15.48±5.69	<i>p</i> =0.001
Keeping close behaviors	22.23±6.5	17.24±7.58	<i>p</i> =0.001
Caring behaviors	4.43±1.9	3.56±6.79	<i>p</i> =0.03
Total attachment behaviors	52.01±6.65	36.28±8.09	<i>p</i> =0.001

Table 2. A comparison of the mean and standard deviation of premature neonates' birth weight in the experimental and control groups two months after the intervention

Weight two months after the intervention (gr)	Min-Max	Mean±SD	<i>p</i> -value
Control	2000-5200	3200±85.824	0.005
Experimental	2000-5300	3620±31.877	

Table 3. The distribution of difference status of mother-infant interaction aspects, separately and totally after intervention

Mother-infant interaction aspects	Mean		Total	Friedman Test		
	Control group	Experimental group		Control group	Experimental group	Total
Loving behaviors	2.24	2.44	2.34			
Keeping close behaviors	2.74	2.54	2.64	$p=0.001$	$p=0.001$	$p=0.001$
Caring behaviors	1.01	1.01	1.01	df=2	df=2	df=2

Statistical test results revealed a significant difference between the two groups in terms of loving behaviors and keeping close behaviors ($p=0.001$). The independent t -test results showed a significant difference between infants in terms of weight two months after the intervention (Table 2). The Friedman test results revealed a significant difference in keeping close behaviors in both groups (Table 3).

Discussion

This study showed that mother-infant interactions were significantly different in both the experimental and control groups. The highest mean of loving behaviors in the experimental and control groups belonged to staring, talking, smiling, and fondling, while kissing and rocking showed the lowest mean. But as is clear, the mean of behaviors in the experimental group was higher compared with the control group, and mothers had shown more behaviors; in terms of keeping close behaviors, curling the arms had the highest mean in both groups.

In terms of the caring behaviors aspect, changing nappies and baby clothes in the experimental group and hitting baby back to cause stomach air out in the control group had the highest mean. Among mother-infant attachment behaviors in the experimental group, the loving behaviors had the highest mean, and then there were keeping close behaviors and caring behaviors. On the other hand, in the control group, keeping close behaviors had the highest mean, coming higher than loving behaviors and caring behaviors. As statistical test results revealed, there was a significant difference between the two groups in terms of loving behaviors and keeping close behaviors ($p=0.001$).

Cassano and Maehara concluded in their study that Japanese mothers showed more behaviors like smelling, talking, touching baby, and keeping their face to the newborn's face. Instead, Brazilian mothers showed more behaviors such as staring, touching with fingertips, and hugging [12]. This is due to differences in the cultural, economical, and social characteristics of these countries.

In his research, Browne studied the role of family-oriented interventions in the improvement of infant-parents communication in neonatal intensive care units and concluded that knowledge, dependency, and interactions was higher in the intervention group than the control group [13]. Tilokskulchai et al. showed that prematurity followed by the separation of the mother from the baby after birth can affect the attachment process. They studied descriptively the attachment behaviors that mothers showed when first meeting with their infants in the neonatal intensive care unit and showed that all mothers exhibited most of the attachment behaviors (such

as staring, facial expressions, touching, talking, and eye contact) except hugging. Anyway, many mothers spend less time with their newborn. The findings suggest that nurses must encourage mothers to interact with the baby to enhance mother-infant attachment. This is the direction of the current study [14].

Regarding the means ranking, the Friedman test showed that the highest interactive aspect belonged to keeping close behaviors. The findings of the study conducted by Alaei et al. showed that the mean of mothers' caring behaviors was higher than keeping close behaviors and emotional behaviors; this finding is inconsistent with the findings of the present research [15]. This difference may be due to the performance of this study on mothers who had healthy and full-term infants; naturally, mothers who had premature babies apart from them in the neonatal intensive care unit would show different behaviors; in fact, they showed emotional and keeping close behaviors.

Mother-infant interaction: Independent t -test results ($p=0.001$) showed that there was a statistically significant difference between the two groups. The study done by Melnyk et al. indicated that educational programs led to more positive relationships with the children and improved beliefs about the roles of parents, which is consistent with the findings of this research [17]. Regarding the weight gain of preterm newborns and that of infants two months after the intervention in the experimental group, the independent t -test showed a statistically significant difference between the experimental and control groups ($p=0.005$). In the study of Arzani et al. it was shown that exclusively continuation of breast feeding was significantly better in the experimental group than the control group in the third month ($p=0.031$).

Regarding the positive effects of this program on mother-newborn interactions and on the weight gain of neonates, it is suggested that the parents be empowered so that they can effectively communicate with the baby and also that they learn and gain the essential skills for newborn care, and that the program be implemented; it is also suggested that the parents be involved in the newborn's care in order to effectively communicate with infants.

Communication between the parents and the newborn may improve the quality of the parents' role and may help parents to feel competent. Thus, it is necessary to train parents; moreover, by gaining information and knowledge from nurses, parents will have better participation in this area. Therefore, it is recommended that nurses who have contact with the mother and the newborn should give more time to parents, so that they should have skin contact with them to further transfer the sense of keeping close and emotional behaviors.

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Authors' Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

The authors declare no conflict of interest.

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