Original Article

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Effects of Maternal Empowerment Program on the Length of Hospitalization and Readmission Rate of Premature Infants

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ABSTRACT

BACKGROUND AND OBJECTIVE: Premature infants because special needs might be admitted at the neonatal intensive care unit for days to recover. Despite medical advances, rate of readmission among preterm infants is relatively high, causing economic and psychological problems for families. This study aimed to evaluate the effects of empowerment Mother Program on length of stay and readmission rate of preterm infants.

METHODS: This randomized clinical trial was conducted on 70 mothers with premature infants, divided into two groups of intervention and control. Educational-behavioral empowerment program was performed in four stages: 2-4 days after admission (stage one), 2-4 days after completing the first stage (stage two), 1-3 days before discharge (stage three), and one week after discharge (stage four). During each stage, mothers in the intervention group listened to selected audio files, and subjects in the control group received usual care based on hospital policies. In two stages, mothers were regularly enquired about the readmission rate of neonates via phone calls within 10-15 days after discharge. In addition, length of hospitalization was extracted from the medical records of the infants. IRCT:N201410151954.

FINDINGS: In this study, mean of hospitalization in the intervention and control groups was 10.85±5.93 and 13.85±7.65 days, respectively (p=0.03). Moreover, no statistically significant difference was observed in the readmission rate of infants one month after discharge.

CONCLUSION: According to the results of this study, the empowerment program caused a significant reduction in the length of hospital stay. However, it had no significant effects on the rate of readmission in the studied neonates.

KEY WORDS: *Empowerment Program, Length of Hospital Stay, Readmission Rate, Premature Infants.*

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Introduction

Premature infants are born before the completion of 37 weeks of gestation (1); these infants account for 12% of the total births every year (2). Premature infants have special needs, and even a different

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appearance, compared to normal babies. In order to regain normal condition, these infants need to be hospitalized at the neonatal intensive care unit (NICU) for several days (3). Very low birth weight infants (<1500 grams) are more frequently hospitalized compared to other neonates due to the complications associated with prematurity, infections, and neurological and developmental disorders (e.g., reduced brain mass, learning disabilities, reduced IQ, hyperactivity and attention deficit disorder, verbal, visual, auditory and motor dysfunction, poor perception and self-confidence, and behavioral and cognitive defects) (4).

Cost of treatment in preterm neonates is 10 times higher than term neonates; moreover, average length of hospital stay is estimated at 1.5 days in term neonates and 13 days in premature infants (5). Infant hospitalization leads to long-term bed occupancy and heavy health care costs, in addition to psychological and economic problems in families (6). Recent studies have reported the rate of neonatal readmission to be alarming, which ultimately imposes a heavy financial burden on the health care system. According to statistics, more than 27% of healthy preterm infants are hospitalized again after discharge, and this rate reaches 50% per year in preterm neonates, as well as high-risk infants weighing less than 1000 grams (5).Several studies have suggested that prematurity is a major cause of readmission in neonates, which often occurs due to respiratory and digestive disorders. Many of these problems are a result of inadequate care on behalf of the parents after discharge (7). Therefore, it should be noted that discharge is not indicative of the full recovery of infants (8).

In one study, Tien et al. stated that discharge of premature infants could not always be considered as the elimination of health issues and developmental disorders. As such, these neonates may experience frequent hospitalizations during the first year of life as the hallmark of acute problems after discharge in high-risk cases (9). Due to the lack of specialized training programs for the protection of mothers with premature infants during the acute phase of hospitalization, these programs are unofficially provided by nurses in order to reduce the aforementioned problems (10).In the present study, we used Creating Opportunities for Parent Empowerment (COPE) program designed by Melnyk et al. (2001) for parents with premature infants. This program consists of four stages of educational-behavioral intervention based on the theory of self-regulatory control, which is carried out within the first days of hospitalization in premature infants using written forms and audio files (11). COPE does not require nursing involvement and could be highly applicable in intensive care units where there is heavy workload (12).

COPE is normally administrated within the first days of hospitalization; according to previous studies, early intervention is the key to success in health care programs devised for parents with premature infants (13). Furthermore, use of this method could yield new data, while providing psychological support and necessary information for parents in order to reduce the length of hospital stay in premature neonates (14). This study aimed to evaluate the effects of maternal empowerment program on the length of hospitalization and readmission rate of premature infants admitted at the NICU of Omolbanin Hospital in Mashhad, Iran.

Methods

This randomized clinical trial was conducted on all the mothers with premature infants (gestational age: <37 weeks) admitted at the NICU of Omolbanin Hospital in Mashhad, Iran during May-September 2014. Study protocol was approved by the Ethics Committee of Mashhad University of Medical Sciences, and official permit was obtained from the NICU authorities of Omolbanin Hospital. Based on the inclusion criteria, subjects were selected via available sampling from the mothers referring to the hospital at the time of study and were divided into two groups of intervention and control.

To prevent information exchange between the groups, research units were randomly allocated into two groups via coin flips, and sampling was performed on the control group first.Control subjects consisted of all the mothers with premature infants with gestational age of <37 weeks admitted at the NICU of Omolbanin Hospital; all the subjects met the inclusion criteria. After completing the sample size in the control group, sampling was interrupted for 3 weeks until the discharge of mothers. Sampling in the intervention group was performed using the same approach. Sample size was calculated based on a pilot study through the comparison of the means of data, with 95% confidence interval and 80% test power; finally, total sample size was estimated at 35 patients in each group (total: 70). There was no sample loss in this study. Inclusion criteria of the study were as follows: 1) maternal age of

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≥18 years; 2) ability to read and write; 3) no history of premature births and neonates with gestational age of <37 weeks; 4) birth weight of 1000–2500 g; 5) no intraventricular hemorrhage (grade III or IV) during the study and 6) single-gestation pregnancy. Exclusion criteria were as follows: 1) discharge of infants before the completion of training program; 2) lack of parental consent to continue participation at each stage of the program; 3) death of infant and 4) hospital stay of less than one week or more than one month. Procedures and objectives of the study were explained to the mothers in accordance with the level of their knowledge, and in case they were willing to participate, written informed consent was obtained from the subjects. Initially, the empowerment program was translated in full text and reviewed by 10 faculty members of the School of Nursing and Midwifery at Mashhad University of Medical Sciences. After necessary corrections, a booklet was prepared specific to the audio files used in each stage of the program. It should be noted that Mianaei et al. translated the first and second stages of the maternal empowerment program in Iran (15), and we obtained the permission to use the translation in the present study.

Content of Booklets in Different Stages of Intervention:

Stage One was carried out about 2-4 days after hospitalization, and information such as the appearance and behavior of premature infants, differences between preterm and term infants, and acquaintance with the environment of NICU were recorded.

Stage Two was implemented 2-4 days after the first stage, involving new information about the behavioral and developmental patterns of the infants and suggestions for fulfilling the needs of infants, as well as facilitating the participation of mothers in neonatal care.

Stage Three was performed 1-4 days before infant discharge, and additional information was presented about the statues and behaviors of infants, such as drowsiness, active consciousness, and the most effective time for mother-infant interaction.

Stage Four was carried out one week after discharge, consisting of complementary information about the behavioral patterns of infants, parental role in the growth and development of infants, and suggestions for the promotion of positive interactions between parents and infants. Before implementing the first stage of intervention, demographic data of mothers and infants were collected using questionnaires. Initially, subjects were trained on the use of mp3 players and the prepared booklets and were reminded that they could ask any potential questions about the training and completion of booklets during each stage of the intervention. At each stage, mothers listened to the audio files containing information about each stage of the program for 15 minutes using the mp3 player in the absence of the researcher. Concurrently, related data was accessible in illustrated booklets, and after each stage, subjects were required to complete the assignments attached to the end of the booklet (16). In this study, no specific tools were applied as to control the implementation of empowerment program for the mothers, and subjects in the control group only received usual care in accordance with hospital policies. After infant discharge, enquiries were carried out about the readmission of infants during two stages (within 10-15 days after discharge) via phone calls. Moreover, length of hospitalization was extracted from the medical records of infants and compared between the groups. Data analysis was performed using paired t-test and Chi-square in SPSS V.16.

Results

In this study, mean age of the mothers in the intervention and control groups was 27.9±5.5 and 26.6±6.2 years, respectively, and there was no significant difference between the groups in this regard. In addition, mean of fetal age was 32.4±2.2 weeks, and birth weight of infants in the intervention and control groups was 1990.0±419 and 1887.0±434 grams, respectively. No significant difference was observed between the infants in terms of birth weight. Among the studied subjects, the majority (N=64, 92.85%) were housewives, 40 mothers (57%) were undergraduate, and 42 subjects (60%) had one child, who was hospitalized due to the complications associated with prematurity.

No statistically significant difference was observed between the study groups regarding the number of children(table 1). Mean length of admission at the NICU in the intervention and control groups was 10.85±5.93 and 13.85±7.65 days, respectively (P=0.03). One month after discharge, no statistically significant difference was observed in the rate of readmission between the study groups (table2).

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Table 1. Demographic Characteristics of Subjects in Intervention and Control Groups

Variables \ Group		Intervention N(%)	Control N(%)	p-value
Father's Education Status	Primary/Secondary School	20(57.1)	19(54.3)	1**
Father's Occupation	Self-employed	23(65.7)	21(60.0)	0.63**
Family Income	Under 6000000 Rls	17(46.8)	16(45.7)	0.61**
Cause of Preterm Delivery	Respiratory Distress	28(80.0)	27(77.1)	0.95**
Infant Gender	Male	18(51.4)	23(65.7)	0.22***
Number of Children	One	60(21)	60(21)	0.64*

***Student's T-test, **Fisher's Exact Test, ***Chi-square Test**

Table 2. Frequency Distribution of Readmission in Infants of Intervention and Control Groups

Frequency of Readmission \ Group	Intervention N(%)	Control N(%)
Never	34(97.1)	32(91.4)
1≤	1(2.9)	3(8.6)
Total	35(100)	35(100)
Test Results	df=1, p=0.23	

Discussion

According to the results of this study, the empowerment program could significantly reduce the length of hospitalization among premature infants. The findings of Melnyk et al. are in line with our results; accordingly, given the similarities in the general condition of the studied neonates, length of admission at the NICU and hospital was 3.8 and 3.9 days shorter in the intervention group receiving the empowerment program compared to the control group (16).

Furthermore, demographic variables including the mean of maternal age, education status (majority undergraduate), infant gender, mean of gestational age and training protocol were similar between these two studies. Another study by Welch et al. was conducted on 150 premature infants aged 26-35 weeks, and length of hospitalization was not statistically significant between the two groups (17), which was inconsistent with the results of the current study. In this study, we performed an educational-behavioral intervention in four stages, while the intervention by Welch et al. involved training sessions designed to improve mother-infant interaction. Some of the methods used in their study included skin-to-skin contact, cuddling, talking and infant relaxation methods. Additionally, mothers were encouraged to participate in activities such as changing diapers and bathing the infants in order to spend more time with infants. The findings of the present study are inconsistent with the results obtained by Ortenstrand et al. in this regard. In their study, parents were allowed to be present at infant bedside 24 hours, from admission to discharge, in order to actively participate in baby care. As such, presence and participation of the parents had a significant effect on the length of hospitalization in the majority of preterm infants, resulting in a 5-day reduction of NICU and hospital admission.It could be stated that parents who spend more time with their babies have enough time to interpret the symptoms, discomfort and needs of infants, which will help them with a more effective performance in infant care (18).

In the current study, booklet assignments aimed to prepare mothers in all aspects of infant care, so that they would be able to be actively engaged in this process and predict the needs of their infants. On the same note, Bhutta et al. reported that length of hospitalization significantly reduced in the neonates of mothers who personally provided the required nursing care for infants before discharge. Similarly, results of the present study indicated that

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active involvement of mothers in infant care before discharge could significantly reduce the length of hospital stay (19). In the current study, the empowerment program was used to increase maternal participation in pediatric care, interpret and respond to infant needs and promote positive interaction between mother and infant through the completion of assignments during each stage of the intervention.

However, this program had no significant effects on the reduction of readmission rate in the neonates. In line with our findings, Klein et al. reported no significant decrease in the readmission rate of the infants whose mothers received empowerment program training. This could be due to the use of similar training programs, which were implemented through prepared booklets, and the fact that research units received the required data in the written form. In another study in Thailand, Erdeve et al. divided premature infants into two groups of intervention and control, and instead of admission at the NICU, subjects of the intervention group were hospitalized in a private room with their mothers actively involved in pediatric care. On the other hand, neonates in the control group were admitted at the NICU without maternal participation in infant care.

About three months after discharge, parents were enquired about the readmission, and the results were indicative of decreased readmission rates and referral visits among the infants of the intervention group (21). In the study by Erdeve et al., direct interventions were implemented in infant care by mothers, while in the current study, trainings were performed using booklets and audio files without any practical interference. Therefore, differences in the findings of these two studies could be due to the variations in the methods of intervention.

In conclusion, results of the present study indicated that the empowerment program could reduce the length of hospital stay, whereas it has no significant effects on the readmission rate of premature infants. This highlights the need for further studies on larger sample sizes, with long-term follow-up. Given the efficacy of maternal empowerment program in the reduction of hospitalization among preterm neonates, it is recommended that this method be implemented as a standard procedure in neonatal health care units.

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