

The Effect of Empowering Mothers of Infants Hospitalized at the Neonatal Intensive Care Unit on Their Participation in Neonatal Care

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Abstract

Introduction: Mothers' participation in the Neonatal Intensive Care Unit is important in promoting neonatal care and good outcomes for neonates and their mothers. The present study was conducted with the aim of assessing the effect of empowering mothers of hospitalized neonates on the level of their participation in neonatal care.

Methods: This quasi-experimental single-group study with before-after design recruited 59 mothers of neonates hospitalized at the NICU, selected according to the study inclusion criteria. Data were collected using educational needs questionnaire and the maternal participation checklist. The questionnaire was completed by mothers and the participation checklist by the researcher before the intervention. The empowerment program was then implemented over 2 to 4 days.

Results: Comparison of participants' checklist scores before and after the implementation of the empowerment program in 3 domains of care needs, information needs, and bonding, and attachment needs, showed significant increases in the level of mothers' participation. The comparison of checklist participation scores showed that the Mean (M) and Standard Deviation (SD) of scores before and after performing the mothers' empowerment were respectively 7.61 ± 3.66 and 12.38 ± 1.31 in the care area, 1.47 ± 0.99 and 3.13 ± 0.66 in the information area, and 4.77 ± 1.42 and 5.70 ± 0.59 in the area of attachment and dependency.

Conclusions: Implementation of the empowerment program for mothers based on their educational needs significantly increased mothers' participation in neonatal care. This empowerment program could be applied for a broad range of population of mothers at the intensive care units of neonates.

INTRODUCTION

Advances in technology and medical sciences have led to increased number of neonates hospitalized at intensive care units, and dramatically increased their survival rate [1]. Neonates hospitalized at intensive care units often require advanced respiratory support, phototherapy equipment, and incubation, which diminish the possibility of mother's contact with them [2]. Mothers' separation from neonates leads to consequences, such as feeling of parenting inadequacy, impaired process of bonding and attachment, and stress [3, 4]. The delayed mother-neonate contact and fear of taking

care of a hospitalized neonate at the intensive care unit could lead to reduced quality of post-discharge neonatal care by the mother. Thus, studies emphasize early mother-neonate contact and participation of mothers in neonatal care, even during acute illness [5]. Simple care deeds, such as changing diapers and breastfeeding, could become challenging for mothers, which adversely affects neonatal health after discharge [6]. Empowerment of parents is one of the concepts emphasized in family-centered care in neonatal and pediatric nursing. In neonatal wards, this concept involves focusing on

needs, availability of open and ongoing information, participation of mothers in neonatal care, greater interaction with the neonate, communication with the nurse, and promotion of mother's maternal role, so as to empower her in neonatal care [7]. Empowering and involving mothers in daily neonatal care, teaching them neonatal care at home, and providing information associated with neonatal health will improve the quality of mother-neonate interaction and help mothers develop a feeling of competence in performing their maternal role [5]. Besides, the level and quality of nurses' contact with parents will increase through implementation of parents' empowerment program, and this could directly and positively affect the quality of nursing care provided for the hospitalized neonates [8]. Empowerment programs and involving mothers in neonatal care creates a feeling of support by nurses, which obviates their stress and other psychological problems [9]. Because of their specialized knowledge of neonatal care, the time they spend with neonates and possibility of contact with mothers, neonatal intensive care nurses are in a special position for supporting parents as neonatal care providers and controllers [10]. Previous studies have shown that information and communication are what parents of neonates hospitalized at intensive care units need most [5]. They are also concerned about continuing their neonatal care at home [8]. By providing empowerment programs, nurses can alleviate these needs of parents. A number of studies have so far been conducted in Iran on the effect of empowering parents of neonates in intensive care units on different variables, including weight of the preterm neonate, parents' participation in care of the preterm neonate, duration of hospitalization and readmission, attachment, maternal self-efficacy and preparation for discharge, maternal stress, and mother-neonate interaction [5, 11, 12]. The population of these studies consisted of mothers of preterm neonates and most empowerment programs were implemented without determining primary educational needs of mothers. Thus, the present study was conducted to assess the effect of empowering mothers of infants hospitalized in neonatal intensive care unit on their participation in neonatal care. To this end, mothers' educational needs were first determined, and mothers of preterm, term, and post-term neonates were also included in the present study.

METHODS

This quasi-experimental single-group study with before-after design recruited mothers of neonates hospitalized at the intensive care unit of a referral pediatric hospital affiliated to Shahid Beheshti University of Medical Sciences in Tehran. Considering type I error of 5%, type II error of 20%, and effect size of 50%, the minimum sample size was determined as 59 mothers [13]. This semi-experimental study was based on a single group before and after, which was not regarded as a random study. There were control and experimental groups in the research. The groups were selected randomly. The statistical intended population of the study were mothers whose infants were hospitalized in special care areas and were capable of participation in the study. The study inclusion criteria for mothers were being older than 15 years, having a hospitalized neonate at the neonatal intensive care unit for reasons other than congenital abnormalities and life-threatening conditions, the

ability to read and write, with no self-reported serious psychological or physical diseases. The study exclusion criteria included diagnosis of a life-threatening abnormality for the neonate in the course of the study. Data collection tools included mothers' and neonates' demographic questionnaire, mothers' needs assessment questionnaire, and mothers' participation checklist. In the demographic questionnaire, items relating to mothers included questions about the delivery method, education, age, occupation, number of children, and birth order of the neonate; and items relating to neonates included gestational age at birth, gender, weight, and present age, which was completed by the researcher. Mothers' educational needs questionnaire was prepared with slight culture-based changes from Lubb's educational needs questionnaire. This questionnaire was developed in two stages, including a qualitative stage that involved interviewing mothers, and a quantitative stage, which involved obtaining information on the prepared items. This questionnaire contained three domains, including care needs (breastfeeding or formula, proper holding of the neonate during breastfeeding, knowing the defecation time, diaper change, care of the umbilical cord, taking the neonate's temperature, and positioning of neonates), information needs (notifying the mother about diagnosis and illness of the neonate and ability to communicate with nurses regarding neonatal needs), and bonding and attachment needs (mother's ability to talk with the neonate, making eye contact, and gently touching and massaging the neonate's arms). For each activity, "need training" or "do not need training" option was determined [14]. This questionnaire was initially completed by mothers before implementation of the empowerment program.

Mothers' participation checklist was extracted from Schinder's checklist and Alaee-Korahroudy et al.'s study with slight changes based on the 3 domains in mother's educational needs questionnaire, and in terms of measurement, the scale included 3 parts: "proper participation" (2 points), "improper or inadequate participation" (1 point), and "no participation" (0 point) with total scores ranging from 0 to 24 [11, 15]. After obtaining permission to enter the study settings from the research deputy of Shahid Beheshti University of Medical Sciences, the first author attended the neonatal intensive care unit during morning and evening shifts. To collect data, eligible neonates were first identified, then mother's inclusion criteria were assessed, and the researcher introduced herself to eligible mothers and fully explained the study objectives and methods, voluntary participation, confidentiality of data, and the right to withdraw from the study at any stage. After obtaining a written consent, the researcher completed the mothers and neonate's demographic questionnaire by asking questions of mothers and reviewing neonates' medical records. Next, educational needs questionnaire was given to the mothers to complete. Based on the needs assessment, education defects were obtained and the training program was developed, and the mother had been capable in these areas. Prior to implementation of the empowerment program, a checklist of mother's participation in neonatal care was completed by the researcher through an observation. The empowerment program was performed over 2 hours (maximum) at the time determined by the mothers at neonate's bedside, where she felt comfortable [11]. The empowerment pro-

gram was implemented using educational booklets that contained introduction to neonate's abilities, psychological and physiological needs of neonates, neonatal care, feeding, communication and attachment between the mother and neonates, and cleaning the neonates. These booklets were prepared by the researcher after reviewing similar studies, and used pictures, simple language, and an attractive design. The qualitative content validity of booklets was confirmed by 10 faculty members with pediatric nursing expertise. The booklets were provided to each mother based on their need priorities pre-determined in the pre-intervention phase by the questionnaire. The researcher explained the content of booklets to the mothers and answered their questions, and also gave them an opportunity to self-study and find further questions to be answered afterwards. After ensuring empowerment of mothers, a participation checklist was completed again by the researcher through observation after 2 to 4 days. Content validity was determined using both quantitative and qualitative methods. The questionnaires and checklist were made available to 10 faculty members with pediatric nursing expertise, and after implementation of their views, they were given to them again in order to determine the content validity index. The content validity index was 88% for the educational needs questionnaire and 86% for the checklist. To assess the reliability of the tools, consensus among observers was used and correlation coefficient of 95% was obtained. Data were collected analyzed with the SPSS-21 using descriptive (absolute and relative frequency) and analytical (Wilcoxon single-ranked test, Pearson's correlation coefficient, and Mann-Whitney) statistical tests at significance level of $P < 0.001$.

RESULTS

A total of 59 mothers entered the study. The mean age of the participants was 30.25 (7.53). Some other demographic characteristics of mothers and neonates are presented in Tables 1 and 2.

In the domain of care, mothers' most common educational

need was temperature control (74.6%) and their least common need was holding the neonate during breastfeeding (44.1%). In the domain of information, mothers' mostly needed information about neonatal illness (51%), and the least information about establishing contact with the ward nurse (49%). In the domain of bonding and attachment, the highest educational need of mothers was about massaging the neonate (22%) and the lowest was about making eye contact with the neonate (11%). Table 3 shows comparison mean scores of participation of mothers in the 3 domains of care, information and bonding, and attachment domains of the checklist.

Table 4 presents comparison mean scores of each item of the checklist before and after implementation of the empowerment program.

Table 1: Demographic Characteristic of Mothers (N = 59)

Variable	Number	Percent (100%)
Child order		
First child	28	47.5
Second child	24	40.7
Third child	5	8.5
Fourth child	2	3.4
Delivery method		
Normal vaginal delivery	15	25.4
Caesarean section	44	74.6
Education		
Under diploma	11	18.6
High school diploma	29	49.2
College education	19	32.2
Occupation		
Working	49	83.1
Housewife	10	16.9

Table 2: Demographic Characteristic of Neonates (N = 59)

Variable	(Mean(SD	Maximum	Minimum
(Gestational age (weeks	(2.82)34.59	40	28
(Birth weight (grams	(744.15)2236.37	4350	900
(Neonatal age (days	(3.22)6.22	18	2

Table 3: Comparison of Mean Scores in Care, Information and Bonding and Attachment Domains of Mothers based on Participation Checklist before and after the Empowerment Program

Domains	Mean ± SD	Mean ± SD	* P
	Before	After	
Care needs	(3.66)7.61	(1.31)12.38	0.00
Information needs	(0.99)1.47	(0.66)3.13	0.00
Bonding and attachment needs	(1.42)4.77	(0.59)5.70	0.00

* Wilcoxon Single-Ranked Test

Table 4: Comparison of Mean Score for each Item of Participation of Mothers in Three Domains of Care in the Checklist before and after the Empowerment Program

Variable	Before program *	After program *	P **
Care need			
She gives Milk to her infant or helps in feeding.	1.10(0.80)	1.89(0.30)	0.00
She keeps her infant well below the breast.	1.30(0.67)	1.90(0.50)	0.00
She knows her infant's defecation time.	0.98(0.91)	1.66(0.47)	0.00
She changes the baby's diaper.	1.45(0.72)	1.94(0.22)	0.00
She takes care of the umbilical cord according to the education	0.83(0.79)	1.62(0.48)	0.00
She changes the infant's position.	0.94(0.87)	1.64(0.48)	0.00
She can check the infant's temperature at the necessary time.	0.61(0.76)	1.54(0.50)	0.00
Information needs			
She has learned the information about the diagnosis of neonatal diseases from her medical team.	0.50(0.56)	1.45(0.50)	0.00
She talks to the nurse about the infant's needs.	0.88(0.64)	1.55(0.50)	0.00
Bonding and attachment			
She talks to her infant.	1.66(0.60)	1.96(0.18)	0.00
She has eye contact with her infant.	1.66(0.54)	1.94(0.22)	0.00
She slowly and gently massages her infant's arms.	1.60(0.78)	1.71(0.45)	0.00

* Mean (SD)

** Wilcoxon single-ranked test

In the care context, by using the Spearman Product Test, the correlation coefficient between continuous quantity variables of education (-0.19), filial degree (-0.13), and infant weight (-0.09) were obtained and there was a direct relationship between filial degree and infant weight and mother's participation in the care environment, and since the P value was < 0.05 a meaningful statistical difference was indicated. By using the Spearman Product Test, the correlation coefficient between continuous quantity variables of education (0.07), filial degree (-0.13), and infant weight (-0.30) with mother's participation in the information context were obtained so that there was a direct relationship between education, filial degree, and mother's participation, yet the difference was not meaningful. Moreover, the correlation coefficient amongst continuous quantity of education (0.12), filial degree (0.005), and infant weight (0.20) with mother's corporation in attachment and dependency context were obtained by using the Spearman test and there was no difference in any of the variables. Meanwhile, there was an inverted relationship between mother's corporation and the other 3 variables (P > 0.05).

DISCUSSION

The present study was conducted with the aim of assessing the effect of empowerment of mothers of neonates hospitalized at the NICU on their participation in neonatal care. The results confirmed that the empowerment program for mothers significantly increased their participation in neonatal care at the NICUs, which agrees with the results of other studies conducted on the effect of empowering mothers on their participation in neonatal care at the NICU [6, 11, 16, 17]. In a study conducted by Borimnejad et al., implementation of empowerment programs for mothers with preterm neonates led to improvement in mother-neonate interaction and neonatal weight gain [5]. In the present study, partici-

pation of mothers in the domain of bonding and attachment significantly increased following implementation of the empowerment program. Given the importance of onset of bonding and attachment process in neonatal development, especially separation from the mother due to hospitalization at the NICU, educational programs are essential to increase mother-neonate interaction skills. Encouragement of the mother to touch and make eye contact with the neonate and to perform kangaroo care and primary neonatal cares, such as feeding and changing diapers of the hospitalized neonate are recommended for the development of mother-neonate interaction and promotion of attachment and the dependence process [18, 19]. In a study conducted by Alaee Karahroudy et al., participation of the intervention group mothers in care of their preterm neonate significantly increased after implementation of the empowerment program and researchers explained that according to the theory of control, the difference between parents' expectations and what actually happen motivated them to take part in neonatal care, yet anxiety and uncertainty prevented such behaviors and led to parents' feeling separated from their neonate [11]. Planned intervention of parents' empowerment could help remove this barrier. In a study conducted by Karbandy et al., implementation of the empowerment program was considered effective in reducing the duration of hospitalization of preterm neonates. Like other studies, Karbandy et al. did not determine educational needs of mothers before the intervention. However, in terms of the method of implementation of the empowerment program, namely use of booklets, this study was similar to the present study [12]. Yet, other methods were used in similar studies, such as using an audio software. Considering the cost of other educational materials, providing booklets is more practicable given their effectiveness and cost-saving benefits. Other similar studies have been conducted on the effect of empowerment programs on participation of mothers in care

or other matters, such as readmission, parents' readiness for discharge, and reduced maternal anxiety and depression. The present study results support the results obtained by other studies regarding the effect of empowerment on several maternal-neonatal variables that lead to improvement in the quality of neonatal care and its outcomes [2, 6, 20]. The present study results showed that low birth weight of the neonate and first birth order reduces mother's participation. This may have been due to mother's greater stress about touching a low birth weight neonate and lack of previous experience in neonatal care. Mother's education and a greater number of children also increased her participation in the domain of information. Clearly, mothers with previous experience of childcare and education could be more successful in finding information sources about the neonatal condition, and will have greater participation in the information domain and communication with nurses. No significant relationship was found between maternal-neonatal characteristics and mother's participation after implementation of the empowerment programs in the domain of bonding and attachment. In Karbandy et al.'s study, no reference was made to the relationship between maternal-neonatal demographic characteristics and mother's attachment behaviors [12]. Bonding and attachment could be considered as emotional matters, with no need for psychomotor skills or information, and therefore cannot be affected by variables, such as education, the number of children, age, or neonatal weight. The present study limitations included use of a single-group design, which is relatively weaker than experimental designs. Ward's lack of readiness for receiving mothers and facilitating their comfort could have affected mothers' participation. Moreover, a greater diversity of samples in terms of demographic characteristics through a larger sample size for investigating the relationship between these variables and mother's participation is recommended.

CONCLUSIONS

Although the effect of education on behavior change could be taken for granted, studies have rather focused on the methods of empowerment, implementation, and evaluation of behavior change as well as long-term effects of empowerment of neonatal care and its outcomes. In the present study, the broad age range of neonates, their widely varied diagnosis and demographic differences in mothers (given that little significant differences were found between these variables and the effect of intervention) indicate that the empowerment program implemented in the present study could have been applied to mothers and neonates with different neonatal-maternal variables. Also, in the literature there was a broad range of empowerment programs using modern technology like audio-visual modalities for education of mothers; this study showed that simple and cost effective methods like booklets could be efficient in situations where the use of other methods are impossible for any reason. Education and empowerment of mothers have a key role in the participation of the mother in care, information, and bonding and attachment domains. The present study results support the family-oriented care approach in NICUs and could improve outcomes in neonates discharged from these wards. Further studies are recommended on the performance of empowered mothers in neonatal homecare.

ETHICAL CONSIDERATION

The present study was conducted after obtaining ethical permission (IR. SBMU. PHNM.1395.387) from the ethics committee of Shahid Beheshti University of Medical Sciences and registration in the clinical trials database (IRCT2016112631099N1).

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CONFLICT OF INTEREST

The participation of mothers has not led to their own losses

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AUTHOR CONTRIBUTIONS

Introduction and data collection and methodology by Manijeh Shokibifard and Discussion by Dr. Fatemeh Alaee done.

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