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The effect of a comprehensive support program on the stress level of mothers in a neonatal intensive care unit

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ABSTRACT

Background & Aim: Parents of neonates hospitalized in the neonatal intensive care unit may experience a high level of stress. Although many approaches were applied to reduce stress, little is known about the effect of a comprehensive support program. This study aims to investigate the effect of a comprehensive supportive program on maternal stress levels in a NICU.
Methods & Materials: This is a quasi-experimental study that lasted for about eleven months, 62 mothers whose premature neonates were hospitalized in a NICU in Edirne, Turkey, were selected and assigned into intervention and control groups non-randomly. A comprehensive support program was applied for the mothers in the intervention group, whereas the mothers in the control group received the standard routine care. Data were collected using the Parental Information Form, Newborn Information Form, and Parent Stress Scale in NICU and analyzed using SPSS software.
Results: The maternal stress level of the mothers in the intervention group (mean=2.95±.72) was found significantly lower than the control group (mean=3.74±.82) ($p\leq001$) in the post-test. Similarly, the average scores obtained by the mothers in the intervention group in the Parent Stress Scale's subcategories of images and sounds, neonates' appearance, and change in parental roles were also found to be significantly lower than that obtained by the mother's in the control group ($p\leq001$).
Conclusion: A comprehensive support program is significantly effective in reducing maternal stress levels. So, it is highly recommended that nurses use these comprehensive approaches in practice and especially support mothers by facilitating interaction between parents experiencing similar problems.

Introduction

Premature is defined as a delivery that takes place before 37 completed weeks of gestation or less than 259 days (1). Parents of premature neonates' experience disappointment in their dream of giving birth to a healthy baby (2-4). They usually experience extreme stress because of the technological and complicated appearance of the NICU setting, wherein the neonate is placed on a ventilator and has low body weight (5-7). Also, it has been reported that parents of neonates hospitalized in a NICU have difficulties in participating in the care of their neonates because they are unable to visit their baby at any time they wish and have difficulty in acquiring parental roles (6, 8, 9), while having needs of connection, support, and trust (4, 10). These difficulties experienced by parents can change their parental roles and finally lead to increasing their stress level (11, 12). High-stress level causes parents to have difficulty in coping with anxiety, depression, and sleep disorders (11, 13). These parents want to reduce the stress that they experience and try to develop various ways to manage it. In this regard, Heidari et al. (2017) showed that parents might use some strategies for stress management such as spirituality, searching for information, seeking hope, calming

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down, attachment to the baby, and trying to communicate with the team of healthcare professionals (14).

There are some studies that confirmed that nursing interventions in NICUs could significantly reduce parental stress levels (15-18). Such studies implemented planned interventions such as family support programs (15), providing information (16), emotional support (17), and kangaroo care (19). Gimenez et al. in 2015 assessed the effectiveness of an individualized intervention to reduce parental stress, anxiety, and depression in a neonatal intensive care unit, and they found that at least 4 weeks program was effective in reducing anxiety and depression compared to the standard care (20).

Bry and Wigert (2019) examined the stress coping mechanisms of parents of extremely premature babies in a qualitative study. It was revealed that empathic care provided by the health professional, peer support provided by other parents, feeling of trust in healthcare staff, and balancing time spent with the babies and other responsibilities were found to be the four most important factors in coping of parents with premature neonates in the NICU (21). In Turkey, Turan et al. (2008) did a study to evaluate the effect of nursing interventions on stressors of parents of premature infants in NICU. It has been determined that parents feel a high-stress level in NICU. They recommended that determining the sources of stress experienced by parents can help NICU nurses use appropriate interventions in cooperation to decrease the stress that parents experience (18).

However, to the best of our knowledge, previous studies have focused on a simple approach, and little is known about the effectiveness of a comprehensive support program. In this comprehensive program, we plan to consider educational and emotional support in groups and benefits from peer discussion (to share knowledge with mothers who has similar experiment). As human beings are multidimensional, and according to the World Health Organization (WHO), health can be influence by different dimensions, so a comprehensive program may seem more logical in planning for mothers in NICU (WHO, 2018). Also, as the context is important in improving psychosocial status, there is obviously value in extending these studies to evaluate and focus on combining different approaches in reducing parental stress in NICUs in the Turkish context. Furthermore, we plan to evaluate the effect of peer discussion, which may help the mothers to share their experiences with similar mothers in the society of Turkey. By doing this research, our knowledge about different approaches can be improved, and the result can help nurse practitioners to plan appropriately. As a result, it would be interesting to have further knowledge about combing different approaches. So, the purpose of this study is to investigate the effect of a comprehensive supportive program on maternal stress levels in a NICU.

Methods

Design

This study had a quasi-experimental design. In this study, mothers in the intervention group participated in a comprehensive support program, whereas the mothers in the control group received the standard routine care. There was a risk of interaction between mothers in groups. To control this, data collection of the control group was completed first. Then the intervention group was intervened, and the data were collected. Because of the nature of the study, randomization could not be performed while dividing the mothers into intervention or control groups.

Setting

This study was conducted in a NICU in Edirne, Turkey from May, 2018 to April, 2019. In standard routine care, all nursing needs of neonates fulfill by nurses. Parents are not allowed to participate in advanced nursing care and can come to the NICU to see their babies once a day (30 minutes). During these visits, parents are informed

about their babies' general condition. Accommodation for parents is not available in this hospital. There is no planned training or training material available. Mothers are trained and allowed to participate in primitive care while being monitored for their adaptation with their neonates.

Participants

The study participants comprised of mothers whose neonates were hospitalized in a NICU. An effect magnitude that was determined in a previous study was considered while calculating the sample size (18). In this study, where a calculation was made based on an alpha margin of error of 5% and a power of 80% with an effect magnitude of 0.8. It was then decided to increase by 20% due to possible losses. So, a total of 62 mothers were included in the study.

The inclusion criteria were the ability to speak Turkish, having a degree at least in elementary school, not having an existing health problem, having given birth at 24-37 weeks, and volunteering to participate. The exclusion criteria were multiparty, congenital anomalies, surgical operation for the neonate, having previous NICU experience of mother, and any changes in neonatal status.

Data collection tools

Data collection was performed by using the Parental Information Form, Newborn Information Form, and Parent Stress Scale in NICU (PSS).

The **"**Parental Information Form" includes questions concerning the demographic data of mothers.

"Newborn Information Form" includes nine questions concerning the neonates.

PSS was developed by Miles in 1993 to determine the perceived level of the stressors caused by the physical and psycho-social environment in the unit (22). The scale was adapted to Turkish culture by Turan et al. in 2008 (18). Turan et al. (2008) found the Cronbach's alpha value of the scale to be 0.90 (18). The scale comprised 29 items and 3 subcategories. The subcategory of neonates' appearance and behaviors contains 13 items, whereas the parental subcategory contains 10 items, and the one on images and sounds contains 6 items. A 5-level Likert type scale is employed.

Data collection

The mother filled out the Parental Information Forms and PSS, and the Newborn Information Form was filled out using the neonates' files. The control group's data were collected first because the program could potentially be reflected in clinical routines following the research. After data collection of the control group was completed, planned interventions were applied in the intervention group, and their data were collected. Figure 1. Shows The CONSORT 2010 Flow Diagram. All the programs lasted for about 6 months.

The comprehensive program included introducing the NICU environment, training about the neonates, allowing and encouraging sensual contact with the neonates, providing mothers with the educational booklet, ensuring mothers get acquainted and interact with parents with similar experiences, and group training.

Statistical analysis

Skewness and kurtosis were used to assess whether data were normally distributed. To test the homogeneity of the descriptive properties, Pearson's chi-square, Yates' correction chi-square, and Fisher's exact tests were used for categorical variables, whereas the t-test was used for numerical variables in independent groups. To compare the score averages of the PSS, the paired and independent t-test was used in comparing the dependent and independent groups. The significance level was considered at $p < .05$.

Ethical considerations

The ethics committee approved this study of Necmettin Erbakan University

(Decision No:2018/1268). The mothers participating in the study were informed about the research and its purpose, and their written informed consent was obtained.

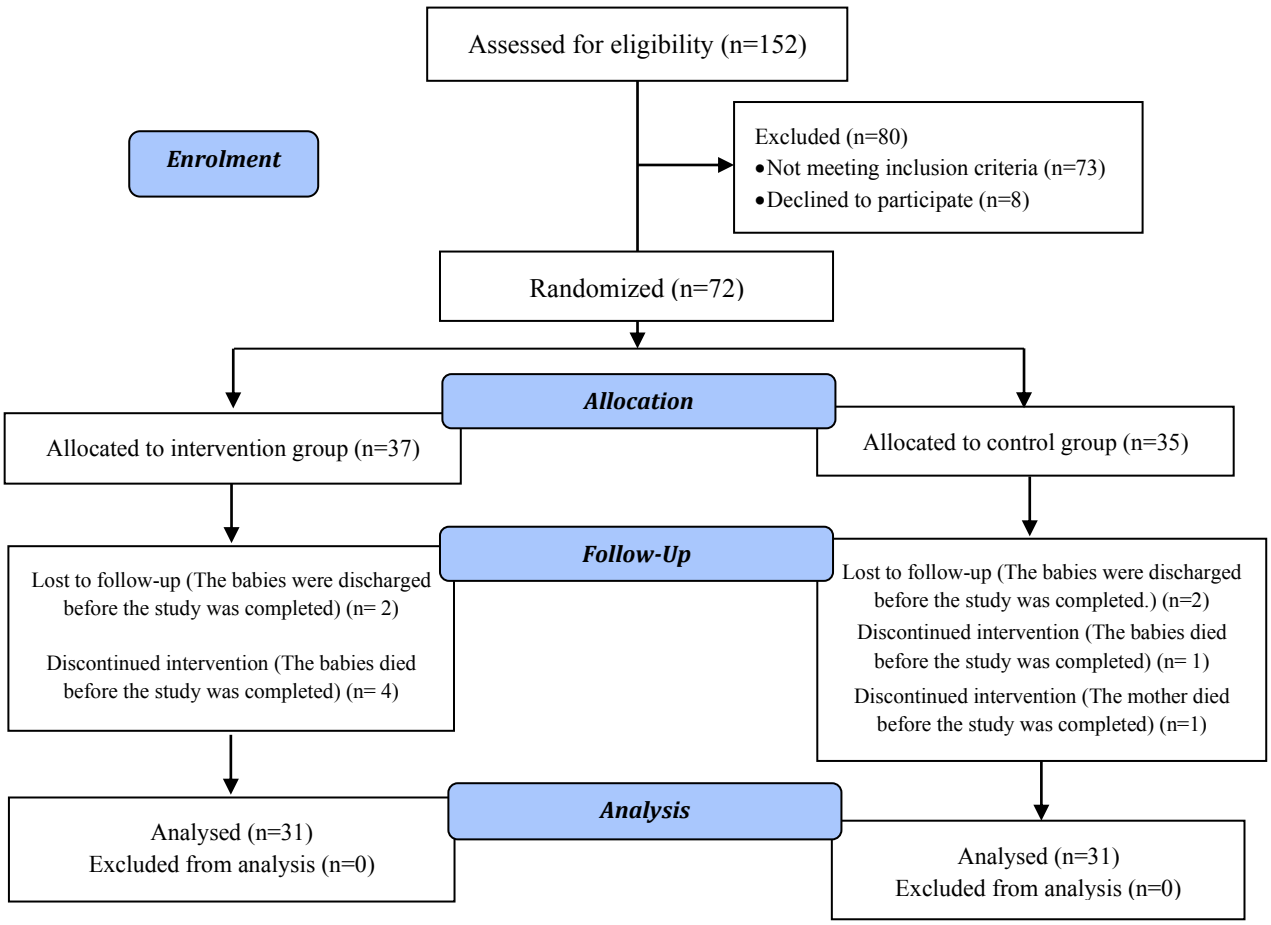

Figure 1. Consort flow diagram of the study

Results

Table 1 shows the descriptive characteristics of the mothers and neonates. There was no significant difference between the groups before the study ($p > .05$).

The total scores of the mothers in the PSS and their scores in the subcategories of the scale are shown as intergroup and intragroup comparisons in Table 2. There was no significant difference between the groups in terms of their total score averages before the study ($p > .05$, Table 2).

The total score averages in the PSS were found to be significantly lower in the intervention group than in the control group after the study ($p \leq 001$) (Table 2). The average score obtained by the mothers in the intervention group in the PSS's subcategory of images and sounds was found to be significantly lower than that obtained by the mothers in the control group ($p \leq 001$). In the PSS's second subcategory of neonates' appearance and behaviors, the average scores were significantly lower in the intervention group than in the control group after the study ($p \leq 001$). Similarly, for the average scores in the subcategory of change in parental roles, the mothers in the intervention group had significantly lower scores than those in the control group after the study ($p \leq 001$) (Table 2).

Table 1. The comparison of experiment and control groups according to the descriptive characteristics of infants and mothers

Descriptive characteristics	Control group (n= 31)		Intervention group (n= 31)		Test	
	N	%	N	%	χ^2	P
Age of mothers						
17-29 years old	16	51.6	18	58.1	.065	.80 Y
30-42 years old	15	48.4	13	41.9	(sd: 1)	
Education status of mothers						
Primary education	8	25.8	7	22.6	.349	.84
High school	16	51.6	15	48.4	(sd: 2)	
University	7	22.6	9	29.0		
Working status of mothers						
Working	9	29.0	8	25.8	.000	1.00 Y
Housewife	22	71.0	23	74.2	(sd: 1)	
Status of pregnancy						
Primipara	12	38.7	16	51.6	.586	.44Y
Multipara	19	61.3	15	48.4	(sd: 1)	
Did the mother face a stressful experience last year?						
Yes	2	6.5	2	6.5		1.00F
No	29	93.5	29	93.5		
Gender of infants						
Female	14	45.2	19	61.3	1.037	.31 Y
Male	17	54.8	12	38.7	(sd: 1)	
Gestational age of infants						
28-31 weeks	10	32.3	15	48.4	3.273	.20
32-35 weeks	13	41.9	13	41.9	(sd: 2)	
36-37 weeks	8	25.8	3	9.7		
Birth way of infants						
Normal spontaneous delivery	7	22.6	11	35.5	.705	.40 Y
Cesarean delivery	24	77.4	20	64.5	(sd: 1)	
Birth weight of infant						
Very low (<1500g)	8	25.8	17	54.8	5.430	.07
Low (1501-2500 g)	18	58.1	11	35.5	(sd: 2)	
Normal (≥ 2501 g)	5	16.1	3	9.7		
Does the infant receive ventilatory support?						
Yes	11	35.5	10	32.3	.000	1.00 Y
No	20	64.5	21	67.7	(sd: 1)	
Nutrition way of infants						
Enteral/mix nutrition	16	51.6	21	67.7	1.072	.30 Y
Parenteral	15	48.4	10	32.3	(sd: 1)	

χ2: Pearson Chi-Squared analysis
Y: Chi-Squared Test with Yates Continuity Correction
F: Fisher' exact test as the expected number is <5

Table 2. Parental stressor scale of the mothers in control and experiment groups: The comparison of NICU mean score

Parental Stressor Scale: NICU	Groups	Pre-test (Before the Intervention) $\overline{x}$ ±SS	Post-test (After the Intervention) $\overline{x}$ ±SS	t*	P
Parental Stressor Scale: NICU Total Score	Control (n: 31)	4.00±.56	3.74±.82	2.703	.01
	Intervention (n:31)	3.85±.78	2.95±.72	6.465	.00
	*t***	*.874*	*4.066*		
	P	*.39*	.00		

Images and Sounds	Control (n: 31)	3.67±.87	3.48±1.03	1.319	.197
	Intervention (n:31)	3.42±1.16	2.20±.92	5.081	.00
	*t***	*.949*	*5.156*		
	P	*.35*	.00		
Infant' Appearance and Behavior	Control (n: 31)	3.78±.69	3.57±.88	1.814	.08
	Intervention (n:31)	3.81±.71	3.05±.73	5.711	.00
	*t***	*.171*	*2.569*		
	P	.87	.01		
Changes in Parenting Role	Control (n: 31)	4.51±.51	4.15±.86	3.042	.005
	Intervention (n:31)	4.16±.85	3.19±.83	6.277	.00
	*t***	*1.972*	*4.441*		
	P	*.054*	.00		

*paired t-test
** independent t-test

Discussion

In general, many studies have revealed that mothers of premature babies hospitalized in NICU experience significant stress levels (5, 8, 13, 23-26). Reducing mothers' stress in the neonatal unit is an important component of family-centered nursing care (2, 6, 25). The purpose of the study was to investigate the effect of a comprehensive supportive program on maternal stress levels in a NICU. There was no significant difference between the mothers in the control group and those in the intervention group before the study. This condition is important and desirable for investigating the impact of nursing interventions on maternal stress levels (27).

The total scores and the scores in the three subcategories of the PSS based on the final testing showed that the mothers in the intervention group had significantly lower scores than those in the control group. The intragroup changes in stress levels revealed that the total scores were significantly reduced in both groups and that the mothers' stress levels in both groups decreased. However, the effect magnitude of the change in the maternal stress levels in the intervention group was significantly higher than that in the control group. Moreover, there was a significant reduction in the scores of the mothers in the intervention group in all three subcategories of the PSS, and the change had an extensive effect magnitude.

However, in the scores of the mothers in the control group, there was a significant decrease only in the subcategory of changes in parental roles, but the effect magnitude of this change was also determined to be low. These findings support our hypothesis. These results conclude that a comprehensive support program was significantly effective in reducing mothers' stress levels with premature neonates. The comprehensive approach in this study supports the result of Bry et al., who confirmed that stress-coping mechanisms of parents of extremely premature babies are important (21). Similarly, other studies that involve nursing interventions other than standard care practices showed that the stress level of the intervention group significantly decreased (16-18, 28).

In the study by Turan et al. (2008), there were significant reductions in the total scores and the scores in the subcategory of images and sounds and the subcategory of change in the stressor, but there was no difference in the subcategory of neonate's appearance and behaviors in the control group (18). However, the present study reports a decrease in all subcategories of the PSS. In this regard, studies have shown that neonate appearance and behaviors are a source of high stress for mothers (6, 8, 14, 24, 25, 29).

In the present study, it was observed that the one-to-one training offered to mothers concerning neonate appearance and behaviors as well as the booklet containing relevant images, decreased maternal stress regarding this issue. Matricardi et al. (2013) reported that there was a significant reduction in the stress scores of the mother

whose babies were monitored and massaged in addition to the standard care already offered and revealed significant reduction particularly in the subcategory of neonate's appearance and behaviors and the subcategory of change in parental roles (28). The study by Matricardi et al. (2013) did not include any intervention concerning the NICU environment and reported that there is no decrease in the parental stress level in the subcategory of images and sounds (28).

However, in the present study, the NICU environment was introduced to the mothers, and the mothers were given the information booklet. This practice reduced the maternal stress level related to images and sounds in the NICU environment. Another finding of our study was about the important role of peer support in which mothers help each other's in this process to decrease the stress level. Our finding is similar to Laborie et al. (2020), who aimed to evaluate the effect of breastfeeding peer counseling for mothers in NICU (30). These findings support the idea that collaboration with peers and sharing experiences can help mothers to address their shared challenges.

Limitation and strength of the study

The fact that this study was conducted in a single NICU and with a relatively limited sample can be considered as a limitation. Notwithstanding its limitation, this study provided the opportunity of peer support for mothers with similar situations as a new strategy in providing nursing care in the NICU.

Conclusion

The result of the present study showed that a comprehensive support program was significantly effective in reducing maternal stress levels. So, it is recommended that nursing managers encourage nurses to consider these interventions to be included in the care plans to improve nursing care in the NICU.

In addition, nurses should prioritize providing and facilitating mother-neonate connection and interaction between parents experiencing similar problems. Finally, educational sessions for parents in the group whose neonates suffer from similar problems is a good strategy and recommended. Further research can focus on the effect of group training on the stress level of mothers. Qualitative research would be one possible direction for future research.

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