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The effect of family-centered education on posttraumatic stress symptoms in mothers of premature infants hospitalized in the NICU

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Abstract:

BACKGROUND: Premature infant hospitalization in the neonatal intensive care unit (NICU) is considered a traumatic event for mothers. It is critical to provide instructions and support to couples to help them emotionally adapt and reduce posttraumatic stress. The aim of the present study was to determine the effect of family-centered education on posttraumatic stress in mothers of premature infants hospitalized in the NICU.

MATERIALS AND METHODS: The present study was a quasiexperimental study. The parents of 80 premature infants admitted to the NICU ward of a hospital in southeastern of Iran in 2020 were divided into two groups of 40 intervention and control. The intervention group received five sessions of family-centered program on daily basis with an average of 60 minutes per session; sessions were held in the presence of both couples and for each couple separately. The control group received only training and usual care. Six weeks after intervention, information was collected using the posttraumatic stress disorder checklist. Data were analyzed using the paired *t*-test, independent *t*-test, Chi-square test, and covariance analysis.

RESULTS: The intervention and control groups' mean posttraumatic stress scores before family-centered care were 49.65 ± 8.73 and 55.45 ± 10.39 , respectively. Six weeks after the intervention the score decreased significantly to 32.75 ± 6.05 and 44.82 ± 6.53 . Also, the mean score changes in the intervention group (-16.90 ± 7.69) were significantly higher than those in the control group (-10.63 ± 6.12).

CONCLUSIONS: Family-centered education has a positive effect on reducing the severity of posttraumatic stress in mothers of premature infants admitted to NICU.

Keywords:

Education, family-centered care, NICU, parents, posttraumatic stress, premature infant

Introduction

The birth of an infant is a pleasant event, but encountering a premature infant and subsequently being hospitalized in the neonatal intensive care unit (NICU) creates a severe psychological crisis for parents.^[1,2] Parents frequently suffer a lot of psychological distress during the hospitalization of the infant in NICUs. Multiple invasive treatments and the

environment of the unit in terms of light, sound and unfamiliar equipment, pipes and devices connected to the infant, lack of involvement and participation in care, and lack of knowledge about parental role and interact with their premature infant are considered of the most important stressors for parents.^[3-5]

Although premature birth and caring for a sick infant are highly stressful experience for

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the whole family, mothers are more at risk for mental disorders, including depression and posttraumatic stress disorder (PTSD), compared to other members of the family.^[6,7] Excessive stress and life-threatening situations can cause PTSD.^[8] PTSD occurs following a stressful event, one of which is premature birth.^[9] Factors influencing the occurrence of postpartum stress disorder include the history of hospitalization of an infant in the NICU, the stress of caring for the infant,^[10] and performing painful procedures on the infants, the feeling of lack of control, and the presence of emotional distress.^[11]

Family-centered care is an innovative approach to planning, implementing, and evaluating health care that is founded upon mutual and beneficial collaborations among patients, families, and health care providers. Family-centered care shifts parents from inactivity to being actively involved in caring for their infants.^[12] The main components of family-centered care consist of respect, receiving information, participating in care, and collaboration.^[13] Reducing stress, ensuring the sufficiency of care before discharge, and providing comfort and support for the patient are some of the benefits of family-centered care.^[2] If the needs of the family are met, they are better prepared to provide post-discharge care.^[14]

One of the principles that are not taken seriously in the implementation of family-centered care in the NICU is the participation of fathers in infant care and training to support of mothers.^[15] Therefore, paying attention to the role of fathers and their ability to be heavily involved in caring for the infant with the purpose of assisting the mother in emotional adjustment during hospitalization and her psychological health in the postpartum period as well as reducing stress and increasing their sense of autonomy would be of significant value. This study aimed to determine the effect of family-centered education on posttraumatic stress in mothers of premature infants hospitalized in the NICU.

Materials and Methods

Study design and setting

The present study is a quasi-experimental study with a pretest–posttest design that was performed on 80 parents of premature infants admitted to the NICU in a hospital in southeastern Iran in 2020.

Study participants and sampling

The inclusion criteria for infants and parents were gestational age between 30 and 37 weeks, a singleton infant, no congenital malformations, having a minimum literacy for parents, the presence of both parents, no history of severe physical or psychological illness or

addiction and abuse of psychiatric drugs, no history of premature infant care, no stressful experience during the past year. Furthermore, exclusion criteria of the research include death of the infant in the NICU, discharge of the infant in less than one week, non-participation of parents in training and counseling sessions.

The sample size based on the mean and standard deviation of posttraumatic stress score in the study of Beheshtipour *et al.*^[4] and with 95% confidence interval and test power of 95 was determined about 40 for each group (80 in total).

The research units were selected using convenience sampling and then randomly divided into two groups of intervention and control. The sample was randomized using limited random allocation. After admitting the infant to the ward, the parents of both groups underwent a pretest by completing a questionnaire. If a sample was excluded from the study due to early discharge or infant death, another eligible individual was included in the study.

Data collection tool and technique

The data collection tool in this study is a questionnaire. The first part of the questionnaire was related personal information of mother and the infant. The second part was the 17-item questionnaire on PTSD.

The PTSD checklist is a 17-item self-report checklist of PTSD symptoms based closely on the DSM-IV criteria. It includes three dimensions of signs and symptoms of re-experiencing traumatic event (5 items), signs and symptoms of emotional numbness (7 items), and avoidance and signs and symptoms of intense arousal (5 items). Items are scored on a 5-point Likert scale (1 = not at all, 5 = very high), amassing to a total score ranging from 17 to 85. Lower scores indicate less perceived stress while higher scores indicate more perceived stress. The validity of this inventory in Iran and its applicability thereon was checked and confirmed by Goodarzi (2003), in which a Cronbach's alpha of equal to .93 was obtained. In order to provide an indicator for the validity of this scale, its correlation with the inventory of life events was determined. The aforementioned correlation coefficient was ($P = 0.0001$, $n = 117$, $r = 0.37$).^[16] In the present study, the reliability of this tool was determined to be 0.88 using Cronbach's alpha.

Intervention included five sessions of family-centered program on a daily basis with an average of 60 minutes in the form of preterm infant care, participation in infant care, facilitating communication and mutual support of couples, and psychological training on the stress associated with the presence of parents of preterm infants in the NICU, based on the contents specified in

Table 1. The family-centered care was performed with the presence of parents and a researcher in the NICU ward, and alongside the infant, a phone number was provided to call and follow up of intervention during the study to provide additional information, respond to the questions, and alleviate the concerns of parents. Then six weeks after the intervention, the PCL questionnaire was completed again with prior coordination and visiting the parents' home. Parents were assigned to the control group, at the same time interval of the intervention group, posttest was performed on them. Data were collected and analyzed by SPSS 22. Paired *t*-test, independent *t*-test, Chi-square test, and covariance analysis were used.

Ethical consideration

This study was approved by the Ethics Committee of Zahedan University of Medical Sciences (IR.ZAUMS-REC.1398.394). Providing information on the research process and content of intervention, obtaining written informed consent, ensuring confidentiality of

Table 1: Structure and content of family-centered educational supportive intervention

Session	Educational content
1	Introduction, getting familiar with the neonatal intensive care units (NICUs) and equipment and its rules and regulations, appearance, problems of premature infants, sleeping and waking patterns, stress symptoms in premature infants and ways to alleviate them, washing hands, touching the infant and the role of parents in the care of premature infant.
2	Teaching the principles and correct methods of regular daily care for premature infants, bathing, maintaining proper body temperature and clothing, changing diapers, umbilical cord care and how to move the infant, the importance of embracing and performing kangaroo care [i.e., skin-to-skin contact] and the effect of simultaneous parental involvement in infant care and physical contact on physiological indicators and psychosocial nourishment of the infant.
3	Offering instructions on psychological issues regarding participation and the presence of the father and emphasizing the supportive role of the father and assisting couples in emotional adaptation and participation, encouraging couples to express thoughts and feelings related to the ward and the premature infant, instructing techniques of emotional disclosure and venting such as parents talking about trauma.
4	Training related to feeding and breastfeeding [preparation of mother, milking by hand and types of milking methods], training to start feeding with a syringe or dropper, how to collect and store breast milk, how to hug the infant and help to perform breastfeeding, teaching infant burp.
5	Familiarity of parents with the stress process and its consequences, the significance of stress reduction and muscle relaxation training, familiarity with psychological changes of mothers in the postpartum period, especially PTSD and ways to prevent and deal with it and the supportive role of the father, vaccination and effective communication with the infant

the information and the freedom to withdraw from the study at any stage were among ethical considerations observed in this study.

Results

The results of independent *t*-test showed that there was no significant difference between the groups in terms of mothers' age, gestational age of preterm infants, and duration of hospitalization of neonates. The socio-individual characteristics of the research units are summarized in Table 2.

Findings based on Table 3 showed that the mean of posttraumatic stress score of mothers before the family-centered educational supportive care in the intervention and control groups were, respectively, 49.65 ± 8.73 and 55.45 ± 10.39 and after six weeks of the intervention and discharge, they were significantly decreased to 32.75 ± 6.05 and 44.82 ± 6.53 .

Comparison between groups using independent *t*-test showed that the mean posttraumatic stress score of mothers both before discharge and six weeks after family-centered educational supportive intervention was a significant difference between the intervention and control groups. The results of analysis of covariance test showed that the mean posttraumatic stress score of mothers of preterm infants hospitalized, in two group six weeks after discharge is statistically significant difference [Table 4].

Discussion

The results of the present study clearly indicate that family-based intervention leads to a reduction in the severity of posttraumatic stress symptoms in mothers with preterm babies hospitalized in NICUs. Several studies have been performed on employing family-centered care approaches in NICUs and their effect on the psychological distress of parents of preterm babies, including the participation of parents in care to improve the physiological parameters of preterm infants, to reduce stress, and to increase parental satisfaction,^[17] the effect of interventions by parents on stress reduction,^[18] noted the effectiveness of family-centered care training program on anxiety and general health of mothers of premature infants.^[2] Nevertheless, owing to the fact that posttraumatic stress symptoms are often the last type of negative emotional identified in mothers of preterm infants in the postpartum period,^[19] few studies have been performed focusing on the effects of family-based intervention on posttraumatic stress symptoms.

Beck *et al.* argue that interventions focusing on counseling and psychological instructions are able to significantly alleviate the severity of posttraumatic

stress symptoms in mothers.^[20] In line with the results of the present study, Shaw, Joha *et al.* showed that mothers who received six training sessions of 45 to 55 minutes reported a significant reduction in the level of posttraumatic stress symptoms compared to mothers in the control group who had only one training session.^[21] On the other hand, the sole employment of any intervention on the parents of premature infants is not capable of reducing the severity of postpartum trauma stress (PTS) symptoms, as Shaw, Bernard *et al.* intervention with three sessions of individual treatment, each lasting 45 minutes, in two weeks, which began one week after birth, did not yield significant alleviation of the severity of PTS symptoms.^[22] Shaw, Sweet *et al.* also revealed that providing an educational booklet had near-zero effect on PTS symptoms.^[23] The ineffectiveness

of the two aforementioned studies in comparison with the results of the current study can be attributed to individual and text-based treatment instead of couple and family-centered treatment, as well as delayed administration instead of early intervention.

One of the possible reasons for the efficacy of the intervention in the current study can be attributed to its family-centered nature. Fathers are the most important source of support for mothers, in that the mothers have reported indulging in stress and pressure as being similar to drowning and suffocation in water, with husbands playing the role of lifeguards pulling their heads out of the water at the nick of time.^[20] Raiskila *et al.* examined fathers, mothers, and nurses in 11 NICUs in several European countries, the results of which reported the weakest aspects of family-centered care quality were emotional support, participation in decision-making, and the involvement of father in care for baby.^[15]

In the present study, intervention was started from the first day after the hospitalization. Early intervention and support for mothers are of paramount significance, during both hospitalization of the preterm baby and the transition to home care, as the greatest reduction in the severity of PTSD symptoms occurs when educational interventions are performed immediately after birth and in the first days of hospitalization in NICU.^[19] While in some studies, the intervention started after one week of hospitalization.^[22]

Creating a psychologically safe environment and friendly interaction (multi-natured conversation with doctor, nurse, father, mother, and the midwifery consultant (along with active participation of both husband and wife in training sessions may among the most significant factors in reducing stress and PTS symptoms in this study. Creating a family-friendly environment in which mothers feel comfortable and relaxed further helps alleviate stress-related challenges and eases mothers to their roles. Providing such an environment is possible by ensuring unlimited and 24-hour access to the baby, encouraging active participation in baby care along with verbal support for families and other supportive actions,^[24] as factors such as poor communication between parents and the healthcare staff and lack of social support from staff and the father are high-risk factors for PTSD.^[25] Hasanpour *et al.* study showed that

Table 2: Demographic characteristics of participants in the intervention and control group

Variable	Intervention n (%)	Control n (%)	P
Gender of the baby			
Female	21 (52.5)	24 (60)	P=0.49 ^a
Male	19 (47.5)	16 (40)	
Total	40 (100)	40 (100)	
Mother's occupation			
Employed	5 (12.5)	8 (20)	P=0.54 ^b
Housewife	35 (87.5)	32 (80)	
Total	40 (100)	40 (100)	
Mechanical ventilation			
Yes	33 (82.5)	30 (75)	P=0.41 ^a
No	7 (17.5)	10 (25)	
Total	40 (100)	40 (100)	
Type of delivery			
Vaginal delivery	16 (40)	11 (27)	P=0.23 ^a
Cesarean section	24 (60.6)	29 (72.5)	
Total	40 (100)	40 (100)	
Mother's education			
Lower than diploma	20 (50)	19 (47.5)	P=0.87 ^a
Diploma	9 (22.5)	11 (27.5)	
Diploma and higher	11 (27.5)	10 (25)	
Total	40 (100)	40 (100)	
Variable	Mean±SD	Mean±SD	P
Age of mothers [year]	28.32±5.96	30.97±6.21	P=0.06 ^c
Gestational age [week]	33.20±1.75	32.65±1.61	P=0.14
Hospitalization [day]	8.60±2.34	7.97±1.94	P=0.19
Weight [gram]	1967.87±521.17	1838.55±433.91	P=0.23
Age of fathers [year]	32.45±5.60	34.82±6.18	P=0.07

^aChi-square; ^bFisher's exact test; ^cIndependent t-test

Table 3: Posttraumatic stress scores of mothers of premature neonates in intervention and control group before and after the family-centered educational supportive intervention

Variable	Before Mean±SD	After Mean±SD	Changes Mean±SD	Paired t-test [Before-After]
Posttraumatic stress score				
Intervention	49.65±8.73	32.75±6.05	-16.90±7.69	0.001
Control	55.45±10.39	44.82±6.53	-10.62±6.12	0.001
Independent t-test	0.008	0.001	0.001	

Table 4: The results of covariance analysis on the score of posttraumatic stress in mothers of premature neonates after family-centered educational supportive intervention by adjusting the pretest effect

Source of change	SS	df	MS	f	Sig	Eta	Power
Pretest	1476.09	1	1476.09	70.02	0.001	0.47	1
Group	1631.78	1	1631.78	77.40	0.001	0.50	1
Error	1623.17	77	21.08				
Total	126373	80					

with better parent–staff communication, parent stress decreases and therewith likely promotes parent and infant health in the NICU.^[26]

Therefore, support and education to deal with the stress of hospitalization as well as practices that promote bonding between parents and neonates should be delivered to all parents.^[27]

The findings of the present study revealed that in mothers of the control group who did not receive family-centered intervention, the severity of posttraumatic stress symptoms was significantly reduced. It seems that the passage of time, discharge from the hospital, survival of the baby, and the consequent growth and nourishment of the baby in the postpartum period are possible causes of this reduction in the severity of stress symptoms.

Lack of a dedicated room with the necessary equipment for each baby, the large and extensive content of the intervention, and the difficulty of achieving 100% participation of fathers in education, and especially in practical care, for cultural reasons are among the limitations and challenges of this research that needs to be addressed in future studies.

Conclusion

The results of our study showed that educational supportive intervention with a family-centered approach and psychological education of couples simultaneously has a positive effect on reducing the severity of posttraumatic stress symptoms in mothers of premature infants hospitalized in the NICU. It seems that the education, participation, and empowerment of fathers along with mothers as the most important source of supportive from the perspective of women will help to reduce the stress of premature birth trauma and hospitalization in NICU and ensure their mental health.

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Conflicts of interest

There are no conflicts of interest.

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