

Effect of Family-centered Intervention in Neonatal Intensive Care Unit on Anxiety of Parents

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Abstract

Background

Birth of a premature infant and hospitalization in the neonatal intensive care unit (NICU) is a stressful phenomenon and lead to parents' anxiety. In such situation, fathers have important role to reduce mothers' anxiety. This study aimed to investigate the effect of family-centered intervention in the NICU on the anxiety of parents.

Materials and Methods

In this clinical trial, 60 parents of premature infants hospitalized in the NICU were assigned to two groups using randomization with the block size of 6. Before the intervention, the anxiety of the mothers was measured in both groups. The fathers in the control group received only the routine care of the ward, but those in the intervention group were educated about mother supporting and newborn care 3 times. Furthermore, the parents were given the opportunity to be with their infants for 3 days in order to exchange ideas in the non-visiting hours. One day after the intervention, the anxiety of the mothers was measured in both groups. Data was analyzed by SPSS software (version 11.0).

Results

Most of newborns in both group have delivered by caesarian section (71.4 vs. 64.3%). Investigating the difference between the mean total anxiety scores of parents in the two groups before and after the intervention showed a significant reduction in the anxiety score of the intervention group (97.37 to 75.70) ($P<0.000$), but no significant difference in the control group ($P<0.320$).

Conclusion

Results of this study demonstrated that family-centered care and paternal supports reduces the anxiety of the parents of premature infants.

Key Words: Anxiety, Family-centered care, Infants, Parents, Premature.

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1- INTRODUCTION

According to the WHO's report, nearly 15 million premature infants are born annually, which accounts for is one-tenth of the total newborns, and statistics of such infants varies between 5 and 18% in different countries (1). Stress, anxiety, and depression indicate a series of cognitive and behavioral states in dealing with stressful events in life (2). Bearing a premature infant is a special and specific experience (3), which causes a drastic mental crisis for parents (4, 5). In most cases, the hospitalization of premature infants after their birth is inevitable due to the need for intensive care, which leads to the separation of mothers and infants (6) followed by high levels of stress, anxiety, and depression in mothers (6-9).

Approximately 27% to 70% of the mothers of premature infants are afflicted with high levels of psychological-mental pressure (10). Various studies have shown that hospitalization of the infants who require intensive care in neonatal intensive care unit (NICU), including premature infants, sick infants, infants with low birth weight, infants with congenital abnormality, etc., can be stressful for parents (11, 12). Most of the studies have represented that the level of anxiety and depression among the parents of premature infants is higher than those of term infants (13, 14).

A systematic study (2007) on pre- and post-pregnancy stress during 1998-2003 showed that the presence of anxiety in mothers is a strong risk factor for disrupting their mental balance and disturbing the growth and development of the child and even the fetus (15). According to the WHO's recommendations, the interventions can help improve the results of such complications, so family-centered care is one of the recommended interventions (1). "Family-centered care" is defined as delivery of services that revolve around the incorporation of the family in the

development and implementation of interventions (16). "Family-centered and patient care" is an approach for planning, discharging, and evaluating the health care, which provides the ground for mutual and useful cooperation of health care providers, patients, and families (17). Most of the studies have increasingly emphasized one family-centered care as an essential and crucial element in NICUs (18, 19); therefore, family-centered care and family protection can be of special importance for identifying the concerns and stresses related to parental roles (20), and development and fulfillment of such interventions in NICUs should be prioritized (21). Since a part of the infant's natural evolution depends on the mother-infant emotional interactions resulting in a physiological and mental bond, such a bond can be facilitated and reinforced by the emotional support of the family and kind father (22). Since the parental empowerment program has positive effects on their mental health, most of the studies have recommended further contribution of fathers for improving the mental health of parents (10).

Furthermore, if nurses have a good understanding of the fathers' experiences and feelings, they as the members of the health care team will be able to support the fathers by promoting the family-centered care in critical cases (23). Studies have shown that immediately after the delivery, the Iranian fathers must take the responsibility of providing physical and emotional support for the mothers and infants. The fathers' role includes making decisions on the hospitalized infant, communicating with the worried family and friends, taking care of other kids, supporting the mothers, and, in many cases, returning to work within a few days after the infant birth (24). Since technical aspects of the child care in NICUs can take the nurses' time, the fathers' needs are ignored (25), while in such cases, they

need support and require some guidelines (26). Therefore, regarding the fathers' need for more support, encouraging and facilitating the parents' mutual support for each other, as well as neglecting the fathers' needs, the nurses, due to their critical position in the NICU, can provide the necessary conditions for facilitating the family-centered care and the appropriate position and role for the fathers to support their families. Thus, the present study was aimed to investigate the effect of family-centered intervention in NICUs on the mothers' anxiety.

2- MATERIALS AND METHODS

2-1. Study design and population

The present study is an interventional clinical trial conducted in 29 Bahman Hospital, Tabriz city, East Azarbaijan province, Iran in 2016. By regarding the data derived from Shahkolahi's paper and with the confidence of 95% and test power of 90%, 23 individuals were estimated as the sample size in each group.

However, considering the sample loss probability, 30 persons were selected in each group and overall 60 fathers with premature infants hospitalized in the NICU had the inclusion criteria were selected as the research population. This samples were assigned to the two control and intervention groups using randomization method.

2-2. Methods

At the second day after the premature infant's admission in the NICU, the assistant researcher visited the parents and explained the research objectives. After obtaining the fathers' consent in both intervention and control groups and completing the demographic characteristics of the parents and infants, Spielberger State-Trait Anxiety Inventory (STAI) was filled by the parents (27, 28). The questionnaire was given to each of the

parents separately (mothers in the mothers' rest room and fathers in the conference room). One day after the supportive stage, the anxiety of the participating parents in both groups was evaluated by re-filling Spielberger STAI in the presence of the researcher.

2-3. Measuring tools: validity and reliability

Data collection tools in this study included demographic characteristics questionnaire (personal information of infants and parents), and Spielberger STAI (27). This questionnaire includes 40 statements (20 trait and 20 state anxiety terms) adjusted as positive and negative, and each question contains 4 choices, each of which is scaled as very low, low, medium, and high.

A score of 1-4 is assigned based on the response, so that the score of 4 indicates a high level of anxiety. The scores in this instrument range between 40 and 160 and the scores of each domain of the state and trait anxiety range between 20 and 80 (27-29). The STAI has demonstrated good reliability, concurrent validity, and construct validity. In the current study, Cronbach's alpha was 0.79 and 0.94 in the "character" and "position" sections, furthermore, the split-half method was used to calculate the reliability (30).

2-4. Intervention

Two 60-minute face to face sessions in the hospital conference room will be held for parents of premature infants and they participated in NICU visit (**Table.1**).

2-5. Ethical consideration

After obtaining approval of Ethical Committee of the university (code IR.TBZMED.1395.99) and Iranian Clinical Trial Database registration (No. IRCT2015080613691N4), study was started.

Table-1: Educational materials in Intervention group

Session	Educational materials	Time
First Session	NICU properties Features of the neonatal Ward The objectives of neonatal hospitalization Provisions of ward Staffs and familiarity with their duties Equipment, such as incubators, ventilation, heater, suction and serum therapy devices FAQ, and visit the ward	60 min
Second Session	Premature infants appearance and behavior The father's role in the protection and care of mother and infant Physical and emotional changes in the postnatal mothers Nursing care of serum therapy, suctioning, oxygen therapy, sampling and phototherapy Review previous topics	60 min

2-6. Inclusion and exclusion criteria

The inclusion criteria for the infants included passing two days since their admission, 34-37 weeks of pregnancy, above 7-min Apgar score of 5, lack of major congenital malformations, and being primigravida. Furthermore, the inclusion criteria for the parents included signing the informed consent, lack of diagnosed psychological and mental problems, minimum elementary literacy, and living with the spouse. In the case of occurrence of any burdensome incidence during the intervention (infant death), absence, or father's unwillingness to participate in the study, the sample was excluded from the study.

2-7. Data Analyses

In this research, the samples were described using descriptive statistical methods, including frequency distribution tables, mean, and standard deviation (SD). Furthermore, in order to investigate the homogeneity of the two groups in terms of qualitative variables, to compare the two groups in terms of the mean of variables before and after the intervention, and to compare each group before and after the intervention, Chi-square test (or Fisher's exact test), independent-t test, and paired-t test were used, respectively. In all the analyses, $P < 0.05$ was considered statistically significant. Fisher's exact

test is more accurate than the Chi-squared test when the expected numbers are small. After the data collection, the obtained data was analyzed in SPSS version 11.0 software.

3- RESULTS

The mean age of the mothers in the intervention and control groups was 26.43 ± 4.00 and 28.95 ± 4.64 years old, respectively ($P < 0.033$) and fathers age was 32.04 ± 4.84 and 32.04 ± 5.23 , respectively ($P = 0.306$) but no statistical significant difference was observed between the parents in terms of other demographic variables (**Tables 2, 3**).

There was no statistically significant difference between the two intervention and control groups in terms of independent-t test in trait anxiety ($P = 0.684$), state anxiety ($P = 0.950$), and total anxiety ($P = 0.796$) of the mothers before the study. After the intervention, there was no statistically significant difference between the two groups of mothers in terms of trait anxiety ($P = 0.055$); while state anxiety ($P = 0.000$), and total anxiety ($P = 0.000$) of the mothers had statistically significant difference. Trait, State and total anxiety of fathers before intervention were not statistically difference, but State and total anxiety after intervention showed statistical differences. On the other hand, the paired-t test in trait

anxiety ($P=0.007$), state anxiety ($P=0.000$), and total anxiety ($P=0.000$) of the mothers and fathers showed statistically significant difference in the intervention group before and after the study ($P<0.05$); while there was no statistically significant difference in the control group in terms of trait

anxiety ($P=1.000$), state anxiety ($P=0.211$), and total anxiety ($P=0.320$) of the mothers before and after the study (**Table. 4**). Also, there was not significant correlation between mostly demographic variables and general anxiety in two groups ($P>0.05$) (**Table.5**).

Table-2: The comparison of social and individual characteristics in studied mothers (intervention and control groups)

Variables		Intervention group (n=28)	Control group (n=28)	Statistical results
		Number (%)	Number (%)	
Type of delivery	Caesarean section	20 (71.4)	18 (64.3)	0.775 **
	Natural	8 (28.6)	10 (35.7)	
Pregnancy	Wanted	28 (100.0)	27 (94.4)	0.500*
	Unwanted	0 (0.0)	1 (3.6)	
Favorable infant sex	Yes	26 (92.9)	27 (94.4)	0.500*
	No	2 (7.1)	1 (3.6)	
Spousal consent	Satisfied	26 (92.9)	23 (82.1)	0.211*
	Dissatisfied	2 (7.1)	5 (17.9)	
Education level	Under high school diploma	13 (47.0)	10 (35.7)	0.313**
	High school diploma	9 (32.1)	6 (21.4)	
	Academic education	6 (21.4)	12 (42.9)	
Occupation	Housewife	26 (92.9)	23 (82.1)	0.211*
	Employed	2 (7.1)	5 (17.9)	

*Fisher's test, ** Chi-square test.

Table-3: The comparison of social and individual characteristics in studied fathers (intervention and control groups)

Variables		Intervention group (n=28)	Control group (n=28)	Statistical results
		Number (%)	Number (%)	
Income level	Income equal to expenses	8 (28.6)	3 (1.7)	0.76*
	Income more than expenses	1 (3.6)	0 (0.0)	
	Income less than expenses	19 (67.9)	21 (75.0)	
House	Rental	6 (21.4)	7 (25.0)	0.86**
	Paternal house	9 (32.1)	9 (32.1)	
Occupation	Self-employed	15 (53.6)	17 (60.7)	0.699*
	Employee	4 (14.3)	4 (14.3)	
	Worker	9 (32.1)	6 (21.4)	
	Unemployed	0 (0.0)	1 (3.6)	
Level of education	Under high school diploma	14 (50.0)	12 (42.9)	0.610*
	High school diploma	11 (39.3)	11 (39.3)	
	Academic education	3 (10.7)	5 (17.8)	
Favorable infant gender	Yes	25 (89.3)	25 (89.3)	0.665*
	No	3 (10.7)	3 (10.7)	

*Fisher's test, ** Chi-square test.

Table-4: Comparing the mean anxiety scores of mothers before and after intervention in the two intervention and control groups

Variables		Intervention group (n=28)	Control group (n=28)	P-value
		Mean \pm SD	Mean \pm SD	
Maternal trait anxiety	Before intervention	42.91 \pm 11.37	44.10 \pm 10.37	0.684
	After intervention	38.98 \pm 10.48	44.10 \pm 8.98	0.055
** P-value		0.007	1.000	
Maternal state anxiety	Before intervention	54.45 \pm 14.80	54.69 \pm 13.61	0.950
	After intervention	36.72 \pm 12.28	51.54 \pm 13.23	0.000
** P-value		0.000	0.211	
Total maternal anxiety	Before intervention	97.37 \pm 21.59	98.80 \pm 19.61	0.796
	After intervention	75.70 \pm 19.35	95.80 \pm 15.51	0.000
**P-value		0.000	0.320	
Paternal trait anxiety	Before intervention	40.43 \pm 6.80	41.82 \pm 6.80	0.447
	After intervention	38.35 \pm 7.69	41.42 \pm 8.24	0.155
**P-value		0.007	0.796	
Paternal state anxiety	Before intervention	46.39 \pm 9.05	46.50 \pm 10.26	0.967
	After intervention	38.46 \pm 8.37	44.12 \pm 9.24	0.019
**P-value		0.001	0.182	
Total paternal anxiety	Before intervention	86.82 \pm 13.89	88.32 \pm 13.92	0.688
	After intervention	76.82 \pm 14.78	85.57 \pm 15.17	0.033
**P-value		0.001	0.278	

* Paired-t test, ** Independent-t test.

Table-5: The correlation between demographic variables and total anxiety scores

Variables	Total Anxiety							
	Intervention group				Control group			
	Mother		Father		Mother		Father	
	r	P-value*	r	P-value*	r	P-value*	r	P-value*
Birth Age	-0.082	0.977	0.011	0.957	-0.066	0.737	0.100	0.612
Weight	0.292	0.132	-0.150	0.447	0.159	0.420	0.005	0.978
Mother Age	0.219	0.264	0.276	0.155	0.172	0.380	0.340	0.077
Father Age	-0.048	0.807	-0.022	0.912	0.240	0.218	0.398	0.036

* Pearson Correlation.

4- DISCUSSION

In NICU, the actual cooperation and sharing of decisions on the infant care with families have not been standardized yet, and factors such as over-involvement and frequent traumatic experience for the infants' parents might prevent such a cooperation (31). Due to the importance of family support for infants hospitalized in

NICUs, family-centered care is the main element of the relationship between the health staff and families; thus, this type of care should be taken into consideration and also prioritized by the staff (18). The present research, which was aimed to investigate the effect of family-centered intervention in the NICU on the mothers' anxiety, showed that the family-centered care was effective in reducing the anxiety

of the mothers of premature infants hospitalized in the NICU. In this study, before the "supportive-training intervention on fathers of premature infants", there was no statistically significant difference in terms of the mean anxiety score of the mothers in both intervention and control groups. However, after the intervention, the obtained results indicated a statistically significant difference between the two groups so that a considerable reduction in the mothers' anxiety was observed in the intervention compared to the control group.

Most of the studies have shown that the parents of premature infants hospitalized in NICUs experience mental disorders, especially anxiety and stress (32), and although the parents need the health staff's support in such a critical situation, in most countries, the care in NICUs is mostly limited to the infants, and the parental role, especially fathers, is neglected (33). Findings of several studies have demonstrated that the interventions, including supportive programs (training-emotional) for the parents of premature infants, have reduced their anxiety (34-36).

By performing the individual need-based supportive intervention for the parents with the infants hospitalized in the NICU. Cano and Sánchez-Luna. (2015), showed that anxiety and depression were reduced among the parents in the intervention group compared to the parents in the control group who had received only the routine care of the department (2).

Carvalho et al. (2009), in the study entitled 'Stress and anxiety among mothers of premature infants and mental interventions during hospitalization in the NICU', showed that anxiety was significantly reduced among the mothers who had received mental-supportive interventions compared to the control group, indicating a statistically significant difference (37). Similarity of the results of these studies with those of the present study might be

related to the family-centered care of the premature infants' parents, which had a positive effect on the reduction of maternal anxiety. In a study entitled "Maternal mental anxiety in the first two years after birth in extreme premature infant and early intervention", Meijssen et al. (2011), showed that the reduction of the mean anxiety score after 6 months, had no statistically significant difference in both intervention and control groups. Inconsistency of the results of this study with those of the present research might imply that early intervention is an effective factor in reducing the anxiety of the mothers with infants hospitalized in NICUs (38).

Shaw et al. (2013), showed that after the intervention, there was no statistically significant difference between the intervention and control groups in terms of the mean anxiety score (39). The results of this study are inconsistent with those of the present study, which might be due to the type of intervention and the material provided in this study in the training intervention stage for the fathers of the premature infants. Since, in the present study, in addition to the material commonly trained in most of the studies (including superficial characteristics of premature infants, environment, staff, and equipment of the NICU), some materials were provided in relation to the physical and mental changes in the mothers after the delivery as well as the paternal support for the mothers and infants. Moreover, since at the supportive stage, the fathers visited the mothers beside the infant's beds in non-visiting hours on 3 consecutive days in order to exchange thoughts, it might have affected reduced maternal anxiety in the intervention group.

Also, Yurdakal et al.'s findings (2009) on determining the symptoms of depression, anxiety, and mother-infant relationship in the NICU were inconsistent with those of the present study. According to the results

of this study, after the intervention, no significant difference was observed between the scores of anxiety and mother-infant attachment in both groups (33). Inconsistency of the result of the two studies might be related to the type of sampling method because, in this study, the mothers of the infants hospitalized in the NICU and mothers of the healthy infants were selected as the intervention and control groups, respectively. In the present study, before the training-supportive intervention among the fathers of premature infants, the mean state and trait anxiety scores of the mothers with premature infants showed no statistically significant difference in both groups. However, after the intervention, the level of state anxiety exhibited a statistically significant difference between the two groups, but no statistically significant difference was observed between the two groups in terms of trait anxiety level.

Studies conducted by Carvalho et al. (2009), and Jafari et al. (2014), have represented that, after the intervention, there is a statistically significant difference between the two groups in terms of state anxiety, while trait anxiety demonstrates no statistically significant difference between the two groups (10,37). Results of these studies are consistent with those of the present study because state anxiety emerges in the individual in a specific situation (40) and is specific for stressful situations, while trait anxiety is a kind of stress that an individual always encounters, implying the individual differences in responding to stressful situations with different levels of anxiety (41).

Tosi et al.'s (2011) study which was aimed to investigate the effects of attachment behaviors on anxiety and mother-infant attachment showed that, after the intervention, there was a statistically significant difference between the intervention and control groups in terms of trait and state anxiety (42), which is

inconsistent with the results of the present study. Such a change in the level of anxiety and its aspects might be resulted from the training during pregnancy because such training during pregnancy can affect the reduction of anxiety and promotion of physical and mental health of individuals (43). According to the control theory, between the current situation and predetermined aim provoked behavior of people. It reduce the distance (44); however, certain situations such as low self-esteem, environmental restrictions and anxiety can prevent this behavior is creative. When premature infant was born parents see a big difference about what happened (having a sick baby in hospital) and what was expected (taking care of a healthy term infants) (45).

Based on control theory, these differences provoke parents to participate in take care of her baby during her hospitalization. But barriers such as anxiety and uncertainty prevents the evolutionary behaviors. In family-based intervention programs according to content and the program and providing factual information and training to father can decrease anxiety, and increase confidence in the mother, as well as promoting ability level and the interaction of parents with children (46).

4-1. Limitations of the study

Since all the samples with the inclusion criteria were selected from among the patients referring to the hospitals affiliated to Social Security Organization, it is recommended to conduct a more comprehensive study on more social classes.

5- CONCLUSION

The family-centered interventions, training, and participation of fathers in the process of mother-infant care can have significant effects on the improvement of their support for mothers and infants. Also, increasing the paternal support will lead to

the reduced maternal stress, the beneficial results of which can reduce anxiety among mothers and improve the infants' growth. Therefore, regarding the results of the present research, the nurses and healthcare providers would better apply this strategy since the beginning of the infant's admission and, thereby, empower the fathers to provide support and care for mothers and infants.

6- CONFLICT OF INTEREST

The authors declare no conflict of interest in this study.

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8- REFERENCES

1. World Health Organization. Preterm birth. Geneva: World Health Organization; 2016 Available at: <http://www.who.int/mediacentre/factsheets/fs363/en/>. Accessed in 2016 Aug.20.
2. Cano Giménez E, Sánchez-Luna M. providing parents with individualized support in a neonatal intensive care unit reduced stress, anxiety and depression. *Acta Paediatr* 2015; 104: e300–e5. doi:10.1111/apa.12984.
3. Lindberg B, Öhrling K. Experiences of having a prematurely born infant from the perspective of mothers in northern Sweden. *International Journal of Circumpolar Health* 2008; 67 (5): 461-71.
4. Lee S-NC, Long A, Boore J. Taiwanese women's experiences of becoming a mother to a very-low-birth-weight preterm infant: a grounded theory study. *International Journal of Nursing Studies* 2009; 46(3): 326-36.
5. Jebrayili M. The stress resources from the view points of mothers of infants hospitalized in NICU. *Nursing Midwifery* 2009; 15(4): 35-41.
6. Nyström K, Axelsson K. Mothers' experience of being separated from their newborns. *Journal of Obstetric, Gynecologic, & Neonatal Nursing* 2003; 31(3): 275-82.
7. Huntsinger ET, Luecken LJ. Attachment relationships and health behavior: The mediational role of self-esteem. *Psychology and Health* 2004; 19(4): 515-26.
8. Bastani F, Ali Abadi T, Haghani H. The effectiveness of participatory care program in neonatal intensive care unit on state anxiety of mothers of preterm newborns. *Journal of Babol University of Medical Sciences* 2012; 14(3): 59-65.
9. LS Segre, R Chuffo-Siewert, RL Brock, MW O'Hara. Emotional distress in mothers of preterm hospitalized infants: a feasibility trial of nurse-delivered treatment. *Journal of Perinatology* 2013; 33(12): 924–28.
10. Jafari Mianaei S, Alae Karahroudy F, Rassouli M, Zagheri Tafreshi M. The effect of Creating Opportunities for Parent Empowerment program on maternal stress, anxiety, and participation in NICU wards in Iran. *Iran J Nurs Midwifery Res* 2014; 19(1): 94–100.
11. Carter JD, Mulder RT, Bartram AF, Darlow BA. Infants in a neonatal intensive care unit: Parental response. *Arch Dis Child Fetal Neonatal Ed* 2003; 90:F109-13.
12. Schen CR. When mothers leave their children behind. *Harvard Review of Psychiatry* 2005; 13(4): 233-43.
13. Feeley N, Gottlieb L, Zekowitz P. Mothers and fathers of very low-birth weight infants: similarities and differences in the first year after birth. *Journal of Obstetric,*

Gynecologic, and Neonatal Nursing 2007; 36(6): 558-67.

14. Pace CC, Spittle AJ, Molesworth Ch, Lee KJ, Northam EA, Cheong JL, et al. Evolution of depression and anxiety symptoms in parents of very preterm infants during the newborn period. *JAMA Pediatr* 2016; 170(9): 863-70. doi:10.1001/jamapediatrics.2016.0810.

15. Correia LL, Linhares MBM. Maternal anxiety in the pre-and postnatal period: a literature review. *Revista Latino-Americana De Enfermagem* 2007; 15(4): 677-83.

16. Kenner C, Press J, Ryan D. Recommendations for palliative and bereavement care in the NICU: a family-centered integrative approach. *Journal of Perinatology* 2015; 35: S19-S23. doi:10.1038/jp.2015.145

17. Cheryl A, Priscila C. Implications of preterm birth for maternal mental health and infant development. *MCN in Advance* 2017; 42(2): 108-114.

18. Gooding JS, Cooper LG, Blaine AI, Franck L S, Howse JL, Berns SD. Family support and family-centered care in the neonatal intensive care unit: origins, advances, impact. *Seminars in Perinatology* 2011; 35(1): 20-8.

19. Ahn Y-M, Kim N-H. Parental perception of neonates, parental stress and education for NICU parents. *Asian Nursing Research* 2007; 1(3):199-210.

20. Dudek-Shriber L. Parent stress in the neonatal intensive care unit and the influence of parent and infant characteristics. *American Journal of Occupational Therapy* 2004; 58 (5): 509-20.

21. Welch MG, Myers MM. Advances in family-based interventions in the neonatal ICU. *Current Opinion in Pediatrics* 2016; 28(2):163-69. doi: 10.1097/MOP.0000000000000322.

22. Kliegman RM. *Nelson Textbook of Pediatrics*. 20th ed. United States: Saunders; 2016.

23. Zamanzadeh V, Valizadeh L, Rahiminia E, Ranjbar Kochaksaraie F. Reactions in Fathers of Preterm Infants

Hospitalized in Neonatal Intensive Care Unit. *J Caring Sci*. 2013; 2(1): 83-8. doi: 10.5681/jcs.2013.010

24. Mackley AB, Locke RG, Spear ML, Joseph R. Forgotten parent: NICU paternal emotional response. *Advances in Neonatal Care* 2010; 10(4): 200-3.

25. Lundqvist P, Jakobsson L. Swedish men's experiences of becoming fathers to their preterm infants. *Neonatal Network* 2007; 22(6): 25-31.

26. Nagorskiy, A. Engaging father in the NICU: taking down the barriers to the body. *The Journal of Perinatal & Neonatal Nursing* 2008; 22(4): 302-5.

27. Kvaal K, Ulstein I, Nordhus IH, Engedal K. The Spielberger State-Trait Anxiety Inventory (STAI): the state scale in detecting mental disorders in geriatric patients. *Int J Geriatr Psychiatry* 2005; 20(7): 629-34.

28. Gedney JJ, Glover TL, Fillingim RB. Sensory and affective pain discrimination after inhalation of essential oils. *Psychosom Med*. 2004; 66(4): 599-606.

29. Hur MH, Cheong N, Yun H, Lee M, Song Y. Effects of delivery nursing care using essential oil on delivery stress response, anxiety during labor, and postpartum status anxiety. *Taehan Kanho Hakhoe Chi*. 2005; 35(7): 1277-84.

30. Hoseini M. The effect of Benson relaxation education on anxiety status and digestive sign in IBS patients of Faghihi and Motahari hospitals in Shiraz university medical science. Master Thesis. Shiraz: Shiraz University Medical Science, Nursing and Midwifery Faculty. 2003:97-99. (Persian).

31. Harris GM. Family-Centered Rounds in the Neonatal Intensive Care Unit. *Nurs Womens Health* 2014; 18(1):18-27. doi: 10.1111/1751-486X.12090

32. Abdeyazdan Z, Shahkolahi Z, Mehrabi T, Hajiheidari M. A family support intervention to reduce stress among parents of preterm infants in neonatal intensive care unit Iran. *J Nurs Midwifery Res*. 2014; 19(4): 349-53.

33. Yurdakul Z, Akman I, Kuşçu MK, Karabekiroglu A, Yaylalı G, Demir F, et al.

Maternal psychological problems associated with neonatal intensive care. Admission.

34. Segre LS, Chuffo-Siewert R, Brock RL, O'Hara MW. Emotional distress in mothers of preterm hospitalized infants: a feasibility trial of nurse-delivered treatment. *Journal of Perinatology* 2013;33(12): 924–8.
35. Javanmarda GH, Mohammadi Garegozlob R. The effectiveness of relaxation training on anxiety of disordered children's mothers. *Procedia - Social and Behavioral Sciences* 2013; 84: 341–5. doi:10.1016/j.sbspro.2013.06.563
36. Vakilian K, Khatami Doost F, Khorsandi M. Effect of Kangaroo mother care on maternal attachment behavior before. *Hormozgan Medical Journal* 2007; 11(1): 57-63.
37. Carvalho AE, Linhares MB, Padovani FH, Martinez FE. Anxiety and depression in mothers of preterm infants and psychological intervention during hospitalization in neonatal ICU. *Span J Psychol* 2009; 12(1): 161-70.
38. Meijssen D JM, Koldewijn K, VanBaar A, Kok J. Maternal psychological distress in the first two years after very preterm birth and early intervention. *Early Child Dev Care* 2011; 181(1):1-11.
39. Shaw RJ, John NS, Lilo E A, Jo B, Benitz W, Stevenson DK, Horwitz SM. Prevention of traumatic stress in mothers with preterm infants: a randomized controlled trial. *Pediatrics* 2013; 132 (4): e886–e894. doi: 10.1542/peds.2013-1331.
40. Alyani Z. Examinatin of the relationship between commitments to pray with students of anxiety rate Tabriz International Journal of Pediatrics 2009; 2009: 1-7. doi:10.1155/2009/591359
- University. Master's Thesis. Tabriz: Tabriz University; 2009:58-60. (Persian)
41. Khodayarifard M, Gholami lavasani M, Akhbari Zardkhaneh S. Psychometric properties of farsi version of the spiel Berger's state –trait anxiety expression inventory. *Procedia Social and Behavioral Sciences* 2013; 82: 325-9.
42. Toosi M, Akbarzadeh M, Zare N, Sharif F. Effect of attachment training on anxiety and attachment behaviors of first-time mothers. *Hayat* 2012; 17(3): 69-79.
43. Scott JR, Gibbs RS, Karlan BY, Haney AF. *Danforth's Obstetrics and Gynecology*. 9th Ed. Philadelphia: Lippincott Williams and Wilkins; 2003.
44. Sandelands L, Glynn MA, Larson JR. Control theory and social behavior in work place. *Human Relation* 1991; 44 (10): 1107-30.
45. Franck LS, Cox S, Allen A, Winter I. Measuring neonatal intensive care unit-related parental stress. *Journal of Advanced Nursing* 2005; 49(6): 608–15. doi: 10.1111/j.1365-2648.2004.03336.x
46. Melnyk BM, Crean HF, Feinstein NF, Fairbanks E. COPE study coordinator maternal anxiety and depression following a premature infants' discharge from the NICU: An integrative model of the COPE program. *Nursing Research* 2007; 57(6): 383-94.