Evaluation of Maternal Anxiety in Mothers of Infants Admitted to the Neonatal Intensive Care Unit

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Abstract

Background: Preterm birth and subsequent admission of the infant to neonatal intensive care unit (NICU) can be distressing for parents and lead to their anxiety. The aim of this study was to evaluate maternal anxiety in mothers of infants admitted to the NICU and determine the characteristics associated with maternal anxiety.

Materials and Methods: This study is a descriptive, cross-sectional study with participation of 100 mothers with infant that was born premature and hospitalized in NICU (mothers were selected through convenient sampling method) of Al-Zahra hospital, affiliated to Tabriz University of Medical Sciences, Tabriz, Iran. Data collection tools included baseline characteristics (21 items), and Spielberger State-Trait Anxiety Inventory (STAI). Data were analyzed using SPSS software (version 23.0).

Results: The results of study showed that 62% (n=100) of mothers had moderate level of state anxiety and (54% (n=100) had moderate level of trait anxiety, mean (SD) state anxiety score was 48.62(6.00) and mean (SD) trait anxiety was 32.45(3.63. There was statistically significant difference regarding state anxiety mean scores and number of delivery, education level, gestational age at birth weeks and child order (P<0.05).

Conclusion: Based on the results, mother of premature infants had moderate level of state anxiety. Having university degree, the mothers whose premature infants were at 33 weeks gestational age and mothers who had third or more delivery number and their child order was third and over had experienced state anxiety.

Key Words: Anxiety, Infant, Mother, Neonatal Intensive Care Unit, Preterm.

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1- INTRODUCTION

Preterm birth is defined as childbirth occurring at less than 37 completed weeks or 259 days of gestation (1). Preterm birth is a worldwide epidemic with a global incidence of 15 million per year, nearly 1 in 10 babies is still born preterm (2). Keshavars et al., stated that the premature birth rate is 10% of live births in Iran (3). Regarding increased rates of preterm newborns as well as associated factors with high risk pregnancies, the number of infants who require admission to neonatal intensive care units (NICU) is growing (4, 5). Hospitalization of premature infant in NICU is inevitable most of the time (6). If newborn is sent to the NICU, the first question of parents probably will be "what is this place?" (7). NICU constitutes a therapeutic environment appropriate for treatment of the ill or premature newborn in a serious condition (8).

Preterm birth and subsequent admission of the infant to NICU can be highly distressing for parents (9). Parents who are not psychologically ready for a preterm delivery, go through high levels of anxiety (10). Anxiety is a universal phenomenon, often challenging and beneficial at the same time. It acts as a biological warning system against danger signs and prepares an individual to take appropriate action. Thus normal anxiety acts as a protective response towards certain risks. A low level of anxiety is beneficial, but high and chronic levels of anxiety result in impairment of physiological and psychological functions. The shift from normal state to anxiety disorders is characterized by distinct nervous system abnormalities (11). NICU mothers experience multiple stressors related to preterm birth, medical condition of the infant, the complexity of the NICU environment and perceived vulnerability of the infant (12) these can put mothers at risk of experiencing psychological distress, such as anxiety (13). Many parents are challenged by needing to balance daily activities with parenting an infant outside the home, needing to return to work sooner in order to save time to stay with the baby at NICU discharge, or having other children to care for at home, this can result in high levels of stress and anxiety in parents (14, 15). Anxiety symptoms are prevalent among mothers of infants hospitalized in the NICU. 27.7% of mothers of newborns in the NICU, reported significant state anxiety symptoms in the moderate to severe range (16). Screening mothers of newborns in the NICU for the presence of clinically significant emotional distress is critical to ensure that they receive adequate support and appropriate referrals for treatment. Indeed, a number of efficacious psychosocial interventions have been identified for use with mothers of newborns in the NICU (17).

The prevalence of anxiety symptoms in mothers of hospitalized infants and the attention of anxiety screening recommendations from the national prenatal association are the basis for the present study (18). However, emotional distress is often not identified, and even when it is detected, mothers are not always able to access support (19). The lack of attention to the mothers and their emotional and psychological concerns in the long term can affect their health and quality of life, loss of ability to make decisions and communicate with other family members. Also, it can lead to the physical, social, cognitive, emotional and behavioral disorders of infants (20-22). Previous studies have focused on identifying sources of maternal stress in the NICU (23-26). There were fewer studies on determining the anxiety levels of the mothers whose premature infants were admitted to the NICU. The purpose of this study was to determine the anxiety levels of the mothers whose premature infants were admitted to the NICU and to

determine the characteristics associated with maternal anxiety, by identifying them we can reduce maternal anxiety in NICU.

2- MATERIALS AND METHODS

2-1. Study design and population

This study is a descriptive, cross-sectional study. The study population consisted of the mothers with infant that was born premature and hospitalized in NICU. The study was conducted in Tabriz Al-Zahra teaching hospital affiliated to Tabriz University of Medical Sciences (Iran), during January to May 2016. The pilot study was conducted with 45 mothers who had inclusion criteria for entering the study. By considering the changes to be 25% in response to state anxiety, sample size was estimated 90 mothers with 95% confidence level (CI), and 0.9 power of the test. Considering the possible attrition rate, the sample size was increased to 100 mothers who were selected through convenient sampling method within a 5 month period.

2-2. Methods

Sampling started after receiving all the permission and approvals. Mothers with preterm newborns hospitalized in NICU (gestational age 30-36 weeks) were identified from the NICU and delivery ward by the first researcher. Researcher attended the mother's bedside and checked inclusion criteria. Mothers who met the inclusion criteria and had willingness to participate in the study completed the mother and babies baseline characteristics with the help of researcher (infant's characteristics were completed by using infant's medical file via researcher). After informing and explaining the study objectives, written informed consent was obtained. Mothers, usually one day after delivery, were stable in terms of physiological conditions and were ready to meet their baby. State-Trait Anxiety Inventory (STAI) was completed by mothers. When filling the questionnaire, the mother was alone in the room next to NICU.

2-3. Measuring tools: validity and reliability

Research tools included two questionnaires:

1. Baseline characteristics of mother and infant: for mother data included age, education level, job, number of delivery, type of delivery, number of births, planned or unplanned pregnancy, etc. (21 items). Infants data included the gestational age, gender, birth weight, Apgar score at first and five minutes, etc. (7 items).

2. Spielberger State-Trait Anxiety Inventory (STAI): the Spielberger STAI consists of two parts measuring the state and trait anxieties separately (27). Each section is comprised of 20 questions and each question has been scored 1 to 4. For the state items, respondents are asked to indicate "how you feel right now, that is, at this moment". Responses indicate intensity of feeling on a 1 to 4 scale, from "not at all" through "somewhat", "moderately so" to "very much so". For the trait items the question concerns "how you generally feel" and the response scale indicates frequency as "almost never", "sometimes", "often" and "almost always".

The total score for each individual will be between 20 and 80. Based on this questionnaire, participants were classified into three groups of mild (20-40 score), moderate (41-60), and severe (61-80) anxiety (27). Reliability (alpha= 0.97), and validity of Persian version of this questionnaire was adopted in 2007 (28). Mousavi et al., reported the alpha=0.89 for the reliability of state and trait anxiety questionnaire (29). In this study, the face and content validity of study tool was approved by 10 academic staff (nursing and psychiatrics) from Tabriz University of Medical Sciences. The reliability based on Cronbach's alpha coefficient in a

sample of 45 mothers for the whole scale was estimated 0.80.

2-4. Ethical consideration

Ethical considerations of this study included the participants' consent for participating in the study, respecting the principle of personal confidentiality and confidentiality of the data. For protecting participants' privacy, the researcher used codes for each mother. They were also guaranteed confidentiality and anonymity in the presentation of the data. The researcher, after obtaining the permission of ethics committee of Tabriz University of Medical Sciences (ID-code number: 93108), and receiving the letter of introduction from the relevant authorities, referred to Al- Zahra hospital affiliated to Tabriz University of Medical Sciences.

2-5. Inclusion and exclusion criteria

Inclusion criteria were the mother's willingness to participate in the study, mothers with newborns who were born premature and hospitalized in NICU (gestational age 30-36 weeks, without abnormality), mothers who did not have any experience of preterm infant hospitalization in NICU, having no anxiety disorders and mothers who have never seen NICU. Exclusion criteria were the mothers whose baby died in the first 24 hours after birth, the mothers who have severe obstetric complications leading to hospitalization in other hospitals after delivery and the mothers whose infant has been sent to another hospital.

2-6. Data Analyses

Statistical analysis was conducted by SPSS software (version 23.0) (SPSS Inc. IL, Chicago, USA). Normality of the numeric variables was checked by Kolmogorov-Smirnov test. Data were presented using mean (SD), for the Numeric normal and non-normal variables respectively and frequency (percentage) for categorical variables. The between group comparisons of baseline measures and demographic variables were conducted by the analysis of variance (ANCOVA), and followed by Tukey post hoc test. In all analyses, P values less than 0.05 were considered as significant.

3- RESULTS

This study with participation of 100 mothers whose infant was admitted to NICU. Mean (SD) age of the mothers participating in the study was 29.98(6.11). About seventy-eight subjects (79%) had cesarean delivery and 49.0% were primiparous. Most of them (44%, n=44) had less than diploma and 87% were housewife, 43% evaluated their monthly income as moderate. In addition, 29% had one child. Most of the newborns (57%, n=57) were males and their mean (SD) birth weight was 1851.67(573.42) grams. About 37% had over 34 weeks of gestational age at birth and 44.3% were in hospital only because of being premature, main cause of preterm delivery (33%) was premature rupture of membranes. About 92% had single born infants. About 98% claimed that they had a positive experience with current pregnancy (**Table.1**).

Table.2 shows that, 20% of the studied sample had severe level of state anxiety, 62% had moderate level of state anxiety and (18%, n=18) had minimal level of state anxiety. While 54% had moderate level of trait anxiety, 46% had minimal level of trait anxiety which shows that mean (SD) state anxiety score of the mothers was 48.62 (6.00). However, mean (SD) trait anxiety score of the mothers was 32.45(3.63). When the anxiety levels were examined according to the mother-infant socio demographic and trait anxiety mean scores, no statistically significant difference was found (P>0.05), and no statistically significant difference was found between state anxiety mean scores and mothers' ages, delivery method, employment status, perceived income,

infant gender and infant's birth weight (P>0.05); while there was statistically significant difference regarding state anxiety mean scores and number of delivery (P=0.011), education level (P=0.045), gestational age at birth weeks (P=0.027) and child order (P=0.002) (**Table.3**). The results showed that there was statistically significant difference between the education levels of the mothers and state anxiety mean scores (P=0.045). It was determined that mothers with university degree had higher state anxiety mean scores (50.47±1.76) compared to diploma (46.93±1.33), and less than diploma (51.68±1.80), this difference was significant (P=0.038). Furthermore, there was a statistically significant difference in levels of state anxiety mean scores among mothers related to gestational age (P=0.027). It was determined that the mothers who had 33 weeks of gestational age experienced higher state anxiety mean (SD) scores: 55.220 (2.262) compared to other mothers in study, this difference was significant (P=0.003). Also, the difference between the number of delivery and state anxiety mean scores of the mothers was statistically significant (P=0.011), and the results reflected that mothers who were experiencing their third and over delivery, had higher state anxiety mean scores (55.94±2.37) compared to primiparous mothers and this difference was significant (P=0.000). In addition, the difference between the child order and state anxiety mean scores of the mothers was statistically significant in the study (P=0.002), and the results indicate that third and over child order, resulted in higher state anxiety (mean scores: 41.28±2.41) compared to other participants and this difference was significant (P=0.001) (**Table.3**).

Table- 1: Baseline characteristics of the mother- infant in this study (n=100).

Characteristics		Number (%)
Type of delivery	Normal vaginal delivery (NVD)	21(21%)
	Cesarean section	79(79%)
Number of delivery	First	49(49%)
	Second	28(28%)
	Third and over	23(23%)
Education level	University education	17(17%)
	Diploma	39(39%)
	Less than diploma	44(44%)
Mother's Working status	Employee	13(13%)
	Housewife	87(87%)
Mother's age (years)	15-25 years	25 (25)
	26-30 years	29 (29)
	31 years and older	46 (46)
Perceived income status	Good	26 (26%)
	Moderate	43 (43%)
	Low	31 (31%)
Infant's gender	Female	43(43%)
	Male	57(57%)
Gestational age at birth (weeks)	≤30	33(33%)
	31-34	30(30%)
	>34	37(37%)

Table - 2: Mean of STAI in mothers (27).

Variables		Number (%)	Mean ± SD	95% Confidence Interval	
				Lower Bound	Upper Bound
State anxiety	Severe	20(17%)	48.62±6.00	34.00	24.00
	Moderate	62(39%)			
	Minimal	18(44%)			
Trait anxiety	Severe	0	32.45±3.63	65.00	42.00
	Moderate	54(54%)			
	Minimal	46(46%)			

STAI: State- Trait Anxiety Inventory; SD: Standard deviation.

Table-3: Factors related to the STAI of the mothers and association between socio-demographic characteristics of the mothers and state anxiety (n=100).

Variable (independent)	Variable (dependent)	Mean ±SD	P-value	Difference Variable	Mean± SD	P-value	95% CI	
							Lower Bound	Upper Bound
State anxiety	Number of delivery	48.66(2.56)	0.011	Third and over delivery	55.94(2.37)	0.000	51.221	60.660
	Education level	48.20(1.51)	0.045	University degree	50.47(1.76)	0.038	46.96	53.99
	Gestational age at birth (week)	49.26(1.91)	0.027	33 weeks of gestational age	55.22(2.26)	0.003	50.71	59.72
	Child order	49.22(2.53)	0.002	Third and over child order	41.28(2.41)	0.001	36.47	46.10
Trait anxiety	Number of delivery	30.49(1.61)	0.690	SD: Standard deviation. STAI: State- Trait Anxiety Inventory. CI: Confidence Interval.				
	Education level	31.54(1.17)	0.246					
	Gestational age at birth (week)	32.10(1.50)	0.264					
	Child order	33.35(1.58)	0.477					

4- DISCUSSION

Neonatal intensive care unit induces anxiety for mothers (30), and anxiety symptoms are prevalent among mothers of infants hospitalized in the NICU (31). This study aimed to determine the anxiety levels of the mothers whose premature infants were admitted to the NICU and to determine the characteristics associated with maternal anxiety. The results showed that the mothers of premature infants had state anxiety. Most (62%) mothers experienced moderate level of state anxiety; while 54% had moderate level of trait anxiety. The results of our study are consistent with other studies conducted which aimed to determine the anxiety levels of the mothers. In a study of Segre et al., results showed that 27.7% of mothers of newborns in the NICU, had significant state anxiety symptoms in the moderate to severe range (17.4% of mothers had moderate anxiety symptoms and 10.3% of mothers had severe anxiety

symptoms) (32). In a recent study of Holditch et al., 57% of mothers (27), and in Motasem Salah et al.'s study 50.8% the mothers of newborns in the NICU, had moderate to severe symptoms of anxiety (33). The results of our study are also in line with the findings of Padovani et al.'s study. They found that 44% of mothers showed emotional symptoms such as anxiety during their infant's admission to NICU (34), and Holditch-Davis et al., reported that about 50% of mothers of premature infants have elevated levels of anxiety symptoms during hospitalization in NICU (6). Swee Leong et al., reported that 85.5% of mothers had a high level of state-anxiety and 67.8% of mothers had a high level of trait-anxiety (35). When the anxiety levels were examined according to the mother- infant socio demographic and trait anxiety mean scores, no statistically significant difference was found (P>0.05).

The result of our study showed that, there was no statistically significant difference between state anxieties mean scores and maternal age, delivery method, employment status, perceived income, infant birth weight and gender. Motasem Salah et al.'s study found similar reports that results indicated insignificant differences in levels of anxiety related to age of mothers, mode of delivery, working status, and family income, gender of neonate and infant's weight (33). In addition, Yurdakul et al., reported that the majority of babies admitted to NICU were delivered by cesarean section, and that maternal age, working status, parity, and gender of the baby did not contribute to higher levels of maternal anxiety (36). Alkozei et al., reported that demographic factors and pregnancy related factors were not associated with increased levels of anxiety (37). Erdem found that maternal anxiety was significantly related to duration of hospitalization, and anxiety was higher if their infant was a boy, while gestational age, reasons for hospitalization

of the infant and birth weight did not affect maternal anxiety levels (38, 39). The results of our study indicated that there was statistically significant difference between the education levels of the mothers and state anxiety mean scores (P=0.045). It was determined that mothers with university degree had higher state anxiety compared to diploma or less (P=0.038). This finding is similar to the findings of Ionio et al. (8), and Welch et al. (12) who found that the majority of their samples had more than high school education. Yurdakul et al., and Motasem Salah et al., reported that the education level of mothers whose babies were admitted to NICU, did not contribute to higher levels of maternal anxiety (33, 36). In addition, our results indicated that the mothers with higher education levels were reported to be more worried about the medical conditions of their infants.

Although mothers have high education, they do not have enough information in the field of medicine and a higher anxiety level is expected as a result of the inadequate information had by mothers regarding the infant's care. Furthermore, there was a statistically significant difference in levels of state anxiety mean scores among mothers related to gestational age (P=0.027), it was determined that the mothers who had 33 weeks of gestational age experienced higher state anxiety compared to others (P=0.003). Erdem found that maternal anxiety was significantly related to gestational age and did not affect maternal anxiety levels (38). Motasem Salah et al.'s study results reflected that maternal anxiety was significantly related to gestational age (33) because premature infants are in hospital for a longer period, and they had not had a premature infant before, these can cause mothers anxiety. Also, our results indicated that the difference between the number of delivery and state anxiety mean scores of the

mothers was statistically significant in the study (P=0.011), and the results reflected that mothers who were on their third and over delivery, had higher state anxiety compared to primiparous mothers (P=0.000). Motasem Salah et al., reported that there were no significance differences in levels of anxiety related to number of deliveries. In addition, difference between the child order and state anxiety mean scores of the mothers was statistically significant in the study (P=0.002) (33). The results of our study indicate that third and over child order, caused higher state anxiety compared to other participants (P=0.001). Many parents are challenged by the need to balance daily activities with parenting an infant outside the home, needing to return to work sooner in order to save time to stay with the baby at NICU discharge, and/or having other children to care for at home, this can result in high levels of anxiety. The mothers' anxiety levels may be explained by the fact that they play the primary role in providing care for their infant and other children.

4-1. Study Limitations

Current study focused on mothers with infant who was born premature and hospitalized in NICU of Al-Zahra hospital affiliated to Tabriz University of Medical Sciences and infants were 30-36 weeks gestation, without anomaly. Results are not generalizable to infants less than 30 weeks and mothers with abnormal infant and anxiety of other family members. These limitations point to the need for further studies. It is suggested further studies assess anxiety level of fathers and all family members' with premature infants without age limitation with anomalies.

5- CONCLUSION

According to the results of this study, there was statistically significant difference regarding state anxiety mean scores and number of delivery, education level, gestational age at birth weeks and

child order. Mothers of premature infants had moderate level of state anxiety. Mothers whose premature infants were in 33 weeks of gestational age, had third and over delivery and the mothers who had third and over child order, also having university degree affected the state anxiety levels of them.

6- CONFLICT OF INTEREST: None.

7-ACKNOWLEDGEMENT

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