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Determination of Stress and Anxiety Levels of Parents of Infants Staying in Neonatal Intensive Care Unit

Yenidoğan Yoğun Bakım Ünitesinde Bebeği Olan Ebeveynlerin Stres ve Kaygı Düzeylerinin Belirlenmesi

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ABSTRACT

Introduction: Anxiety and stress in parents' lives during their babies' NICU stays can have a negative impact on all family members. This study aimed to measure the stress and anxiety levels of parents of infants in the neonatal intensive care unit receiving oxygen support.
Methods: This study was conducted based on cross-sectional design with 123 parents of infants between 1 August 2020 and 01 May 2021. Data was gathered using the "State-Trait Anxiety Inventory (STAI)", "Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU)", and "Parent Information Form and Infant Information Form".
Results: The STAI scores of the parents were considered "moderately anxious" and the parents were "moderately stressed" based on the overall mean scores on the PSS: NICU and the mean scores on the subscales of the scale. It was found that parents' number of children, employment, infant gender, type of delivery, intensive care environment characteristics, parents' communication with health personnel, and health condition all influenced their scores on the STAI and PSS: NICU subscales.
Conclusion: Providing a holistic and family-centred approach to parents, the closest relatives of their infants who will create future generations as well as educational and counselling roles played by nurses and reducing stress and anxiety experienced by parents, will have a positive impact on neonatal health.

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ÖZET

Giriş: Bebekleri yenidoğan yoğun bakım ünitesinde kaldığı süre boyunca anne babaların hayatlarındaki kaygı ve stres tüm aile bireylerini kötü etkileyebilir. Bu çalışma, yenidoğan yoğun bakım ünitesinde yatan ve oksijen desteği alan bebeklerin ebeveynlerinin stres ve kaygı düzeylerini belirlemek amacıyla yapılmıştır.
Yöntem: Bu çalışma, 1 Ağustos 2020 – 01 Mayıs 2021 tarihleri arasında bebekleri olan 123 ebeveyn ile kesitsel desene dayalı olarak yapılmıştır. Veri toplamada Ebeveyn Bilgi Formu ve Bebek Bilgi Formu, Durumluluk ve Sürekli Kaygı Ölçeği (DSK) ve YYBÜ: Anne Baba Stres Ölçeği (ABS:YYBÜ) kullanılmıştır.
Bulgular: ABS:YYBÜ toplam puan ortalamaları ve ölçeğin alt ölçek puan ortalamalarına ve DSK puanlarına göre ebeveynlerin "orta derecede kaygılı" ve ebeveynlerin "orta derecede stresli" olduğu belirlendi. Anne ve babanın sahip olduğu çocuk sayısının, mesleğinin, bebeğin cinsiyetinin, doğum şeklinin, yoğun bakım ortamı özelliklerinin, anne babanın sağlık personeli ile iletişiminin ve bebeğin sağlık durumunun, anne ve baba stres ve anksiyete puanlarını etkilediği saptanmıştır.
Sonuç: Gelecek nesilleri oluşturacak bebeklerinin en yakınları olan anne ve babalara bütüncül ve aile merkezli bir yaklaşım gösterilmesi, hemşirelerin oynadıkları eğitici ve danışmanlık rolleri ile anne babaların yaşadıkları stres ve kaygıların azaltılması ile yenidoğan sağlığını olumlu yönde etkilenecektir.

1. Introduction

Birth is a unique process that constitutes a new beginning for families. Families undergo a psychological transition period during which they experience a wide range of emotions (1). Following delivery, families are expected to learn their new duties, interact with the newborn, care for them, and deal with any difficulties that may arise (2). After leaving the intrauterine life, in which the infant is protected from the influences of the outside and receives all of his/her necessities from its mother, the infant makes an effort to adjust to life in the outer world by displaying significant change and growth (3). One of the most prevalent illnesses seen in newborns at this time is respiratory distress syndrome. This illness ailment may also be the initial indication of the existence of numerous illnesses.

Respiratory distress can manifest quickly after delivery, although it can also appear much later in some cases. Therefore, newborns may be admitted to the intensive care unit, and conditions requiring resuscitation may emerge (4,5) .

While parents are concerned about their babies' health, they are also subjected to a number of pressures as a result of the intensive care unit, which is a new environment for them (6,7). Parents experience stress and anxiety as a result of the infant's health problem, the properties of the intensive care unit (bright lights, sounds, drug odours, equipment, monitors, etc.), hospital costs, poor communication with hospital staff, fear of losing the infant, feeling the deficiencies in parenting roles because they can't be with their infants, worrying about how their infants will be, and not knowing what will happen(8). Anxiety and stress levels in parenting may also vary from person to person. It is critical to assess parents' stress and anxiety levels so that families with newborns in neonatal intensive care may go about their normal daily lives and make decisions that affect the baby with family-centred care (9). Within the scope of the role that nurses perform as caregivers, allowing parents to participate in the care of the newborn helps to lessen parental worry and tension. Furthermore, as instructors and counsellors, nurses may guide families and reduce their fear and tension (9,10,11). Determining the situations that cause parents to become stressed is important in terms of interventions to reduce anxiety and stress in families and it will guide future studies (12).

The purpose of this study was to assess the stress and anxiety levels of parents of infants hospitalized in the neonatal intensive care unit and receiving oxygen support.

2. Methods

2.1. Study settings and subjects

The study was conducted based on the cross-sectional design with the parents of infants who were hospitalized in the neonatal intensive care unit and receiving oxygen support between 01.08.2020 and 01.05.2021. The population consisted of 352 infants hospitalized in the neonatal intensive care unit during this period. As a result of the power analysis that was done concerning previous studies (correlation coefficient r=0.342 at a confidence level of 95% and significance level of 0.05), the sample size for the power of 80% was determined as n=80 parents. The present study enrolled 123 parents who signed an informed consent form. The following criteria were used to determine parents inclusion; having infants staying in the intensive care unit and receiving invasive or non-invasive oxygen support, being 18 years of age or older, being literate in Turkish, and being willing to to participate in the study. The necessary ethics committee approval (dated 18/06/2020, numbered 54022451-050.05.04) and a signed permit from the linked hospital were acquired to conduct this study. The authors of the scales used in the study also provided written consent. Parents who consented to participate in the study and completed the informed consent form were given an average of 15-20 minutes, and data was collected face-to-face in a confidential setting.

2.2. Research questions

- What emotions do families experience the most?
- What can be done to reduce the anxiety and stress of families
- Do parents' anxiety and stress levels change according to the demographic characteristics of newborns?

2.3. Data collection tools

"Parent and Infant Information Form", "State-Trait Anxiety Inventory", and "Parental Stressor Scale: Neonatal Intensive Care Unit" were used to collect the data.

Parent and Baby Information Form: The researchers developed this form consisting of open-ended and closed-ended questions from the literature (1,12). The Parent Information section had 18 questions, which assess the characteristics of the parents, such as their age, gender, marital status, and educational level, and two of which are open-ended. The Infant Information section had 13 questions, which assessed the characteristics of the infant, such as gestational week, gender, weight, mode of delivery, postnatal age, duration of hospitalization (days), and respiratory condition and four of which are open-ended.

State-Trait Anxiety Inventory (STAI): This tool was developed by Spielberg et al., in 1970 and its Turkish reliability and validity study was conducted by Öner & Le Compte in 1983. The questionnaire section first includes the "State Anxiety Scale", followed by the "Trait Anxiety Scale". Each of the two scales has a total of 20 questions. There are four choices for each statement which are 1 (none) to 4 (completely). The scores on both scales range between 20 feeling positive, no anxiety) and 80 (anxious). The Cronbach's Alpha internal consistency coefficient for the STAI was between 0.94-0.96 (10,13). When the reliability analysis values of the scale are examined, Cronbach's Alpha internal consistency coefficient was 0,85 for the STAI in our study.

Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU): The scale was developed by Miles, Funk, and Carlson in 1993 to determine the perception levels of stressors induced by the physical and psychosocial atmosphere in the neonatal intensive care unit by parents. The scale demonstrated good validity and reliability in North American NICUs (8). Turan and Başbakkal (2006) conducted a Turkish validity and reliability study. This tool which

includes 34 items was used for the Turkish study. Each item was scored using a Likert scale. It is ranging from 1 (not stressful) to 5 (extremely stressful) or 0 (not experienced). The PSS: NICU's alpha value was 0.94. (14). In the present study, the internal consistency coefficient of the PSS: NICU was 0.95.

2.4. Data analysis

The SPSS 22.0 statistics software was utilized for statistical analysis when assessing the findings of the study. Concerning the responses given by participants to the scale items in the questionnaire, validity, and reliability analysis was made. According to the results of the study, one item (Question 7) from the PSS: NICU was omitted from the study. The validity and reliability of the scales were ensured in the study with a sample size of 123 people. The normality of the scales was tested with Kolmogorov- Smirnov and Shapiro-Wilk methods. Non-parametric tests (the Mann Whitney U test, the Kruskal Wallis Test) were used to compare non-normally distributed variables, while parametric tests (the Independent t-test, the One-Way ANOVA) were employed to analyze normally distributed variables. The results were evaluated at the significance level of $p<0.05$ at a confidence interval of 95% and $p<0.01$ at a confidence interval of 99%.

3. Results

3.1. Validity and reliability analysis of scales

According to the results of the Reliability Analysis, the internal consistency coefficient of the whole scale was obtained as Cronbach's alpha value STAI was 0.858 and PSS: NICU was 0.951. It can be said that these tools are highly reliable since Cronbach's Alpha coefficient values are ≥ 0.80 (15). "Principal Component Analysis" was used as an estimation in the factor analysis, and because of the correlation between the factors, the application was made using the "Varimax" rotation method. The PSS: NICU was examined in 3 factors, and the KMO value was found to be 0.782 as a result of the analysis and it was obtained as $\chi 2=1839.769$ ($p<0.000$) according to the Bartlett Test of Sphericity. According to these values, it was determined that the variables were suitable for factor analysis. The rate of explaining the total variance of the 3 factors was 60.90% and suitable.

3.2. Parent and infant characteristics

Demographic characteristics of parents and their Infants are shown in Table 1. It was determined that 54.47% of the parents were mothers, while 45.53% were fathers. Most of them were between the ages of 30 and 39. 74.8% of the infants of these parents were the result of an intended pregnancy, and 31.7% of them were the first child. A great majority of the infants were "male", "prematurity", "cesarean section", with birth weights ranging from 2000 to 4000 g (69.1%). The majority of the infants (43.9%) needed oxygen support for "7 days or more," and the respiratory condition of the infants was determined to be "invasive mechanical ventilation support" (44.7%). The majority of the parents saw their infants (30.08%) within the first half hour after the birth, and the majority of the parents (94.31%) were adequately informed about the disease of their infants. The frequency of visiting infants by their parents was mostly every day (82.93%) (Table 1).

Table 1. Distribution of demographic characteristics of parents and their infants

Variables		N	%
Parent	Mother	67	54.47
	Father	56	45.53
Age	18-24 years	8	6.50
	25-29 years	24	19.51
	30-39 years	74	60.16
Intended pregnancy	Yes	92	74.80
	No	31	25.20
Number of children in the family	1 child	39	31.71
	2 children	27	21.95
	3 children	33	26.83
	4 children and more	24	19.51
Gender of the Infant	Female	48	39.02
	Male	75	60.98
Prematurity	Yes	65	52.85
	No	58	47.15
Mode of Delivery	Vaginal	25	20.33
	Cesarean section	98	79.67
Duration of oxygen support for the infant	1-24 hours	18	14.63
	1-3 days	32	26.02
	4-7 days	19	15.45
	7 days and more	54	43.90
Respiratory condition	Invasive mechanical ventilation support	55	44.72
	Non-invasive mechanical ventilation support	29	23.58
	Simple oxygen support (mask, high flow, nasal cannula, etc.)	16	13.01
Duration of seeing the infant for the first time	After 1-30 min.	37	30.08
	After 30-60 min.	17	13.82
	After 1-24 hours	49	39.84
	Other	20	16.26
Frequency of visiting the infant	Everyday	102	82.93
	Once a week	6	4.88
	Twice a week	6	4.88
	3 times a week or more	9	7.32

3.3. Scores of STAI and PSS.NICU and scores correlation

When the parents' total anxiety (95.78±16.18) scores were determined as "moderate anxiety", mean scores in PSS: NICU (104.38±31.58) were determined as "moderate stress" too. It was determined that the relationship between STAI and PSS.NICU scores were statistically significant ($p<0.01$), in this case, there was a moderate positive correlation ($0.40<r<0.59$) ($r= 0.467$) between the two scales (Table 2).

Table 2. Correlation analysis between STAI and PSS.NICU Scores

	N	Mean	SD	Correlation coefficient	State Anxiety	Continuous Anxiety	Images and Sounds	Baby Appearance and Behavior	Your Relationship with Your Baby	STAI	PSS.NICU Scores
State Anxiety	123	48,2	10,2	r	1,000	0,508**	0,398**	0,345**	0,406**	0,884**	0,448**
Continuous Anxiety	123	47,5	8,46	r		1,000	0,253**	0,270**	0,367**	0,831**	0,352**
Images and Sounds	123	16,2	6,12	r			1,000	0,591**	0,372**	0,393**	0,701**
Baby Appearance and Behavior	123	52,5	19,1	r				1,000	0,401**	0,343**	0,895**
Your relationship with your baby	123	35,6	13,4	r					1,000	0,466**	0,724**
STAI	123	95,7	16,1	r						1,000	0,467**
PSS.NICU Scores	123	104,3	31,5	r							1,000

**p<0,01 *p<0,05 SD: Standard Deviation, STAI: State-Trait Anxiety Inventory, PSS.NICU: Parental Stressor Scale: Neonatal Intensive Care Unit.

3.4. Association among variable

When the findings were analyzed, it was found that the total anxiety and stress mean scores of the mothers were significantly higher than those of the fathers (p<0.05). While the gender, mode of delivery, and employment status of the total anxiety scores mean were examined, scores of the parents with “male” infants, the parents who had an infant with “vaginal delivery” and the parents who were unemployed were higher. Against this, the stress mean scores of these results were lower. During this period, parents who were informed by the physician had higher anxiety scores; whereas, those who were informed by the nurses had higher mean scores on stress. When Table 4 is examined, it can be said that the perception of the STAI and PSS: NICU scales did not show a statistical difference according to the status of the 'gender', 'mode of delivery', 'employment', 'the person who give information' and 'intended pregnancy' (p>0.05). Parents who felt “sadness” when they first saw their infant in the intensive care unit and parents who mostly felt “anxiety” during the visit had higher total anxiety and stress mean scores. And, the emotions of parents affected total anxiety and stress (p<0.05). While parents with a “third child” felt more anxiety than others and parents who have their first child felt more stress. According to the number of children in the family, the perception of the total anxiety scale showed a statistically significant difference (p<0.01). However, the perception of parents' stress scale did not differ statistically (p>0.05).

Table 3. Distribution of parent and infant demographic information and STAI and PSS: NICU Scores

		STAI Total Anxiety Score		PSS:NICU Total Stress Score	
Variables		**Mean±SD**		**Mean±SD**	**n**
Parent	Mother	98.50±16,54		107.44±30,85	67
	Father	92.51±15,25		100.71±32,32	56
	t	2,071	t	1,179	
	p	0.040*	p	0,241	
Gender	Female	92.50±16,10		106.57±32,56	48
	Male	97.88 ±15,99		101.29±30,20	75
	t	-1,815	t	0,912	
	p	0.072	p	0.364	
Mode of Delivery	Vaginal	98.68±12,58		101.44±38,17	25
	Cesarean section	95.04±16,95		105.13±29,85	98
	t	1,004	MWU	-0,520	
	p	0.318	p	0.604	
Employment	Yes	94.03±16,95		106.57±32,56	75
	No	98.25±14,86		101.29±30,20	51
	t	-1,433	t	0,912	
	p	0.154	p	0.364	
Emotions the parents felt when they saw their infant for the first time	Happiness	93.42±15,80		96.40±29,54	62
	Sadness	104.33±18,28		119.75±31,86	12
	Complicated emotions	98.96±15,11		110.04±32,13	27
	Excitement	98.25±15,41		118.31±29,36	16
	Astonishment	82.17±13,04		93.50±34,93	6
	F	2,730	F	3,066	
	P	0.032*	P	0.019*	

**p<0,01; *p<0,05 SD: Standart Deviation MWU: Mann-Whitney U. STAI: State-Trait Anxiety Inventory, PSS.NICU: Parental Stressor Scale: Neonatal Intensive Care Unit.

4. Discussion

The anxiety and stress in parents in their life during their babies' NICU stay have a negative impact on all family members.

Parents experience anxiety and stress if their newborn suffers respiratory distress after birth, needs oxygen support for any reason, or is transferred to intensive care unit and separated from the family.. Some risk factors contribute to the development of this condition (3). Caesarean section, according to Turkish Neonatology Association, is a risk factor for neonatal respiratory distress. Another risk factor for neonatal respiratory distress is the "male" gender.(3). Accordingly, the rate of "male" gender among babies was found to be greater in the this research (Table 1). Also, other studies similarly reported that male infants were at higher risk rate than female infants in the retrospective assessment of neonates for respiratory distress (3,4,9,10). The larger proportion of "male" newborns in this research is likely to have boosted the parents' state anxiety levels.

The majority of the infants in this research required oxygen assistance for "7 days or more", and the majority of these were preterm newborns (Table 1). The extension of the duration of hospitalization and oxygen support of the infant significantly affected the stress and anxiety of the parents. The ambiguity that the intensive care process causes intensifies emotional trauma in families, and prolonged hospitalization of the infant prolongs the anxious and stressful time spent by the parents (8,12**)**. According to Ionio et al., (2016), the fact that the infant requires oxygen support in the NICU and the lenghthy hospitalization causes high levels of anxiety and depression in families (8). The trauma caused by this circumstance experienced by families as a result of this predicament may persist long after discharge (5,7).

It was observed that the time of seeing the infant for the first time was also effective in the anxiety and stress of the parents (11). This study found that parents were able to see their infants within the first half an hour. We believe that this circumstance maintained anxiety and stress at a moderate level (Table 2). These findings suggest that it is important for the infant and parents to come together as soon as possible for neonatal health, as well as parents' anxiety and stress.

It was also determined that the total anxiety and stress mean scores of the mothers were higher than the total anxiety mean scores of the fathers during this period (Table 3). Similarly, some studies reported that mothers felt higher levels of anxiety during this period compared to fathers (7,11,16). This is assumed to be due to the fact that while mothers are trying to adapt physically and mentally to the changes during the delivery and postnatal period, the mother is psychologically affected more and becomes more anxious when the infant is referred to intensive care (8,16,17,18,19).

According to STA and PSS: NICU, parents in this study experienced the highest "anxiety". Another feeling experienced by parents of newborns hospitalized in the neonatal intensive care unit and receiving oxygen support was fear (Table 3). In a study conducted in Taiwan reported that the small appearance of the infant and its connection on a ventilator caused "anxiety and stress" in parents and parents needed care assistance (19). Similarly Russell et al., (2014) reported that the most common emotion felt by parents was "anxiety" and "fear", which was mostly induced by the assumption that parents could not fulfill their parenting role (6). Furthermore, Rungamornrat et al., (2012) reported that this prompted families to blame themselves, to fear the death of their infants, and to engage in spiritual pursuits during this period (4). For these reasons, the family-centered care model holds an important place in alleviating the anxieties of parents during this period in which they feel very "anxious" (10,11,12). Regarding family members as an essential and indispensable aspect of care not only alleviates the anxiety, stress and fears of the parents, but also significantly improves the neurological development of the infant (12).

The number of children is one of the factors that affect the stress and anxiety of parents during this period. A study reported that parents felt more anxiety and worry in their first child, while another study reported that families with "one child" were inexperienced in the caring for their babies and needed more help, which led to an increase in the level of stress felt by the parents (2,7). The present study yielded similar findings. For this, it would be beneficial to support parents with family-centered care in neonatal intensive care unit.

Some studies have found that parents who delivered their babies by "vaginal delivery" had considerably greater anxiety levels (1,6). In this study, the caesarean section rate was higher than the vaginal delivery rate. The total anxiety scores of the parents whose babies were born via "vaginal delivery" were higher and the total stress scores of the parents whose babies were born via "Cesarean section" were higher (Table 3). Although the parents prepared themselves for the vaginal delivery procedure, it was believed that hormonal and psychological changes in the mother, referral of the infant to the NICU with an unanticipated condition, and the restriction of physical contact raised the anxiety levels of the parents (20,21).

When the employment status of the parents was examined, it was found that anxiety and stress levels were different between unemployed parents and employed parents. The findings demostrated that the total anxiety scores of unemployed parents were higher (Table 3). Because caring for a preterm baby could have more cost than a normal newborn. In other studies, the total anxiety scores of parents who were unemployed during this period were found to be significantly higher than the scores of those who were employed (7,12).

Some studiesfound that making frequent visits to the infant and having the need to get information on the health condition of the infant were among the stress-coping strategies of parents (6,12,20,22). It was observed that the majority of the parents who visited their babies "every day" were adequately informed during the visit. As was found in this study, the anxiety and stress scores of parents are also affected by the people by whom they received information about the health condition of their babies. Furthermore, it was determined that the parents who got informed by nurses had higher stress scores (Table 3). Throughout this period, we believe that nurses who continuously monitor and treat the infants as caregivers, and take personally care of them, may induce stress in parents since they often inform families about potential changes in their baby's condition. Other studies also reported that the majority of parents experienced stress while participating in care with the nurse and at the same time receiving information about the condition of the infant (5,6).

All these indicated that many factors play roles in the anxiety and stress of parents during this challenging period. Nurses should inform and involve parents in care by taking into account their personality traits, past experiences and psychological state. It is important that the nurse reinforces the information she gives to the parent and allows time for the parent to pose questions for repetition. In order to alleviate anxiety and stress, it would be beneficial to assess parental preferences individually and to adapt information and care interventions accordingly.

4.1. Limitations

Parental visits were completely prohibited in the NICU from 01/12/2020 to 01/03/2021 due to the COVID-19 pandemic, and parents were allowed to enter the unit on a limited basis as of 01/03/2021. So finding parents to fill out the questionnaire forms was difficult for the researcher due to the intensity of the hospital and the unit. Data collection time had taken long time than expected. For this reason, it was not possible to distinguish at which level the baby was in the neonatal intensive care unit and the possibility of affecting parental stress and anxiety.

5. Conclusion

As a consequence of the study, it was determined that the parents perceived "moderate level of anxiety" in total anxiety mean scores, and that the parents were "moderately stressed" as a result of their PSS:NICU total mean scores.

The active involvement of families in the care of their infant with family-centered care may lessen the stress and anxiety levels of the parents. Also, encouraging parents to involve in care, improving the relations of healthcare team members with parents, raising awareness of institutions on family-centered care, and helping families to develop coping strategies, when necessary, can enhance the communication between parents and infants. Consequently, lowering the stress and anxiety levels of the families would contribute to the growth of the infant in a healthy atmosphere in the future.

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Authorship Contribution:

GG: The idea/scope of the work, design, data collection, and writing the article.

SB: The idea/scope of the work, design, supervision and consulting, analysis, source scanning, writing the article, and resources.

TA: Interpretation, supervision and consulting, critical review, resources.

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