

## Research Article

## Stress, Anxiety, and Postpartum Depression in Parents with Premature Infants in Neonatal Intensive Care Unit

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### Abstract

**AIM:** This study aimed to determine stress, anxiety, and postpartum depression in parents with premature infants in neonatal intensive care unit.

**METHOD:** This cross-sectional study was conducted between July 15 and November 31, 2021. The research involved 120 premature infants and their parents (120 mothers and 120 fathers). This research was carried out in Şanlıurfa Mehmet Akif İnan Training and Research Hospital, third level neonatal intensive care unit. Introductory Information Form, Parental Stress Scale: Neonatal Intensive Care Unit, Beck Anxiety Inventory, and Edinburgh Postpartum Depression Scale were used as data collection tools.

**RESULTS:** Stress, anxiety, and depression were high in parents. Stress, anxiety, and postpartum depression mean scores of mothers were significantly higher than that of fathers. A positive correlation was found between stress, anxiety, and postpartum depression in parents. Simple regression analysis revealed that stress in mothers predicted depression by 5% and stress in fathers predicted anxiety by 30%.

**CONCLUSION:** This study emphasizes that stress, anxiety, and depression are seen at high rates in parents with premature infants, and stress increases anxiety in fathers and depression in mothers.

**Keywords:** Anxiety, intensive care unit stress, parent, postpartum depression, premature

### Introduction

Premature birth continues to be a significant concern nowadays, with its high perinatal-neonatal mortality and morbidity rates (Blencowe et al., 2010; World Health Organization, 2013). World Health Organization (WHO) states that 1 out of every 10 births is a premature infant, approximately 1.1 million of these babies die, and 75% of the causes of death of these children are avoidable. It was determined that the rate of premature birth in our country is 11% (World Health Organization, 2012, 2013).

In recent years, the rise in quantity and quality of neonatal intensive care units (NICU) has increased the survival rate of premature infants. Premature birth and subsequent care in the NICU may make it challenging for mothers and fathers to adjust to the postpartum period. Parents who have infants under treatment and care in NICU may experience more stress, anxiety, and depression than parents with healthy infants. The birth of a premature infant and staying in NICU for a long time due to treatment may cause some mental problems in the parents. Medical language, which is difficult to understand due to a health problem in an infant under treatment and the fear of losing the infant, and devices in NICU (Lefkowitz et al., 2010) cause various emotions related to stress, anxiety, and depression, such as sadness, fear, anxiety, grief, and helplessness in parents (Joseph et al., 2007).

The rise in the survival rates of premature infants causes various issues (systemic and neurodevelopmental problems) in their long-term development, which creates serious stress and anxiety in the family (Tommiska et al., 2002). Birth of a premature infant, separation of the infant from family and various health problems, parents' inability to take an active role in the care of the infant, and uncertainty of baby's condition all contribute to the development of mental disorders such as stress, anxiety, and depression in parents who expect to hold their baby in a healthy manner. The physical environment, monitoring equipment, tubes and wires attached to the baby, noises, and chemical odors can be sources of stress for parents. However, the biggest source of stress is the separation of parents from their babies and the inability to establish imagined parental roles and bond with the baby (Trumello et al., 2018). Venkatesh et al. (2014) found a significant relationship between parental stress and postpartum depression in their randomized controlled study. Missler et al. (2020) stated in their randomized controlled study that stress, depression, and anxiety can be seen in parents in the first months after birth. Vismara et al. (2016) researched and determined that the level of parental stress, postpartum anxiety, and depression of mothers was higher than that of fathers, and parenting stress directly affected anxiety and depression. Some studies in the literature show that fathers can also experience postpartum perinatal depression (Condon et al., 2004; Paulson & Bazemore, 2010) similar to mothers. It is stated in the literature that perinatal depression of

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the father may lead to inadequate parental function (Wilson & Durbin, 2010). Also in NICU, unit's images and sounds for mothers and fathers, parental role changes, infant's appearance and behavior, infant's birth weight play critical roles, clinical status of premature infants, hospitalization indications, disappointment of the parents about the expectation of the baby at term, high stressors and stimuli originating from NICU cause stress in parents, and stress causes anxiety and depression in parents (Al Maghaireh et al., 2017; Cajiao-Nieto et al., 2021; Çelen & Taş Arslan, 2017; Fisher et al., 2018).

It has been reported in studies that stress, anxiety, and postpartum depression are high in parents whose babies are hospitalized in NICU, and poor clinical condition of the baby increases stress in parents (Jubenville et al., 2012; Leach et al., 2016; Pisoni et al., 2020; Schappin et al., 2013; Surmeli Onay et al., 2021; Trumello et al., 2018). This situation necessitates a detailed evaluation of parents whose babies are in the NICU in terms of psychosocial problems. Because parents with high levels of stress and anxiety may have difficulty participating in the care of their babies and cooperating with the healthcare team, the development of the parent-infant relationship, which is expected to occur in the early stages of life, is delayed. This increases the susceptibility of parents to depression, which is frequently seen in the postpartum period (Cajiao-Nieto et al., 2021; Fisher et al., 2018).

In the literature, there are researches examining the effect of NICU stress on anxiety and postpartum depression among mothers and fathers with a premature infant in the NICU. But Şanlıurfa province has the highest fertility rate in Turkey, and the area also has a high percentage of premature births (TDHS, 2018; TUIK, 2021). In this region, it is quite limited research comprehensively evaluated stress, anxiety, and postpartum depression in parents with premature infants in the NICU. Also, there are few studies examining the relationship of the infant's clinical condition with stress-anxiety-postpartum depression in parents, the effect of NICU stress on anxiety and postpartum depression in parents and evaluated the relationship between stress-anxiety-postpartum. The study is important in terms of its contribution to the literature in order to determine the mental problems that mothers and fathers who have premature infants in NICU and to create family-focused psychosocial interventions for these problems. In this direction, this study aimed to determine the predictive status of stress, anxiety, and postpartum depression in parents with a premature infant in NICU, and the predictive status of anxiety and postpartum depression by NICU stress.

### Research Questions

1. What are the stress, anxiety, and postpartum depression mean scores of parents?
2. Is there a significant difference between parents' stress, anxiety, and postpartum depression mean scores?
3. Is there a significant difference in parents' stress, anxiety, and depression mean scores according to descriptive characteristics of premature?
4. Is there a significant correlation between the scale mean scores of parents and descriptive characteristics of premature?
5. Is NICU stress a predictor of anxiety and depression in parents?

## Method

### Research Type

This is a cross-sectional study.

### Sample

This research was carried out in Şanlıurfa Mehmet Akif İnan Training and Research Hospital, third level neonatal intensive care unit, between July 15 and November 31, 2021. The population of the study consisted of infants admitted to NICU. It was determined that a minimum of 102 people for difference analysis should be taken into the sample in sample size calculation using GPower 3.1 program with type I error .05,  $d = .05$  effect size 80% power (Cohen, 1992; Faul et al., 2007). Parents of 120 premature infants (120 mother and father couples) were reached in this study. The statistical significance level was determined as  $p < 0.05$ , with a CI of 95%.

Inclusion criteria: Married couples who did not have a psychiatric history/diagnosis, who had a premature infant in NICU, and who volunteered to participate were included.

Exclusion criteria: Couples who did not meet inclusion criteria were excluded.

### Data Collection Tools

Introductory Information Form, Parental Stress Scale: Neonatal Intensive Care Unit, Beck Anxiety Inventory, and Edinburgh Postpartum Depression Scale.

**Introductory Information Form:** This form, developed by the researcher (AK), consists of a total of 24 questions: 12 questions about the characteristics of the premature infant (infant's hospitalization diagnosis), birth weight, birth week, fifth minute APGAR (Activity-Pulse-Grimace-Appearance-Respiration) score, SNAP-II/SNAP-PE II score (Score for Neonatal Acute Physiology with Perinatal Extension-II, SNAP-II/SNAP-PE II mortality score, birth type, number of hospitalization days, state of being on a ventilator and gender), five questions about the sociodemographic characteristics of the mother, four questions about the obstetric characteristics, and three questions about the sociodemographic characteristics of the father (Al Maghaireh et al., 2017; Cajiao-Nieto et al., 2021; Çelen & Taş Arslan, 2017; Fisher et al., 2018; WHO, 2012, 2013).

**Parental Stress Scale: Neonatal Intensive Care Unit:** It was developed by Miles et al. (1993) and adapted into Turkish by Turan and Başbakkal (2006). It is a 5-point Likert-type scale the items of which are graded from 1 (not stressful) to 5 (extremely stressful). It consists of three subdimensions and 34 items in total, with the subdimension of images and sounds 6 items, the appearance and behavior of the baby 17 items, and the parent role subdimension 11 items. The total score is calculated by summing all the items on the scale (ranging from 0 to 170). The scale has no cut-off point. The higher the total score is, the higher the stress level becomes. Cronbach's alpha coefficient of the scale was found to be .94 by Miles et al. (1993) and .79 by Turan and Başbakkal (2006). It was found to be .83 for the mother and .82 for the father in this study.

**Beck Anxiety Inventory:** The scale was developed by Beck et al. (1988) and adapted into Turkish by Ulusoy et al. (1998). It is a 4-point Likert-type scale consisting of 21 items. Each item in the scale is scored as "0: None," "1: Mild," "2: Moderate," "3: Severe." A total score (ranging from 0 to 63) is obtained by summing all items on the scale; 0-7 points from the scale are interpreted as minimal, 8-15 points as mild, 16-25 points as moderate, and 26-63 points as severe anxiety symptoms. The cut-off point of the scale is 17 points and above. Cronbach's alpha coefficient of the scale was found to be .92 by Beck et al. (1988) and .93 by Ulusoy et al. (1998). It was found to be .87 for the mother and .83 for the father in this study.

**Edinburgh Postpartum Depression Scale:** A scale developed by Cox et al. (1987) was prepared to determine the risk of depression in women in the postpartum period. It was adapted into Turkish by Engindeniz et al. (1997). It is a 4-point Likert scale consisting of 10 items. Responses consisting of four options are scored between 0 and 3. A minimum of 0 and a maximum of 30 points can be obtained from the scale. The cut-off point of the scale is 13 points and above for women and 10 points and above for men, beyond which indicates the presence of depression. Cronbach's alpha coefficient of the scale for women was found to be .87 by Cox et al. (1987) and .79 by Engindeniz et al. (1997). For men, this coefficient was found to be .83 by Alkan (2017). This coefficient was found to be .89 for the mother and .89 for the father in this study.

#### Data Collection

Data were obtained by researchers (AK and GS) with face-to-face interviews with couples who voluntarily participated in the research in NICU. Interviews lasted an average of 15-20 minutes.

#### Statistical Analysis

The Statistical Package for Social Sciences version 26.0 package program (IBM SPSS Corp., Armonk, NY, USA) was used in the analysis of data. Number, percentage, mean, and standard deviation values were calculated from descriptive statistics. The conformity of data to normal distribution was determined by the Kolmogorov-Smirnow test. Difference between the mean scores of the scale was found with the Wilcoxon test in dependent groups who did not comply with paired sample *t*-test in the normal distribution. Difference between the mean scores of two independent groups that fit normal distribution was calculated with the independent sample *t*-test, and those that did not fit were calculated with the Mann-Whitney *U* test. Differences between scale mean scores of more than two groups that fit normal distribution were tested with one-way analysis of variance, and those that did not fit were tested with Kruskal-Wallis. The correlation between scale mean scores of mothers and fathers that fit normal distribution was calculated by using Pearson correlation analysis, and those that did not fit were calculated by using Spearman correlation analysis. In addition, simple regression analysis was used to assess whether stress predicted anxiety and postpartum depression in mothers and fathers. Statistical significance was determined as  $p < 0.05$  at a 95% CI.

#### Ethical Consideration

Ethics committee approval (Date: March 1, 2021, No: HRU/21.05.10) from Harran University Clinical Research Ethics Committee and institutional permission (Date: February 9, 2021) from Şanlıurfa Mehmet Akif İnan Training and Research Hospital were obtained to conduct the study. Written consent was obtained from parents participating in the study.

#### Results

Findings regarding the descriptive characteristics of premature infants, mothers, and fathers included are given in Table 1. The mean age of the mothers is 28.4, and 42.5% of them are primary school graduates, 93.3% are unemployed, 81.7% of them have a nuclear family structure, and 97.5% of them have a lower income than their expenses. The mean number of pregnancies of mothers is 4.6, the number of births is 3.5, and the number of living children is 3.5. The mean age of fathers is 32.9, 39.2% of them are secondary school graduates, and 87.5% of them are working. Hospitalization diagnosis of 68.3% of premature infants was respiratory distress, 45.8% of them weighed  $\leq 1800$  g, 40% of them were born by delivery week  $< 32$ , 28.3% of them had APGAR score  $< 7$ , 68.3% of them were born by cesarean section, 33.3% are connected to a ventilator (Table 1).

Anxiety was mild in 2.5% ( $n=3$ ), moderate in 40.8% ( $n=49$ ), and severe in 56.7% ( $n=68$ ) of mothers. It was determined that 20.8% ( $n=25$ ) of the fathers did not have anxiety, 59.2% ( $n=71$ ) had mild anxiety, 19.2% ( $n=23$ ) had moderate anxiety, and .8% ( $n=1$ ) had severe anxiety. According to the anxiety cut-off point, it was determined that 95.8% ( $n=115$ ) of mothers and 15.0% ( $n=18$ ) of fathers had anxiety. According to the cut-off points of Edinburgh Postpartum Depression Scale (EPDS) for mothers and fathers, postpartum depression was found in 96.7% ( $n=116$ ) of the mothers and 66.7% ( $n=80$ ) of the fathers.

Mothers' Parental Stress Scale: Neonatal Intensive Care Unit (PSS:NICU), PSS:NICU images and sounds subdimension, PSS:NICU baby's appearance and behavior subdimension, Beck Anxiety Inventory (BAI), and EPDS mean scores were found to be significantly higher than those of the fathers ( $p < 0.01$ ) (Table 2).

A positive significant correlation was found between mothers' PSS:NICU and BAI ( $r = .59$ ), and EPDS ( $r = .23$ ) ( $p < 0.01$ ). A positive significant correlation was found between fathers' PSS:NICU and BAI ( $r = .55$ ), and EPDS ( $r = .24$ ) ( $p < 0.01$ ) (Table 3).

A negative significant correlation was found between mothers' PSS:NICU and prematures' birth weight ( $r = -.49$ ), birth week ( $r = -.56$ ), and fifth minute APGAR score ( $r = -.48$ ) ( $p < 0.01$ ). A positive significant correlation was found between mothers' PSS:NICU and prematures' SNAP-II score ( $r = .28$ ), SNAP-II mortality rate ( $r = .40$ ), SNAP-PEII score ( $r = .40$ ), SNAP-PEII mortality rate ( $r = .40$ ) ( $p < 0.01$ ) (Table 3).

A negative significant correlation was found between fathers' PSS:NICU and prematures' birth weight ( $r = -.38$ ), birth week

**Table 1.**  
Descriptive Features of Prematures (n=120), Mothers (n=120), and Fathers (n=120)

Prematures' Features	Mean (± SD), (n, %)	Mothers' Features	Mean (± SD), (n, %)	Fathers' Features	Mean (± SD), (n, %)
Hospitalization diagnosis		Mother age	28.4 (± 6.9)	Father age	32.9 (± 8.0)
Respiratory distress	68.3 (82)	Mother's education		Father's education	
Respiratory arrest	16.7 (20)	Literate	9.2 (11)	Primary	17.5 (21)
Respiratory distress syndrome	6.7 (8)	Primary	42.5 (51)	Middle	39.2 (47)
Others	8.2 (10)	Middle	24.2 (29)	High	24.2 (29)
Baby's birth weight	1801.6 (± 648.1)	High	18.3 (22)	University	19.2 (23)
≤1800 g	45.8 (55)	University	5.8 (7)	Father working status	
>1800 g	54.2 (65)	Mother working status		Yes	87.5 (105)
Baby's birth week	31.3 (± 3.2)	Yes	6.7 (8)	No	12.5 (15)
< 32	40.0 (48)	No	93.3 (112)		
≥ 32	60.0 (72)	Family type			
Baby's fifth-minute APGAR score	7.0 (± 1.3)	Nuclear	81.7 (98)		
< 7	28.3 (34)	Extended	18.3 (22)		
≥ 7	71.7 (86)	Economic situation			
Baby's SNAP-II score	25.7 (± 15.3)	Income < expense	97.5 (117)		
< 26	45.8 (55)	Income ≥ expense	2.5 (3)		
≥ 26	54.2 (65)	Number of pregnancies	4.6 (± 2.7)		
Baby's SNAP-II mortality rate	17.5 (± 22.8)	Number of births	3.5 (± 2.1)		
< 18 (%)	75.0 (90)	Number of miscarriages/curettages	1.0 (± 1.0)		
≥ 18 (%)	25.0 (30)	Number of living children	3.5 (± 2.1)		
Baby's SNAP-PEII score	41.9 (± 27.9)				
< 42	69.2 (83)				
≥ 42	30.8 (37)				
Baby's SNAP-PEII mortality rate	18.4 (± 23.6)				
< 19	72.5 (87)				
≥ 19	27.5 (33)				
Baby's birth type					
Vaginal birth	31.7 (38)				
Cesarean section	68.3 (82)				
Number of hospitalization days	12.6 (± 9.5)				
< 13	61.7 (74)				
≥ 13	38.3 (46)				
State of being on a ventilator					
Yes	33.3 (40)				
No	66.7 (80)				
Baby's gender					
Girl	41.7 (50)				
Boy	58.3 (70)				
Total	100 (120)	Total	100 (120)	Total	100 (120)

Note: APGAR=Activity-Pulse-Grimace-Appearance-Respiration; others=premature membrane rupture; preeclampsia, placenta previa, pneumothorax, and meconium aspiration, gestational diabetes mellitus; SD=standard deviation; SNAP-II=Score for Neonatal Acute Physiology; SNAP-PEII=Score for Neonatal Acute Physiology Perinatal Extension.

**Table 2.**

Comparison of the Mean Scores of Parents' Parental Stressor Scale: Neonatal Intensive Care Unit, Beck Anxiety Inventory, and Edinburgh Postnatal Depression Scale

Scales	Mother (n=120)	Father (n=120)	Statistical Analysis		95% CI	
	Mean (± SD)	Mean (± SD)	t/Z	p	Lower	Upper
<b>PSS:NICU</b>	114.4 (± 17.7)	109.3 (± 16.9)	t=4.7 <sup>t</sup>	<0.01	2.91	7.14
Sights and Sounds	22.3 (3.4)	21.5 (3.2)	Z=-3.7	<0.01		
Infant's Appearance and Behaviors	60.7 (11.2)	56.0 (12.6)	Z=-6.0	<0.01		
Parental Role Alteration	31.2 (7.1)	31.7 (5.7)	Z=-1.1	0.2		
<b>BAI</b>	26.8 (± 6.5)	11.3 (± 4.9)	Z=-9.5	<0.01		
<b>EPDS</b>	20.9 (± 4.6)	12.3 (± 4.8)	Z=-9.4	<0.01		

Note: BAI = Beck Anxiety Inventory; EPDS = Edinburgh Postnatal Depression Scale; PSS:NICU = Parental Stressor Scale: Neonatal Intensive Care Unit; SD = Standard deviation; t = paired sample t-test; Z = Wilcoxon Signed Rank Test.

**Table 3.**

Relationship Between Parents' Parental Stressor Scale: Neonatal Intensive Care Unit, Beck Anxiety Inventory, and Edinburgh Postnatal Depression Scale Mean Scores and Other Features

Scales and Features	Mother (n=120)			Father (n=120)		
	PSS:NICU	BAI*	EPDS	PSS:NICU	BAI	EPDS*
<b>PSS:NICU</b>	1			1		
<b>BAI</b>	r=.59 p < 0.01	1		r=.55* p < 0.01	1	
<b>EPDS</b>	r=.23* p = 0.01	r=.51 p < 0.01	1	r=.24 p < 0.01	r=.66 p < 0.01	1
<b>Father PSS:NICU</b>	r=.77* p < 0.01	r=.43 p < 0.01	r=.20* p = .02			
<b>Father BAI</b>	r=.50* p < 0.01	r=.58 p < 0.01	r=.62 p < 0.01			
<b>Father EPDS</b>	r=.23 p = 0.01	r=.46 p < 0.01	r=.77 p < 0.01			
<b>Prematures' descriptive features</b>						
Baby's birth weight	r=-.49* p < 0.01	r=-.49 p < 0.01	r=-.29* p < 0.01	r=-.38* p < 0.01	r=-.27* p < 0.01	r=-.28 p < 0.01
Baby's birth week	r=-.56 p < 0.01	r=-.49 p < 0.01	r=-.40 p < 0.01	r=-.41 p < 0.01	r=-.35 p < 0.01	r=-.35 p < 0.01
Baby's fifth minute APGAR score	r=-.48 p < 0.01	r=-.46 p < 0.01	r=-.40 p < 0.01	r=-.43 p < 0.01	r=-.47 p < 0.01	r=-.41 p < 0.01
Baby's SNAP-II score	r=.28 p < 0.01	r=.28 p < 0.01	r=.31 p < 0.01	r=.20 p = 0.028	r=.20 p = 0.023	r=.25 p < 0.01
Baby's SNAP-II mortality rate	r=.40 p < 0.01	r=.34 p < 0.01	r=.41 p < 0.01	r=.32 p < 0.01	r=.29 p < 0.01	R = .41 p < 0.01
Baby's SNAP-PEII score	r=.40 p < 0.01	r=.35 p < 0.01	r=.45 p < 0.01	r=.30 p < 0.01	r=.31 p < 0.01	r=.40 p < 0.01
Baby's SNAP-PEII mortality rate	r=.40 p < 0.01	r=.35 p < 0.01	r=.42 p < 0.01	r=.32 p < 0.01	r=.28 p < 0.01	r=.41 p < 0.01
Number of hospitalization days	r=.05 p = 0.5	r=-.08 p = 0.3	r=.03 p = 0.6	r=.01 p = 0.9	r=-.05 p = 0.5	r=.03 p = 0.7

Note: \*Pearson Correlation.

PAPGAR = Activity-Pulse-Grimace-Appearance-Respiration; BAI = Beck Anxiety Inventory; EPDS = Edinburgh Postnatal Depression Scale; SNAP-II = Score for Neonatal Acute Physiology; SNAP-PEII = Score for Neonatal Acute Physiology Perinatal; SS:NICU = Parental Stressor Scale: Neonatal Intensive Care Unit.

**Table 4.** Differences Between the Mean Scores of the Parental Stressor Scale: Neonatal Intensive Care Unit, Beck Anxiety Inventory, and Edinburgh Postnatal Depression Scale of Mothers and Fathers According to the Features of Prematures

Prematures' Descriptive Features	Mother (n = 120)				Father (n = 120)					
	PSS:NICU	BAI*	EPDS*	BAI	PSS:NICU	BAI	EPDS*	BAI		
	Mean (±SD)	Test/p	Mean (±SD)	Test/p	Mean (±SD)	Test/p	Mean (±SD)	Test/p		
<b>Hospitalization diagnosis</b>										
Respiratory distress	109.6 (14.5)	F=9.8	25.0 (5.4)	H=23.7	20.9 (4.5)	F=6.4	104.8 (16.6)	F=7.8	11.4 (4.8)	H = 15.9
Respiratory arrest	130.8 (16.2)	<b>p &lt; 0.01</b>	31.8 (5.4)	<b>p &lt; 0.01</b>	23.6 (3.3)	<b>p &lt; 0.01</b>	122.2 (13.7)	<b>p &lt; 0.01</b>	14.5 (3.5)	<b>p &lt; 0.01</b>
Acute respiratory distress syndrome	120.2 (18.4)		33.3 (8.6)		25.1 (2.4)		112.6 (14.7)		16.8 (33.5)	
Others	116.1 (24.3)		26.8 (7.4)		19.6 (5.0)		117.9 (9.0)		12.0 (4.8)	
<b>Baby's birth type</b>										
Vaginal birth	115.0 (16.1)	t=2	27.0 (6.9)	t=2	19.8 (4.9)	t=-1.9	108.5 (17.1)	t=-3	11.2 (4.5)	t=-1.7
Cesarean section	114.1 (18.5)	p=0.7	26.7 (6.4)	p=0.7	21.5 (4.4)	p=0.06	109.7 (16.9)	p=0.7	12.8 (4.9)	p = 0.09
<b>State of being on a ventilator</b>										
Yes	127.6 (16.5)	U=531	31.4 (6.0)	U=630	24.0 (3.0)	U=658	121.0 (13.5)	U=650	14.5 (4.2)	U=676
No	107.7 (14.3)	<b>p &lt; 0.01</b>	24.5 (5.5)	<b>p &lt; 0.01</b>	19.4 (4.5)	<b>p &lt; 0.01</b>	103.5 (15.4)	<b>p &lt; 0.01</b>	9.8 (4.5)	<b>p &lt; 0.01</b>
<b>Baby's gender</b>										
Girl	112.0 (18.1)	U=1420	25.5 (5.7)	U=1395	20.3 (4.2)	U=1509	107.4 (17.5)	U=1538	10.5 (4.2)	t=-1.5
Boy	116.0 (17.3)	p=0.07	27.8 (6.9)	p=0.05	21.4 (4.8)	p=1	110.7 (16.5)	p=0.2	11.9 (5.3)	p=0.1
<b>Baby's birth weight</b>										
≤1800 g	123.4 (15.5)	t=5.8	29.7 (6.5)	U=1650	22.2 (4.5)	t=2.7	116.6 (14.0)	t=4.7	12.6 (5.3)	U=1304
>1800 g	106.7 (15.7)	<b>p &lt; 0.01</b>	24.3 (5.5)	<b>p = 0.03</b>	19.9 (4.5)	<b>p &lt; 0.01</b>	103.2 (16.8)	<b>p &lt; 0.01</b>	10.2 (4.3)	<b>p = 0.01</b>
<b>Baby's birth week</b>										
<32	124.7 (16.7)	t=5.9	30.4 (6.1)	U=774.5	23.2 (3.3)	U=904	117.9 (14.2)	t=4.9	13.9 (4.4)	U=861.5
≥32	107.5 (14.8)	<b>p &lt; 0.01</b>	24.4 (5.7)	<b>p = 0.03</b>	19.4 (4.7)	<b>p &lt; 0.01</b>	103.6 (16.2)	<b>p &lt; 0.01</b>	9.6 (4.5)	<b>p &lt; 0.01</b>
<b>Baby's fifth-minute APGAR score</b>										
<7	127.5 (17.1)	U=585	32.0 (6.3)	U=554	24.2 (3.1)	t=6.2	120.1 (14.3)	U=760	15.0 (4.6)	t=5.6
≥7	109.2 (15.1)	<b>p &lt; 0.01</b>	24.7 (5.4)	<b>p &lt; 0.01</b>	19.6 (4.4)	<b>p &lt; 0.01</b>	105.1 (16.0)	<b>p &lt; 0.01</b>	9.9 (4.3)	<b>p &lt; 0.01</b>
<b>Baby's SNAP-II score</b>										
<26	110.7 (15.1)	U=1369.5	25.5 (5.6)	U=1457.5	20.0 (4.6)	t=-2.1	107.0 (15.2)	U=1538	10.8 (4.3)	U=1595.5
≥26	117.5 (19.2)	<b>p = 0.02</b>	27.9 (7.0)	p=0.08	21.8 (4.5)	<b>p = 0.03</b>	111.3 (18.1)	p=0.18	11.8 (5.3)	p=0.31
<b>Baby's SNAP-II mortality rate</b>										
<18 (%)	110.2 (15.5)	t=-4.8	25.6 (6.5)	U=728	19.8 (4.5)	t=-6.3	105.8 (16.1)	U=747.5	10.3 (4.9)	U=572
≥18 (%)	126.8 (18.2)	<b>p &lt; 0.01</b>	30.4 (5.2)	<b>p &lt; 0.01</b>	24.3 (2.8)	<b>p &lt; 0.01</b>	119.9 (14.7)	<b>p &lt; 0.01</b>	14.6 (3.4)	<b>p &lt; 0.01</b>

(Continued)

**Table 4.** Differences Between the Mean Scores of the Parental Stressor Scale: Neonatal Intensive Care Unit, Beck Anxiety Inventory, and Edinburgh Postnatal Depression Scale of Mothers and Fathers According to the Features of Prematures

Prematures' Descriptive Features	Mother (n = 120)			Father (n = 120)		
	PSS:NICU	BAI*	EPDS*	PSS:NICU	BAI	EPDS*
	Mean (±SD)	Mean (±SD)	Mean (±SD)	Mean (±SD)	Mean (±SD)	Mean (±SD)
<b>Baby's SNAP-PEII score</b>						
<42	109.6 (15.9)	25.4 (6.6)	19.5 (4.5)	105.1 (16.2)	10.2 (5.0)	10.9 (4.6)
≥42	125.1 (17.0)	30.0 (5.1)	24.1 (3.1)	118.9 (14.5)	13.8 (3.6)	15.4 (3.8)
	<b>t = -4.8</b>	<b>U = 826.5</b>	<b>t = -6.4</b>	<b>p &lt; 0.01</b>	<b>U = 815.5</b>	<b>U = 801</b>
	<b>p &lt; 0.01</b>	<b>p &lt; 0.01</b>	<b>p &lt; 0.01</b>	<b>p &lt; 0.01</b>	<b>p &lt; 0.01</b>	<b>p &lt; 0.01</b>
<b>Baby's SNAP-PEII mortality rate</b>						
<19	110.1 (15.7)	25.6 (6.6)	19.7 (4.5)	105.8 (16.2)	10.3 (4.9)	11.1 (4.8)
≥19	125.7 (17.8)	30.0 (5.2)	24.3 (2.8)	118.7 (15.2)	14.1 (3.6)	15.3 (3.5)
	<b>t = -4.6</b>	<b>U = 833</b>	<b>t = -6.6</b>	<b>p &lt; 0.01</b>	<b>U = 834.5</b>	<b>U = 717</b>
	<b>p &lt; 0.01</b>	<b>p &lt; 0.01</b>	<b>p &lt; 0.01</b>	<b>p &lt; 0.01</b>	<b>p &lt; 0.01</b>	<b>p &lt; 0.01</b>
<b>Number of hospitalization days</b>						
<13	112.2 (20.2)	26.8 (7.3)	20.8 (4.3)	107.6 (17.5)	11.3 (5.0)	12.2 (5.0)
≥13	117.9 (12.0)	26.8 (5.2)	21.2 (5.1)	112.1 (15.7)	11.4 (4.8)	12.5 (4.5)
	<b>t = -1.9</b>	<b>t = 0.20</b>	<b>t = -0.5</b>	<b>p = 0.6</b>	<b>U = 1442</b>	<b>U = 1662.5</b>
	<b>p = 0.05</b>	<b>p = 0.98</b>	<b>p = 0.6</b>	<b>p = 0.16</b>	<b>p = 0.83</b>	<b>p = 0.54</b>

Note: BAI = Beck Anxiety Inventory; EPDS = Edinburgh Postnatal Depression Scale; F = one-way analysis of variance; H = Kruskal-Wallis; others = premature membrane rupture, preeclampsia, placenta previa, pneumothorax, and meconium aspiration, gestational diabetes mellitus; PSS:NICU = Parental Stressor Scale: Neonatal Intensive Care Unit; SD, standard deviation; t = independent sample t-test; U = Man-Whitney U test.  
\*No fit the normal distribution.

**Table 5.**

Regression Analysis and Beta Correlation Coefficients of Variables and Significance Levels

Part	Variable	B	SE	β	t	p
Mother EPDS	Invariant <sup>1</sup>	14.021	2.707	-	5.180	<0.01
	Mother PSS:NICU	.061	.023	.233	2.603	<0.01
		R = .233	R <sup>2</sup> = .046			
		F <sub>(1,118)</sub> = 6.774	<b>p = 0.010</b>			
Part 2	Variable	B	SE	β	t	p
Father BAI	Invariant <sup>2</sup>	-6.279	2.484	-	-2.528	0.013
	Father PSS:NICU	.161	.022	.552	7.195	<0.01
		R = .552	R <sup>2</sup> = .305			
		F <sub>(1,118)</sub> = 51.769	<b>p &lt; 0.01</b>			

B = unstandardized coefficients; BAI = Beck Anxiety Inventory; Dependent variables part 1 = mother postpartum depression; EPDS = Edinburgh Postnatal Depression Scale; p = significance value <.05; part 2 = father anxiety; part 3 = mother neonatal intensive care unit; part 4 = father neonatal intensive care unit; part 5 = father anxiety; part 6 = mother postpartum depression; PSS:NICU = Parental Stressor Scale: Neonatal Intensive Care Unit; R = simple correlation coefficient; R<sup>2</sup> = coefficient of determination, the ratio of the independent variable to the dependent variable as a percentage (%); SE = standard error; t = significance test of regression coefficients; β = standardized coefficients beta.

(r = -.41), and fifth minute APGAR score (r = -.43) (p < 0.01). A positive significant correlation was found between fathers' PSS:NICU and prematures' SNAP-II score (r = .20), SNAP-II mortality rate (r = .32), SNAP-PEII score (r = .30), SNAP-PEII mortality rate (r = .32) (p < 0.01) (Table 3).

Mothers' PSS:NICU mean score was found higher in the respiratory arrest diagnosed group, dependent on a ventilator, born 1800 g and less, born before 32 weeks, APGAR score below 7, SNAP-II score 26 and above, SNAP-II mortality rate 18% and above, SNAP-PEII score 42 and above, SNAP-PEII mortality rate 19% and above group (p < 0.01) (Table 4).

Fathers' PSS:NICU mean score was found higher in the respiratory arrest diagnosed group, dependent on a ventilator, born 1800 g and less, born before 32 weeks, APGAR score below 7, SNAP-II mortality rate 18% and above, SNAP-PEII score 42 and above, SNAP-PEII mortality rate 19% and above group (p < 0.01) (Table 4).

It was determined that stress in mothers significantly predicted depression in mothers by 5% (R = .233, R<sup>2</sup> = .046, F<sub>(1,118)</sub> = 6.774, p < 0.05). It was determined that stress in fathers significantly predicted anxiety in fathers with a rate of 30% (R = .552, R<sup>2</sup> = .305, F<sub>(1,118)</sub> = 51.769, p < 0.05) (Table 5).

### Discussion

This study aimed to determine stress, anxiety, postpartum depression, and the predictors affecting these variables in parents with premature infants in NICU. It has been revealed that

factors such as the infant's appearance and behavior in NICU, changes in parental roles, infant's poor response to stimulus and being fragile, and fear of infection have a significant effect on the mood of the parents (Al Maghaireh et al., 2017; Cajiao-Nieto et al., 2021; Fisher et al., 2018).

In a study conducted on premature infants, it was revealed that PSS-NICU of mothers and fathers was 9.27 and 7.43, parental role change was 3.06 and 2.45, and infant's appearance and behaviors were 3.73 and 2.76, respectively. It was also reported that mothers' PSS:NICU and subdimensions are higher than those of fathers (Ionio et al. 2016). In another study conducted on mothers of low-income and low birth weight prematures, it was reported that PSS:NICU of mothers was 65.1, parental role change was 32.5, and the infants' appearance and behavior was 32.6 (Garfield et al., 2015). In a study carried out in 25 neonatal intensive care units in Italy, it was reported that mothers' PSS:NICU sound and noise subdimension was 2.5, infants' appearance and behavior 2.8, and parent role change were 3.4 (Montirosso et al., 2012). A meta-analysis study revealed that parental role change significantly affected PSS:NICU ( $d = .30$ ) and that mothers were more stressed than fathers (Schappin et al., 2013). The current study determined that mothers' and fathers' PSS-NICU subscales were found to be higher than in previous studies. Also, mothers' PSS-NICU subscales were higher than fathers'. This shows that stress is high in parents with premature babies in the intensive care unit.

Studies have reported a positive correlation between the number of days of stay in the NICU and paternal stress, paternal anxiety, and paternal depression (Ionio et al. 2016). A study on low-income mothers of premature infants reported a relationship between parental stress and anxiety and postpartum depression (Garfield et al., 2015). Another study found that mothers had a high correlation between acute stress disorder and acute stress symptoms and depression, and at the end of the first month postpartum, there was a high correlation between acute stress symptoms and postpartum depression (Jubinville et al., 2012). In a comparative study conducted on the fathers of term and preterm infants, in the first three postpartum days, there was a moderately positive relationship between stress (PSS:NICU) and anxiety, and postpartum depression (Cajiao-Nieto et al., 2021). Some relevant studies reported that high anxiety and depressive symptoms are seen in fathers, and that anxiety and depression are associated with parenting stress and worrying about the health of the mother (Arockiasamy et al., 2008; Deeney et al., 2012). In parallel with the results of the previous research, this study found a highly significant positive correlation between stress, anxiety, and postpartum depression mean scores of the mothers and fathers.

There are studies reporting that the current clinical condition of the premature infant during their admission to the intensive care unit affects stress, anxiety, and depression in mothers and fathers. In a study conducted on prematures, a significant relationship was reported between the infant's disease severity score and parental stress, anxiety, and postpartum depression (Garfield et al., 2015). A meta-analysis study reported that gestational age and low birth weight increased stress in parents (Schappin et al.,

2013). Another study found that the SNAP-II mortality rate was high and this situation increased stress (Jubinville et al., 2012). In this study, it was determined that as the clinical condition of prematures worsened, stress, anxiety, and depression increased in mothers and fathers. It was determined that stress positively predicted postpartum depression in mothers and anxiety in fathers. These findings are consistent with the literature.

In this study, stress, anxiety, and postpartum depression in parents were determined to be considerably higher than in previous research findings. Other factors that cause this situation are thought to contribute to the fact that the region is rural, the fertility rate is very high in the region, the education and economic status of the parents living in the region is low, early marriages are frequent, and the use of health services is low (TDHS, 2018; TUIK, 2021). Considering all these conditions, it is thought that the birth of a premature infant, his/her admission to NICU, the current clinical condition of the infant, and other affecting factors cause a high level of psychosocial problems in parents.

#### Study limitations

Since the research was conducted in a single center and data collection tools were based on self-report, it cannot be generalized to the population.

#### Conclusion and Recommendations

Research findings show that stress, anxiety, and postpartum depression are seen at high rates in parents with premature infants in NICU, and stress significantly affects anxiety and depression. Parents who had a premature infant were at high risk for stress-anxiety-postpartum depression and were directed to the psychiatry outpatient clinic to provide necessary psychosocial, family-centered intervention, and counseling services.

**Ethics Committee Approval:** Ethical committee approval was received from the Clinical Research Ethics Committee of Harran University (Date: March 1, 2021 Approval No: HRU/21.05.10).

**Informed Consent:** Written informed consent was obtained from parents who participated in this study.

**Peer-review:** Externally peer-reviewed.

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#### References

Al Maghaireh, D. F., Abdullah, K. L., Chong, M. C., Chua, Y. P., & Al Kawafha, M. M. (2017) Stress, Anxiety, Depression and Sleep

Disturbance among Jordanian Mothers and Fathers of Infants Admitted to Neonatal Intensive Care Unit: A Preliminary Study. *Journal of Pediatric Nursing*, 36, 132–140. [CrossRef]

Alkan, Ç. (2017). *Validity and reliability study of Edinburgh postpartum depression scale in Turkish men* [Specialization Thesis]. İzmir: Dokuz Eylül University Faculty of Medicine Department of Family Medicine. Retrieved from <https://acikbilim.yok.gov.tr/handle/20.500.12812/578327>

Arockiasamy, V., Holsti, L., & Albersheim, S. (2008). Fathers' experiences in the neonatal intensive care unit: A search for control. *Pediatrics*, 121(2), e215–e222. [CrossRef]

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, 56(6), 893–897. [CrossRef]

Cajiao-Nieto, J., Torres-Giménez, A., Merelles-Tormo, A., & Botet-Mussons, F. (2021). Paternal symptoms of anxiety and depression in the first month after childbirth: A comparison between fathers of full term and preterm infants. *Journal of Affective Disorders*, 282, 517–526. [CrossRef]

Çelen, R., & Taş Arslan, F. (2017). The anxiety levels of the parents of premature infants and related factors. *Journal of Pediatric Research*, 4(2), 68–74. [CrossRef]

Cohen, J. (1992). Statistical power analysis. *Current Directions in Psychological Science*, 1(3), 98–101. [CrossRef]

Condon, J. T., Boyce, P., & Corkindale, C. J. (2004). The first time fathers study: A prospective study of the mental health and wellbeing of men during the transition to parenthood. *Australian and New Zealand Journal of Psychiatry*, 38(1–2), 56–64. [CrossRef]

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150(6), 782–786. [CrossRef]

Deeney, K., Lohan, M., Spence, D., & Parkes, J. (2012). Experiences of fathering a baby admitted to neonatal intensive care: A critical gender analysis. *Social Science and Medicine*, 75(6), 1106–1113. [CrossRef]

Engindeniz, A. N., Küey, L., & Kültür, S. (1997). Turkish version of the Edinburgh postpartum depression scale. Reliability and validity study. *Spring symposiums I Book, psychiatric organization of Turkey*, 1, 51–52.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. [CrossRef]

Fisher, D., Khashu, M., Adama, E. A., Feeley, N., Garfield, C. F., Ireland, J., Koliouli, F., Lindberg, B., Nørgaard, B., Provenzi, L., Thomson-Salo, F., & van Teijlingen, E. (2018). Fathers in neonatal units: Improving infant health by supporting the baby-father bond and mother-father coparenting. *Journal of Neonatal Nursing*, 24(6), 306–312. [CrossRef]

Garfield, L., Holditch-Davis, D., Carter, C. S., McFarlin, B. L., Schwartz, D., Seng, J. S., Giurgescu, C., & White-Traut, R. (2015). Risk factors for postpartum depressive symptoms in low-income women with very low-birth-weight infants. *Advances in Neonatal Care*, 15(1), E3–E8. [CrossRef]

Turkey Demographic and Health Survey (TDHS). (2018). Retrieved from [http://www.sck.gov.tr/wp-content/uploads/2020/08/TNSA2018\\_ana\\_Rapor.pdf](http://www.sck.gov.tr/wp-content/uploads/2020/08/TNSA2018_ana_Rapor.pdf)

Ionio, C., Colombo, C., Brazzoduro, V., Mascheroni, E., Confalonieri, E., Castoldi, F., & Lista, G. (2016). Mothers and fathers in NICU: The impact of preterm birth on parental distress. *Europe's Journal of Psychology*, 12(4), 604–621. [CrossRef]

Joseph, R. A., Mackley, A. B., Davis, C. G., Spear, M. L., & Locke, R. G. (2007). Stress in fathers of surgical neonatal intensive care unit babies. *Advances in Neonatal Care*, 7(6), 321–325. [CrossRef]

Jubinville, J., Newburn-Cook, C., Hegadoren, K., & Lacaze-Masmon-teil, T. (2012). Symptoms of acute stress disorder in mothers of premature infants. *Advances in Neonatal Care*, 12(4), 246–253. [CrossRef]

Leach, L. S., Poyser, C., Cooklin, A. R., & Giallo, R. (2016). Prevalence and course of anxiety disorders (and symptom levels) in men across the perinatal period: A systematic review. *Journal of Affective Disorders*, 190, 675–686. [CrossRef]

Lefkowitz, D. S., Baxt, C., & Evans, J. R. (2010). Prevalence and correlates of posttraumatic stress and postpartum depression in parents of infants in the Neonatal Intensive Care Unit (NICU). *Journal of Clinical Psychology in Medical Settings*, 17(3), 230–237. [CrossRef]

Miles, M. S., Funk, S. G., & Carlson, J. (1993). Parental stressor scale: Neonatal Intensive Care Unit. *Nursing Research*, 42(3), 148–152. [CrossRef]

Missler, M., van Straten, A., Denissen, J., Donker, T., & Beijers, R. (2020). Effectiveness of a psycho-educational intervention for expecting parents to prevent postpartum parenting stress, depression and anxiety: A randomized controlled trial. *BMC Pregnancy and Childbirth*, 20(1), 658. [CrossRef]

Montirosso, R., Provenzi, L., Calciolari, G., Borgatti, R., & NEO-ACQUA Study Group. (2012). Measuring maternal stress and perceived support in 25 Italian NICUs. *Acta Paediatrica*, 101(2), 136–142. [CrossRef]

Paulson, J. F., & Bazemore, S. D. (2010). Prenatal and postpartum depression in fathers and its association with maternal depression: A meta-analysis. *JAMA*, 303(19), 1961–1969. [CrossRef]

Pisoni, C., Spairani, S., Fauci, F., Ariando, G., Tziialla, C., Tinelli, C., Politi, P., Balottin, U., Stronati, M., & Orcesi, S. (2020). Effect of maternal psychopathology on neurodevelopmental outcome and quality of the dyadic relationship in preterm infants: An explorative study. *Journal of Maternal-Fetal and Neonatal Medicine*, 33(1), 103–112. [CrossRef]

Schappin, R., Wijnroks, L., Uniken Venema, M. M., & Jongmans, M. J. (2013). Rethinking stress in parents of preterm infants: A meta-analysis. *PLoS One*, 8(2), e54992. [CrossRef]

Surmeli Onay, O., Sarilar, T. D., Taskiran Tepe, H., Ozen, H., & Tekin, N. (2021). The relationship of breastfeeding patterns in the neonatal intensive care unit to maternal symptoms of anxiety and depression. *Breastfeeding Medicine*, 16(3), 251–257. [CrossRef]

Tommiska, V., Östberg, M., & Fellman, V. (2002). Parental stress in families of 2 years old extremely low birth weight infants. *Archives of Disease in Childhood. Fetal and Neonatal Edition*, 86(3), F161–F164. [CrossRef]

Trumello, C., Candelori, C., Cofini, M., Cimino, S., Cerniglia, L., Paciello, M., & Babore, A. (2018). Mothers' depression, anxiety, and mental representations after preterm birth: A study during the infant's hospitalization in a neonatal intensive care unit. *Frontiers in Public Health*, 6(359), 359. [CrossRef]

Turan, T., & Basbakkal, Z. (2006). Study on validity and reliability of a Turkish version of the parental stress scale: Neonatal intensive care unit. *Journal of Hacettepe University School of Nursing*, 32–42. Retrieved from <https://dergipark.org.tr/tr/download/article-file/88580>

Turkish Statistical Institute (TUIK). (2021). Birth statistics. Retrieved from <https://data.tuik.gov.tr/Bulten/Index?p=Dogum-Istatistikleri-2021-45547> Publication Date: 12 May 2022.

Ulusoy, M., Sahin, N. H., & Erkmn, H. (1998). The Beck Anxiety Inventory: Psychometric properties. *Journal of Cognitive Psychotherapy*, 12(2), 163–172.

Venkatesh, K. K., Phipps, M. G., Triche, E. W., & Zlotnick, C. (2014). The relationship between parental stress and postpartum depression among adolescent mothers enrolled in a randomized controlled prevention trial. *Maternal and Child Health Journal*, 18(6), 1532–1539. [CrossRef]

Vismara, L., Rollè, L., Agostini, F., Sechi, C., Fenaroli, V., Molgora, S., Neri, E., Prino, L. E., Odorisio, F., Trovato, A., Polizzi, C., Brustia, P., Lucarelli, L., Monti, F., Saita, E., & Tambelli, R. (2016). Perinatal parenting stress, anxiety, and depression outcomes in first-time mothers and fathers: A 3- to 6-months postpartum follow-up study. *Frontiers in Psychology*, 7(938), 938. [CrossRef]

Wilson, S., & Durbin, C. E. (2010). Effects of paternal depression on fathers' parenting behaviors: A meta-analytic review. *Clinical Psychology Review*, 30(2), 167–180. [CrossRef]

World Health Organization (WHO). (2012). *Born too soon-the global action report on preterm birth*. Retrieved from [http://whqlibdoc.who.int/publications/2012/9789241503433\\_eng.pdf](http://whqlibdoc.who.int/publications/2012/9789241503433_eng.pdf)

World Health Organization (WHO). (2013). Retrieved from <http://www.who.int/mediacentre/factsheets/fs363/en/>