Both parents of neonatal intensive care unit patients are at risk of depression

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Postpartum depression is a serious disorder that can be seen not only in mothers but also in fathers; therefore, it negatively affects the whole family. Hospitalization in the neonatal intensive care unit (NICU) is a stress factor for the parents and contributes to depression. We aimed to detect the frequency of postpartum depression and the contributing risk factors in parents of NICU patients. The Edinburgh Postnatal Depression Scale was used for mothers and the Beck Depression Inventory was performed for fathers in the 2nd and 6th weeks after delivery. At the 2nd week, maternal depression frequency was found as 38.3%, with a mean score [ms] of 10.97±6.93. At the 6th week, maternal depression frequency was 33.3% (ms: 9.57±5.78). Paternal depression was 11.7% (ms= 7.13±7.35) at the 2nd week and 10.0% (ms: 6.50±5.79) at the 6th week. The frequency of maternal depression remained stable, but mean maternal depression scores were decreased at the 6th week compared to the 2nd week (p=0.023). However, paternal depression scores were similar in both periods (p=0.428). The infants' disease severity at admission to the NICU, as shown by SNAPPE-II risk scores, was positively correlated with Edinburgh depression scores of the mothers at the postnatal 2nd week, but not at the 6th week.

In conclusion, NICU stay of high-risk infants may cause depression in their mothers and fathers, even in the absence of any previous risk factor. Although at a lower rate than in mothers, fathers may also suffer from depression. Parental depression screening and whole family support during NICU hospitalization are strongly recommended.

Key words: NICU, postpartum depression, paternal depression.

Pregnancy is an important period when a woman experiences great physiologic and psychological changes in her body and social changes in her life. Postpartum depression (PPD) is a severe form of maternity blues caused by rapid reversal of hormonal changes in pregnancy, and especially estradiol and progesterone withdrawal after birth, but the exact reason is not known[1]. PPD, affecting 10% to 15% of newly delivered women, negatively affects not only the mother but also the infant and all family members[2].

Although most of the previous PPD research has been conducted in mothers, fathers may also show depressive symptoms in this period. The incidence of paternal PPD is reported as 2-5%, but may reach 10%[3] .

The most common symptoms of PPD are dysphoria, emotional lability, insomnia, confusion, fatigue, appetite disturbances, feelings of worthlessness and hopelessness, extreme anxiety, guilt, diminished interest or pleasure, decreased concentration, inability to make decisions, and, in extreme cases, suicidal thoughts[4]. Compromised mother-infant interactions increase the risk for poor childhood developmental outcomes.

Several risk factors of PPD have been identified, including anxiety or depression during pregnancy, a history of depression, as well as increased life stressors[5]. Both parents must learn their new roles in providing a safe

environment and taking care of their newborn infant. They have to learn how to communicate with their infant and how to understand and handle the baby's problems. Perceived stress and the availability of social support are significantly associated with depression in both mothers and fathers[6].

Parent of infants being cared for in Neonatal Intensive Care Units (NICUs) may have a higher risk of anxiety, posttraumatic disorder and depression risk because of intensive fear and anxiety about their infant's illness, the stressful ambiance of the unit, and the physical and emotional separation; however, very few studies have evaluated this issue.

We therefore aimed to analyze the frequency of both maternal and paternal PPD and the contributing risk factors in parents of NICU patients. We also planned to show the relationship between neonatal disease severity scores and PPD.

Material and Methods

Parents of 68 infants being cared for in Ege University Children's Hospital NICU between January and June 2010 were included into the study. The infants with diagnoses of prematurity, respiratory distress, congenital malformation, and perinatal asphyxia requiring a hospitalization period longer than six weeks were included. Eight families were excluded from the study after the first evaluation due to early recovery and discharge of the baby. After obtaining informed consent from the parents, the evaluations were performed in the 2nd and 6th weeks of the hospitalization. According to the reliability and validity studies for the Turkish population, versions of the Edinburgh Postnatal Depression Scale (EPDS)[7] (for mothers) and Beck Depression Inventory[8] (for fathers) were used. The cut-off levels were taken as 13 for EPDS and 17 for Beck Depression Inventory. Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) 13.0 program.

Results

The mean gestational age of the infants was 31.2±3.65 weeks and mean birth weight was 1542±743 grams. The mean age of the mothers was 29±5.2 years and of the fathers was 33.6±8.2 years.

Mean maternal EPDS score at the 2nd week was 10.97±6.93, and 38.3% (23/60) of the mothers had PPD. One month later, at the 6th week, the mean score was 9.57±5.78, and the frequency of maternal PPD was 33.3% (20/60).

Mean Beck score of the fathers was 7.13±7.35 at the 2nd week, and 11.7% (7/60) of the fathers had depression. At the 6th week, the mean score was 6.50±5.79, and paternal depression frequency was 10.0% (6/60) (Table I).

Maternal depression scores had decreased significantly at the 6th week compared to the 2nd week ($p=0.023$), but mean depression scores of fathers were similar at both evaluations ($p=0.428$) (Table I).

Statistically, maternal and paternal PPD risk at the postnatal 2nd and 6th weeks was not related to maternal and paternal education, profession, infant gender, type of delivery (vaginal or cesarean section), planned or unplanned pregnancy, maternal history of depression in a previous pregnancy, presence of medical problems in pregnancy, or the presence of depression in the other parent ($p>0.05$ for all) (Tables II, III). The infants' SNAPPE-II risk scores, which were performed at admission to the NICU, were positively correlated with Edinburgh depression scores of the mothers at the postnatal 2nd week ($r=0.27$, $p=0.036$) (Fig. 1). However, maternal Edinburgh depression scores at the postnatal 6th week and paternal Beck depression scores at the 2nd and the 6th weeks were unrelated to disease severity scores of the infants.

Discussion

This study showed quite a high incidence (38.3%) of maternal depression at the 2nd week of delivery, but this frequency decreased significantly to 33.3% at the 6th week among the mothers of NICU patients. Maternal mean Edinburgh depression scores had also decreased at the 6th week, from 10.97±6.93 to 9.57±5.78. Paternal depression rates were similar in both study periods (11.7% and 10.0%), and mean paternal Beck depression scores were 7.13±7.35 at the 2nd week and 6.50±5.79 at the 6th week.

It is known that even after the birth of a healthy infant, PPD can be seen in 10-15% of mothers and in 2-5% of fathers, but paternal depression has been reported as high as 10%

in some studies[3]. Using a lower cut-off level of >9 in the EPDS, Kerstis et al.[9] reported PPD in 16.5% of the mothers and 8.7% of the fathers at three months after birth in Swedish couples. A study from a family health center in western Turkey included 110 couples, and using the Mother Introduction Form, Father Introduction Form and the EPDS, the prevalence of PPD was reported as 9.1% and 1.8% for mothers and fathers, respectively. The EPDS average score was 4.29±5.33 points for mothers and 1.12±2.75 points for fathers[10]. Our data show a much higher risk of depression in NICU parents compared to these previously reported results for parents of healthy infants.

In our study, the infants' disease severity at admission to the NICU, as shown by SNAPPE-II risk scores, was positively correlated with Edinburgh depression scores of mothers at the postnatal 2nd week, but not at the 6th week. Paternal Beck depression scores at the 2nd and 6th weeks showed no correlation with disease severity scores of the infants. These results indicate that the poor health condition of the infant (as shown by higher SNAPPE-II scores), affects mothers' depression risk at least in the early weeks of life.

The other possible contributing factors, such as maternal and paternal education, profession, infant gender, type of delivery (vaginal or cesarean section), planned or unplanned pregnancy, maternal history of depression in a previous pregnancy, and presence of medical problems in pregnancy, showed no correlation with parental depression scores.

A meta-analysis of 43 studies revealed a significant correlation between maternal and paternal depression in healthy infant populations[11]. Poor relationship satisfaction was also frequently associated with elevated depressive symptoms or depression in men[12]. Some of the major risk factors for paternal depression in the postpartum period are previous history of depression, late adolescent fatherhood and higher social deprivation[13,14]. However, the fact that such correlations could not be shown in our group may be due to the low number of study cases or to the other important stress factors in these parents.

Parents of NICU infants may have a higher risk of posttraumatic stress disorder (PTSD) and PPD due to the stressful condition of their infant and the NICU environment, but very few studies have analyzed this issue.

Lefkowitz et al.[15] evaluated acute stress disorder (ASD) and PTSD in both parents and PPD in mothers of infants cared for in the NICU. In that study, 35% of mothers and 24% of fathers met ASD diagnostic criteria at 3–5 days after the infant's NICU admission, and 15% of mothers and 8% of fathers met PTSD diagnostic criteria 30 days later. Nearly half of the mothers met all criteria for PPD diagnosis, with an additional one-fifth experiencing symptoms at a level of subsyndromal PPD, which is much higher than the rates found in mothers of healthy infants. PPD was highly correlated with PTSD in mothers, and 16% of mothers met the criteria for both disorders. The authors concluded that comorbidity of both disorders is at a high level in mothers of infants in the NICU, and the diagnoses of PPD and PTSD share similar criteria and symptom sets, particularly in the area of anxiety and somatic symptoms[15].

In a study from Turkey, the mean EPDS scores of 88 NICU mothers were found significantly higher than those of the control group mothers (9.6±5.6 versus 7.3±4.9, p=0.005) at the first month after birth. NICU mothers who had high EPDS scores (≥13) accounted for 29.5% of the total study group. This subgroup had significantly higher anxiety scores and insecure attachment style in comparison to the subgroup of NICU mothers who had low EPDS scores[16].

A study from New Zealand compared data from 205 fathers of infants who were admitted to

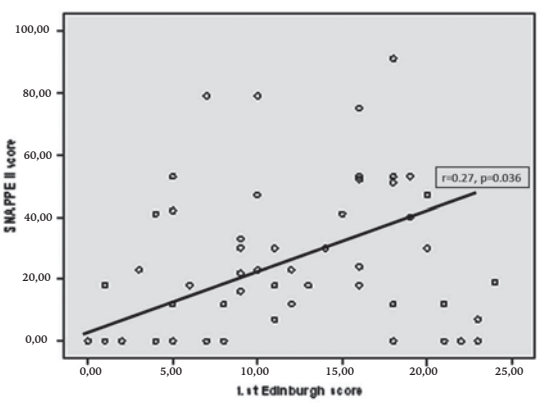

Fig. 1. Correlation between SNAPPE-II score and Edinburgh scores of mothers at the postnatal 2nd week (r=0.27; p=0.036).

Table I. Maternal and Paternal Depression Frequency and Mean Depression Scores

	2nd week			6th week			
	n/N	%	score (mean±SD)	n/N	%	score (mean±SD)	p
Maternal depression	23/60	38.3	10.97±6.93	20/60	33.3	9.57±5.78	0.023*
Paternal depression	7/60	11.7	7.13±7.35	6/60	10	6.50±5.79	0.428

Table II. Relation between Maternal Depression Scores and Demographic Features

Demographic feature	Maternal depression scores (2nd week)		Maternal depression scores (6th week)	
	Mean±SD	*p*	*Mean±SD*	*p*
Education				
≤8 years (n=17)	9.29±6.14	0.49	9.94±6.97	0.80
>8 years (n=43)	11.37±6.94		9.67±5.7	
Profession				
Working (n=24)	12.45±7.08	0.16	10.04±5.88	0.59
Housewife (n=36)	9.97±6.72		9.25±5.77	
Gender of baby				
Male (n=29)	10.96±7.38	0.95	9.68±5.84	0.89
Female (n=31)	10.96±6.59		9.45±5.81	
Delivery type				
C/S (n=47)	11.17±6.73	0.62	9.68±5.71	0.77
NVD (n=13)	10.23±7.82		9.15±6.22	
Pregnancy				
Planned (n=49)	10.36±6.69	0.15	8.97±5.57	0.08
Unplanned (n=11)	13.63±7.64		12.18±6.22	
Maternal history of depression				
Yes (n=3)	7.0±4.35	0.35	8.33±7.5	0.70
No (n=57)	11.17±6.99		9.63±5.75	
Medical problem in pregnancy				
Yes (n=22)	12.4±5.36	0.18	10.22±5.64	0.50
No (n=38)	10.13±7.62		9.18±5.89	
Depression in the other parent				
Yes (n=7)	17.5±4.8	0.07	16.2±2.6	0.08
No (n=53)	10.0±6.73		8.7±5.5	

C/S: Cesarean section. NVD: Normal vaginal delivery.

the NICU and 89 fathers of healthy newborns. Their results showed that levels of anxiety and depression were low in both NICU and healthy control parent groups, but infant prematurity was associated with higher levels of symptomatology in both mothers and fathers of infants in the NICU[17].

Our study is important since it showed a maternal PPD of 38%, which was closely related to the infant's disease severity at the postpartum 2nd week. However, this rate decreased to 33%, and the mean PPD scores also decreased, probably reflecting the mothers' adaptation to the NICU conditions and/or that their infants recovered while still being cared for in the NICU. Another importance of the study is that it showed for the first time that paternal depression is an important issue in this group of infants, although at a lower rate than observed in mothers.

Depressive symptoms are likely to decrease the father's ability to provide maternal support. Children with two depressed parents are at significantly greater risk of poor developmental outcomes than those with one affected parent[18]. Depression in fathers during the postnatal period was associated with adverse emotional and behavioral outcomes in children aged 3-4 years and an increased risk of behavioral problems in boys[19,20]. After controlling for potentially confounding factors, paternal depression was associated with significantly

Table III. Relation between Paternal Depression Scores and Demographic Features

Demographic feature	Paternal depression scores (2nd week)		Paternal depression scores (6th week)	
	Mean±SD	*p*	*Mean±SD*	*p*
Education				
≤8 years (n=16)	8.87±9.59	0.54	5.68±5.42	0.60
>8 years (n=44)	6.5±6.35		6.79±5.95	
Profession				
Employed (n=38)	6.71±6.21	0.89	6.63±5.81	0.86
Unemployed (n=22)	7.86±9.09		6.27±5.9	
Gender of baby				
Male (n=29)	6.44±5.48	0.97	6.72±6.07	0.97
Female (n=31)	7.77±8.78		6.29±5.61	
Delivery type				
C/S (n=47)	6.48±5.71	0.78	6.57±5.64	0.59
NVD (n=13)	9.46±11.51		6.23±6.54	
Pregnancy				
Planned (n=49)	6.55±6.27	0.45	6.44±5.65	0.91
Unplanned (n=11)	9.72±10.98		6.72±6.68	
Paternal history of depression				
Yes (n=3)	5.0±4.35	0.65	6.66±6.02	0.92
No (n=57)	7.24±7.47		6.49±5.83	
Medical problem in pregnancy				
Yes (n=22)	7.40±8.0	0.79	6.18±4.68	0.76
No (n=38)	6.97±7.02		6.68±6.4	
Depression in the other parent				
Yes (n=23)	11.17±9.0	0.06	9.34±6.35	0.07
No (n=37)	4.62±4.69		4.72±4.68	

C/S: Cesarean section. NVD: Normal vaginal delivery.

higher community care costs[21]. In a large cohort study investigating PPD, marital conflict acted as an independent risk factor for adverse child outcomes. Therefore, antenatal and postnatal screening and intervention programs targeted at parental depression and marital problems are suggested[22].

In some countries, routine pre- and postnatal screening for depression in mothers is recommended[23]. Detection of paternal depression is rare because the maternal–child health care system usually only screens for maternal depression[24]. Paternal PPD is a clinically significant problem for families that is currently underscreened, underdiagnosed, and undertreated, and it has negative effects on marital/partner relationships, infant bonding, and child development[25].

Our study shows that both mothers and fathers whose sick infants are being cared for in NICUs have an even higher risk of depression than the normal population, and they deserve a careful depression screening and family support during the infant's NICU stay. Early detection and treatment are very important for the interparental and parent-infant relations and long-term child developmental outcome of the NICU graduates.

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