



# Maternal mental health during the neonatal period: Relationships to the occupation of parenting

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## ABSTRACT

**Purpose:** To (1) examine the extent of a range of early mental health challenges in mothers with a very preterm infant hospitalized in the NICU and mothers of full-term infants, (2) identify family social background and infant medical factors associated with higher levels of maternal psychological distress, and (3) assess the relationship between maternal psychological distress and maternal perceptions of the parenting role, parenting confidence and NICU engagement.

**Methods:** At hospital discharge 37 mothers of very preterm infants ( $\leq 32$  weeks gestation) and 47 mothers of full-term infants ( $\geq 37$  weeks gestation) completed structured assessments of their psychological wellbeing and transition to parenting. Mothers of very preterm infants were also questioned about their NICU visitation and involvement in infant care.

**Results:** Sixty-four percent ( $n = 54$ ) of mothers experienced psychological distress ( $n = 26$ , 70% of preterm;  $n = 28$ , 60% of full-term). Lower infant birthweight was associated with maternal psychological distress ( $p = .03$ ). Mothers of very preterm infants had significantly more psychological distress related to having a Cesarean section delivery ( $p = .02$ ). Higher levels of psychological distress were associated with lower levels of parenting confidence in mothers of both very preterm and full-term infants ( $p < .02$ ).

**Conclusion:** Although parents of very preterm infants have higher rates of maternal mental health challenges, mothers of full-term infants at high social risk are also impacted.

## 1. Introduction

Maternal mental health challenges following the birth of a child are significant, with one in seven American mothers experiencing postpartum depression [1,2]. Prior to delivery, mothers experience emotional changes and an increase in hormone production [3]. Hormone levels change further following delivery, which can result in increased emotional lability [4] and mental health risks for new mothers. Mothers at the highest risk are those with a history of mental health challenges [5] and those who have heightened situational stress and anxiety, as is the case with a preterm birth [6].

Compared to mothers of full-term infants, mothers of very preterm infants report significantly more anxiety, depression and stress [7–10], with rates of depression as high as 40% [11]. Post-traumatic stress symptoms are also relatively common, affecting 23% of mothers with an infant hospitalized in the neonatal intensive care unit (NICU) based on self-report prior to discharge [12], and potentially increasing to 40%

by 14 months post delivery [13]. These mental health symptoms can disrupt the transition to parenting and a mother's healthy adaptation to the occupation of parenting [14], which may, in turn, adversely impact infant outcomes [15–17]. The construct of occupation describes everyday actions an individual needs, wants, or is expected to do [18]. Limited engagement in the occupation of parenting during their very preterm infant's NICU hospitalization can be a challenge for many parents [19]. Moreover, additional parenting challenges have been described among mothers with mental health symptoms. For example, mothers of full-term infants who experience symptoms of postpartum depression are less responsive in mother-infant interactions, are more likely to use undesirable feeding and sleep practices, and are less likely to attend scheduled medical appointments [20]. Similarly, maternal depression following very preterm birth has been shown to predispose a dyad to early interactional difficulties and less developmentally supportive feeding behaviors [13,21–23] which may impact longer term developmental outcomes [13,24].

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The challenges for mothers of very preterm infants are likely exacerbated by the NICU environment, where maternal stressors can be magnified. Significant sources of stress include the overwhelming nature of the NICU environment, and the infant's appearance and behaviors [25]. Mothers report that these stressors, and the highly medicalized environment, limit their participation in the care of their infants [25,26]. They also report high levels of stress relating to their loss of parental role, and in particular their ability to hold, care for, and protect their infant from pain [25,27,28]. Furthermore, mothers who experience avoidant post-traumatic stress symptoms perceive themselves to be less competent caregivers [29]. Increased parent participation during NICU hospitalization and support during the transition to home have been identified as strategies to improve parental confidence and reduce maternal mental health stressors [30]. However, a better understanding about the psychological challenges facing parents in the NICU and how early difficulties might influence maternal perceptions of their parental role and their engagement in infant care during this time is needed.

This study aimed to [1] examine the extent of a range of early mental health challenges in mothers with a very preterm infant hospitalized in the NICU and mothers of full-term infants, [2] identify family social background and infant medical factors associated with higher levels of maternal psychological distress, and [3] assess the relationship between maternal psychological distress and maternal perceptions of the parenting role, parenting confidence and NICU engagement.

## 2. Methods

### 2.1. Setting and participants

Two samples of mothers were recruited. These were as follows.

#### 2.1.1. Very preterm

The first group consisted of mothers of very preterm infants who were recruited within the first week of life based on consecutive admissions to the NICU. Inclusion criteria were mothers who had an infant born  $\leq 32$  weeks estimated gestational age (EGA) and who were free from congenital anomalies. These mothers and their infants were a convenience sample enrolled as part of a study concerned with early oral motor and feeding development. Because inclusion criteria were pre-established, based on the overarching study, the mothers of preterm infants did not have age or drug use exclusions. Very preterm infants were all hospitalized in the level IV NICU at Saint Louis Children's Hospital or in the level III NICU at Barnes Jewish Hospital's Special Care Nursery. Both hospital units are affiliated with each other and are connected by a walkway bridge. Very preterm infants were enrolled from January to June 2015.

#### 2.1.2. Full-term

The second group consisted of mothers of full-term infants (born  $\geq 37$  weeks EGA), cared for on the mother-baby floor of Barnes Jewish Hospital following a normal delivery. These mothers and their infants were enrolled within the first few days of life and prior to hospital discharge (typically day of life 2–4). Mothers were excluded if their full-term infant had a congenital anomaly, any medical complication (including admission to the special care nursery, need for oxygen, or pharmacological treatment), if maternal drug use was identified, if the mother was  $< 18$  years old, and/or if the parents did not speak English. Full-term infants were enrolled between March and June of 2016. Of note, since the hospital served an inner city catchment area of St Louis, this sample was characterized by relatively high levels of socially disadvantaged families (see Table 1).

### 2.2. Procedure

The Human Research Protection Office at Washington University approved this study, and mothers provided written informed consent. All infants received standard of care. Standardized and non-standardized assessments were administered as part of a structured questionnaire that was completed prior to NICU discharge among mothers of very preterm infants [between 35 and 47 weeks postmenstrual age (PMA)], and within four days of delivery and prior to discharge for mothers of full-term infants. This equated to mothers of very preterm infants completing assessments at an average of  $85.1 \pm 40.8$  days after birth, equivalent to  $39.7 \pm 3.4$  weeks PMA, whereas mothers of full-term infants completed assessments at an average of  $2.0 \pm 1.0$  days after birth.

### 2.3. Measures

#### 2.3.1. Maternal mental health

The Parental Stress Scale (PSS) [31], the Edinburgh Postnatal Depression Scale (EPDS) [32,33], the State-Trait Anxiety Inventory (STAI) [34,35], and the Modified Perinatal PTSD Questionnaire (PPQ) [36] were used to assess stress, depression, anxiety and post-traumatic stress symptoms. All of these parent-report measures have high test-retest reliability and convergent validity [31–36].

#### 2.3.2. Psychological distress

To define mothers with any maternal mental health challenges, the outcomes on the standardized measures were combined to form an overall measure of maternal psychological distress. Specifically, mothers were classified as psychologically distressed if they scored above the 75th percentile for the very preterm group on the PSS, EPDS, STAI (state), or modified PPQ. These cut-points equated to a score  $> 11$  on the EPDS,  $> 33$  on the STAI-state and/or a symptom score  $> 11.8$  on the modified PPQ. This approach was used to identify a potentially high-risk group based on existing data showing that 23–40% of mothers of very preterm infants experience more severe mental health challenges [7,9,11–13]. Of interest was how high levels of psychological distress might impact mothers' confidence, perceptions of their own parental role, and engagement in the NICU. To ensure that mothers with mental health challenges received necessary services, all mothers at the study sites were routinely screened and referred for mental health services as needed.

#### 2.3.3. Infant factors and medical procedures

Extensive infant clinical data was collected from the electronic medical record. For the very preterm group these included sex, race, EGA, birth-weight, Apgars at 1 and 5 min, breast milk exposure, PMA at discharge and length of stay (LOS) in days. Detailed information about medical diagnoses was also collected including the presence of patent ductus arteriosus (PDA; requiring indomethacin or surgical ligation), intrauterine growth restriction (IUGR), necrotizing enterocolitis (NEC; all stages), retinopathy of prematurity (ROP; all stages) and brain injury. Brain injury was defined as the presence of a Grade III or IV intraventricular hemorrhage (IVH), cystic periventricular leukomalacia or a cerebellar hemorrhage detected on cranial ultrasound or magnetic resonance imaging. Infant medical procedures collected included: days on total parenteral nutrition (TPN), days of mechanical ventilation, days on non-invasive mechanical ventilation (NIMV), days on continuous positive pressure airway (CPAP) and days on nasal cannula. Infant factors collected for the full-term group included EGA, gender, and race. Whether the infant was from a multiple birth was documented. If a mother gave birth to more than one infant, this was documented and medical factors were collected for the infant with the lowest birth weight for inclusion in the analyses. Information from the other infants in a multiple set was not included in the analyses so that there would not be double representation of multiple births in the sample.

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