

Maternal Mental Health and Neonatal Intensive Care Unit Discharge Readiness in Mothers of Preterm Infants

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Objective To evaluate associations between maternal mental health disorders (MHDs) and discharge readiness for mothers of infants born preterm (<37 weeks). We hypothesized that mothers with a history of MHDs would report decreased perceptions of neonatal intensive care unit (NICU) discharge readiness compared with mothers without a history.

Study design Mothers of infants born preterm in the NICU >5 days between 2012 and 2015 and participating in a transition home program completed a discharge readiness questionnaire measuring perceptions of staff support, infant well-being (medical stability), maternal well-being (emotional readiness/competency), and maternal comfort (worry about infant). Greater scores are more optimal (range 0-100). Social workers obtained a history of MHDs. Group comparisons and regression analyses were run to predict decreased scores and maternal discharge readiness.

Results A total of 37% (315/850) of mothers reported a MHD. They were more likely to be white (64% vs 55% $P = .05$), single (64% vs 45% $P \leq .001$), on Medicaid (61% vs 50% $P = .002$), and less likely to be non-English speaking (10% vs 22%, $P \leq .001$). Mothers with MHD perceived less NICU support (92 ± 13 vs 94 ± 12 , $P = .005$), less emotional readiness for discharge (78 ± 17 vs 81 ± 14 , $P = .04$), and lower family cohesion (81 ± 24 vs 86 ± 19 , $P = .02$) compared with mothers without MHD. Regression modeling (OR; CI) indicated that maternal history of MHDs predicted mother's decreased perception of infant well-being (1.56; 1.05-2.33) and her own well-being (1.99; 1.45-2.8) at discharge.

Conclusion One-third of mothers reported a history of MHDs. This vulnerable group perceive themselves as less ready for discharge home with their infant, indicating an unmet need for provision of enhanced transition services. (*J Pediatr* 2017;■■■:■■■-■■■).

More than 450 000 babies are born preterm in the US.¹ With increased rates of survival, more parents are exposed to extensive medical and nursing interventions. After their infants are discharged from the neonatal intensive care unit (NICU), parents are expected to transition to full-time caregiver responsibilities, so it is not surprising they become anxious when bringing their infant home.² Discharge readiness has been defined as parental emotional comfort and confidence with infant care, in addition to attainment of technical skills and knowledge.³ Therefore, parent mental well-being is critical to parenting readiness.

Time spent in the NICU exposes both infant and parent to stressors.⁴ Parental anxiety has been associated with infant appearance, sights and sounds of the technical NICU environment, alterations in parental role,⁵ concern for developmental outcomes⁶⁻⁸ and anticipated financial burdens.^{5,9-12} Mothers of infants born preterm are at increased risk for poor postpartum functioning, including depression,¹³ anxiety,¹⁴ and posttraumatic distress.¹⁵ The impact of maternal mental health and postpartum psychological distress on the mother-infant dyad is now recognized as a public health priority,¹⁶ because poor maternal mental health adversely affects child cognitive, language, social-emotional, and behavioral development.¹⁷⁻²³ Thus, it is not surprising that parental mental wellness is recognized as a cornerstone of infant wellness.

Stressful life events, poor social support, and prenatal history of psychiatric illness are all strong predictors of postpartum mental illness.²⁴ Prenatal depression has been cited as the strongest predictor for postpartum depression.²⁵ Perceptions of decreased readiness at discharge have been associated with postdischarge depressive symptoms.²⁶ Recent recommendations of recognizing and supporting maternal mental health during the NICU discharge transition have been published²⁷; however, discharge assessment data examining different constructs of maternal perceptions

CSW	Clinical social worker
FIPRE	Fragile Infant Parent Readiness Evaluation
FRS	Family resource specialist
MHD	Mental health disorder
NICU	Neonatal intensive care unit
THP	Transition home program
WIH	Women and Infants Hospital

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Supported by the Centers for Medicare & Medicaid Services, Center for Medicare and Medicaid Innovation (CMS 1C1CMS330993). The authors declare no conflicts of interest.

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<http://dx.doi.org/10.1016/j.jpeds.2017.01.052>

of emotional readiness and factors affecting this readiness are lacking. The objective of this paper was to explore the association between maternal mental health disorders (MHDs) and the perception of discharge readiness in mothers of infants born preterm. It was hypothesized that mothers with a history of MHDs would report decreased discharge readiness compared with mothers without a history of MHDs.

Methods

This prospective, cohort study recruited all infants < 37 weeks' gestation between October 2012 and September 2015 hospitalized in the Women and Infants Hospital (WIH) NICU greater than 5 days. Subjects were part of a larger education and support intervention, Partnering with Parents, the Medical Home and Community Providers to Improve Transition Services for High Risk Preterm Infants in Rhode Island (transition home program [THP]). The institutional review board of WIH approved the study. Excluded were mothers unable to read English or Spanish and infants or mothers with a terminal diagnosis. Families were approached, asked for their consent, and enrolled when infants no longer required acute care and were in the discharge preparation phase.

WIH NICU is an 80-bed, single family room level III/IV NICU. Multidisciplinary rounds involve medicine, nursing, nutrition, case managers, respiratory therapists, and social workers. Parents are encouraged to attend daily multidisciplinary rounds and provide basic infant care of diapering, bathing, feeding, skin to skin, and breastfeeding when developmentally and medically appropriate.

Parents enrolled in THP received the standard discharge process, which included nursing review and a demonstration for parents of infant care, viewing formula mixing videos, and cardiopulmonary resuscitation classes. Discharge planners reviewed follow-up appointments and home equipment details. In addition, parents enrolled in THP received enhanced education and support services, which included educational binders (containing information on infant safety topics, infection control, formula recipes, and community resources), parent mental health support, pre-discharge home assessment, and community referrals as needed. Former NICU parents were hired and trained to serve as family resource specialists (FRS). Families enrolled in THP were matched with a FRS. The FRS reviewed the educational binder, administered study questionnaires, and served as a peer mentor. English-, Spanish-, and/or Portuguese-speaking FRS were available. Study clinical social workers (CSWs) supervised the FRS, offered mental health counseling, and facilitated referrals to community providers. Study CSWs worked in conjunction with NICU staff social workers, however, with an emphasis on transition and the home environment.

Maternal characteristics, including age, race, gravida, marital status, education, insurance, involvement with child protective services, domestic violence, and substance abuse were abstracted from the medical record. Infant characteristics included birth weight, gestational age, sex, intraventricular hemorrhage (grade 3-4), necrotizing enterocolitis (>Bell stage 2), sepsis

(culture positive), bronchopulmonary dysplasia (oxygen at 34 weeks' postmenstrual age), breast milk use, oxygen at discharge, and length of stay. Socioeconomic questionnaires were completed at enrollment.

At enrollment, the study CSW obtained a history of MHDs by maternal report and medical record review. Mothers were interviewed and assigned a history of MHDs if they: (1) reported or had a documented diagnosis of anxiety, depression, bipolar disorder, post-traumatic stress disorder, obsessive compulsive disorder, or other diagnosis of the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*, and or (2) received mental health treatment, either psychotherapy or medication, for any of the aforementioned disorders before enrollment (including prenatal or antenatal). Medical record review included admission notes, social work assessments, and psychiatry consultations.

At discharge, mothers completed the Fragile Infant Parent Readiness Evaluation (FIPRE), which was developed by Health ActCHQ as a quality measure of NICU parent outcomes.²⁸ This discharge tool measures how the parent feels about the NICU care provided to herself and her infant and how emotionally prepared the parent feels to care for her infant at home. It consists of 4 core multi-item Likert-type scales. NICU support reflects how included and informed the parent felt during the NICU stay. Infant well-being reflects how positive a parent feels about infant's current health status and survival. Maternal well-being represents mother's feeling of self-competency and emotional confidence to care for self and infant. Maternal comfort reflects the degree of worry/anxiety the mother is experiencing regarding her infant's current and future health, growth, and development. Response options are "not at all," "a little," "some," and "a lot." Family cohesion (response choices ranging from "excellent" to "poor" on a 5-point scale) and anticipated personal time limitations (response choices ranging from "a lot of time" to "no time" on a 4-point scale) were each single-item scales. For all scales (except time limitation scale) scores are transformed to a standard 0-100 metric. Greater scores are more favorable responses and indicate greater discharge readiness. Mean and median scores are reported. Scores < 75 were evaluated for each scale, to identify responses in the lower three-quarters range of possible scores. Cronbach alpha for each scale was performed to measure internal reliability and ranged from 0.73 to 0.87. Six demographic questions also are asked.

Maternal and infant outcomes for those with and without a history of MHDs were compared with *t* tests and Wilcoxon tests for continuous variables and χ^2 tests for categorical variables. Infant variables were analyzed by the use of random effects models (continuous) or generalized estimating equations (categorical) methods to adjust for multiple births within mothers.

Regression models estimated the effect of MHDs on FIPRE scores while we controlled for independent variables of early preterm, days in NICU, gravida >1, nonwhite, non-English speaking, and Medicaid. A social risk variable comprised a count of selected risk factors, including less than high school education, single, child protective services involvement, and domestic and substance abuse. Statistical analyses were conducted with SAS 9.1 (SAS Institute, Cary, North Carolina).

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