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Emotional Responses of Mothers of Late-Preterm and Term Infants

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Abstract

Objective—To compare the emotional responses of mothers of late-preterm infants "(34 0/7 to 36 6/7 weeks gestation) with those of mothers of full-term infants.

Design—A mixed method comparative study.

Setting—A southeastern tertiary academic medical center postpartum unit.

Participants—Sixty mothers: 29 mothers of late-preterm infants and 31 mothers of full-term infants.

Methods—Measures of maternal emotional distress "(four standardized measures of anxiety, postpartum depression, posttraumatic stress symptoms, and worry about infant health) and open-ended semistructured maternal interviews were conducted in the hospital following birth and by phone at one month postpartum.

Results—Mothers of late-preterm infants experienced significantly greater emotional distress immediately following delivery, and their distress levels continued to be higher at one month postpartum on each of the standardized measures. Mothers of late-preterm infants also discussed the altered trajectories in their birth and postpartum experiences and feeling unprepared for these unexpected events as a source of ongoing emotional distress.

Conclusion—Mothers of late-preterm infants have greater emotional distress than mothers of term infants for at least one month after delivery. Our findings suggest that it may not be a single event that leads to different distress levels in mothers of late-preterm and full-term infants but rather the interaction of multiple alterations in the labor and delivery process and the poorer-than-expected infant health outcomes. In the future, researchers need to examine how and when mothers' emotional responses change over time and how their responses relate to parenting and infant health and development.

Little is known about maternal emotional responses to having a late-preterm infant "(34 0/7 to 36 6/7 weeks gestation), yet late-preterm infants now comprise 71% of premature births and 8.7% of all births in the United States "(Hamilton, Martin, & Ventura, 2010). Although late-preterm births decreased slightly between 2007 and 2009, each year more than 477,000 late-preterm infants are born to American mothers of all ages, and these births occur among all ethnic groups and in all geographic areas "(Hamilton et al.). Mothers of early preterm infants report marked emotional distress "(Callahan & Hynan, 2002; Holditch-Davis, Bartlett, Blickman, & Miles, 2003; Holditch-Davis et al., 2009; Miles, Holditch-Davis, Scher & Schwartz, 2007), and this distress is associated with parenting styles "(e.g., low

warmth, limited involvement, high use of negative discipline) during infancy and the preschool period that have negative effects on child health and development "(Fewell & Deutscher, 2002; Holditch-Davis, Merrill, Schwartz & Scher, 2008; Singer et al., 2003). Therefore, the potential for negative emotional responses such as anxiety and worry in mothers of late-preterm infants is a concern. However, what is known about the early preterm infant/mother dyads cannot be extrapolated to late preterms; thus, information about the experiences of late-preterm infants and their mothers is needed.

Late preterm newborns are more similar in size to infants born at term than early preterm infants, and most late preterms are discharged 4 to 12 days after birth "(Pulver, Denney, Silver & Young, 2010). Therefore, parents and health care providers may not recognize these infants as less neurologically and physiologically mature than full term infants "(Barros, Mitsuhiro, Chalem, Laranjeira, & Guinsburg, 2010; Tomashek et al., 2006; Wang, Dorer, Fleming, & Catlin, 2004). Wang et al. "(2004) suggested late-preterm infants represent an unrecognized population at risk for suboptimal care because they “masquerade” as full-term infants "(p. 374).

Yet late-preterm infants suffer more medical complications after birth than full-term infants "(Consortium on Safe Labor, 2010; Kitsommart et al., 2009; Pulver et al., 2010) evidenced by greater need for neonatal intensive care "(36.5% of late- preterm vs. 7.2% of full-term infants) "(Consortium on Safe Labor, 2010). Late preterm infants are also 4 times as likely as full-term infants to have a diagnosed postnatal medical condition "(Raju, Higgins, Stark & Leveno, 2006), including respiratory distress or apnea requiring oxygen or mechanical ventilation "(Kitsommart et al., 2009), hypothermia "(Engle, Tomashek, & Wallman, 2007; Raju et al., 2006), sepsis "(Cohen-Wolkowiez et al., 2009), electrolyte imbalances "(Dani et al., 2009), and jaundice "(Adamkin, 2009; Dani et al., 2009). Finally, late-preterm infants average longer hospitalizations at birth "(4–12 days) than healthy full-term infants "(2 days) as well as more and longer rehospitalizations in the first years of life "(Gunville et al., 2010; Pulver et al., 2010).

Health professionals often assume that because late preterms are at lower risk of neonatal mortality than early preterm infants "(Bastek et al., 2008; Martin et al., 2006), their mothers experience minimal distress around the infant’s birth and hospitalization. However, this conclusion is not warranted. The few studies that have examined the emotional responses of mothers who experienced a late-preterm delivery found they had greater stress, anxiety, and depressive symptoms than mothers of full-term infants "(Laney & Sandler, 1982; Voegtline, Stifter, & The Family Life Project Investigators, 2010), and that these responses were associated with less optimal infant feeding outcomes "(Zanardo et al., 2011). Additionally, mothers of late- preterm infants were more likely to experience depression and anxiety 6 months following delivery than mothers of full-term infants, and the mothers’ distress was positively related to concurrent maternal perceptions of negative infant behaviors "(Voegtline et al.).

Information about mothers’ experiences after delivery and following discharge is needed to guide the care of late-preterm infants and their mothers and to develop supportive interventions "(Bauer & Msall, 2010). To understand the complex, interactive, and nonlinear

influences that alter trajectories of maternal emotional distress, a developmental science framework guided this study. Developmental science posits a holistic multilevel perspective to investigate processes over time "(Cairns, 2000). Consistent with this framework is the need to examine interrelated maternal experiences including parturition, medical complications of themselves and infants, and experiences in the hospital. These domains influence each other and maternal emotional distress as well as affecting infant health and development.

Therefore, the purpose of this study was to compare the emotional responses of mothers of late-preterm infants with those of mothers of full-term infants following delivery and at one month postpartum. To obtain a more holistic understanding, we examined responses to standardized assessments of maternal emotional distress "(situational anxiety, postpartum depressive symptoms, post-traumatic stress symptoms, and worry about child health) and responses to open-ended semistructured interviews. To determine whether variables other than gestational age "(late preterm or full term) might account for differences between the two groups of mothers, we examined the effects of parity, maternal ethnicity/racial group, marital status, highest level of maternal education/Medicaid receipt, infant health "(birth weight, whether the neonatal hospitalization was spent in the term nursery, length of hospitalization), and whether the infant was receiving human milk "(through breastfeeding or pumping) at discharge. The talk about emotional distress during the mothers' interviews was also given a global rating and compared with the scores from the emotional distress questionnaires.

Methods

A mixed-method comparative design was used to evaluate the similarities and differences of maternal responses following the birth of late-preterm and full-term infants. A descriptive approach was used for the qualitative work "(Sandelowski, 2010).

Participants

Participants were recruited from a regional referral birthing center of a southeastern academic medical center with approximately 3,300 births per year. Average length of postpartum stay for mothers was 3.2 days. Healthy infants who were born at least 35 weeks gestational age were cared for in the Well-Baby Nursery; the Special Care Nursery was for newborns delivered fewer than 35 gestational weeks and for those newborns who required short hospitalizations; and the Intensive Care Nursery served critically ill infants.

Participants in this study were 29 mothers of late premature infants and 31 mothers of full-term infants. Late preterm infants had gestational ages at birth of 34 0/7 to 36 6/7 weeks, and the full-term infants had gestational ages of 38 to 42 weeks. Infants born during the 37th week were excluded to permit greater difference between the two groups. Participants were selected so that the groups were matched on race/ethnicity "(African American, non-Hispanic White, Hispanic, or other) and mode of delivery "(vaginal or cesarean). Infant health was deliberately not an inclusion or exclusion criteria; however, multiples were excluded because mothers of multiples have different birth experiences than mothers of

singletons and can experience more distress. Demographic characteristics of the mothers and characteristics of the infants are summarized in Table 1.

There were no significant differences between the groups on maternal demographic characteristics, but the groups did differ on infant characteristics. By definition, late-preterm infants had lower gestational ages at birth, and, as expected, the late-preterm group had significantly lower mean birth weights. However, there was considerable overlap in birth weights. While all of the infants < 2500 grams were late preterm, both groups included infants with birth weights between 2500 and 3000 grams and > 3000 grams. Late preterm infants also had significantly longer hospitalizations at birth than full-term infants, but the median length of hospitalization was only 4 days for late- preterm infants compared to 2 days for full-term infants.

Table 2 summarizes the perinatal complications experienced by the mothers and infants. The mothers of late-preterm infants were more likely to experience hypertension during their pregnancy and, as expected, were more likely to receive steroids and antibiotics prior to birth. In addition, four mothers of term infants but no mother of a late-preterm infant had a history of depression. Late preterm infants were less likely to spend the entire hospitalization in the term nursery. Four late-preterm infants had respiratory symptoms following stabilization, one of whom required mechanical ventilation. Two late-preterm infants had gastroschisis, one hypermagnesiemia, and one a chest wall deformity. Three term infants had meconium at delivery, one of whom had meconium aspiration and persistent pulmonary hypertension requiring mechanical ventilation. Another term infant had a multicystic dysplastic kidney, and two others had possible congenital anomalies requiring follow-up after birth. The relatively large number of term infants with anomalies in this sample occurred because the setting is a referral center for high-risk pregnancies and high-risk infants.

Measures

Data were collected at two time points following infant delivery during maternal hospitalization and at one month after mother’s hospital discharge. Questionnaires were administered to assess four aspects of maternal emotional distress: anxiety, depressive symptoms, posttraumatic stress symptoms, and worry about the child’s health. Open-ended semistructured interviews were conducted to document mothers’ delivery and infant care experiences.

Situational anxiety was measured with the state anxiety subscale of the State-Trait Anxiety Inventory "(STAI-S; Speilberger, Gorusch, Lushene, Vagg, & Jacobs, 1983). The STAI-S measures anxiety as a transitory response to a stressful situation. Mothers rated 20 descriptive statements about the current intensity of their feelings on a 4-point scale from 1 "(not at all) to 4 "(very much). Scores range from 20 to 80, with higher scores indicating more anxiety. For this study, elevated anxiety was indicated by a score of 48 or above, the 50th percentile for psychiatric patients and the 85th percentile for women age 19 to 39 years "(Speilberger et al., 1983). STAI-S scores are correlated with other measures of distress in mothers of preterm infants, including depressive symptoms, stress about the infant’s illness, posttraumatic stress symptoms, and daily hassles "(Holditch-Davis et al., 2009). Cronbach’s

alphas for internal consistency were .85 to .95 with mothers of preterm infants "(Holditch-Davis et al., 2009; Miles, Funk, & Kasper, 1992). Alphas for this sample were 0.92 at enrollment and 0.84 at one month.

Depressive symptoms were measured using the Edinburgh Postnatal Depression Scale "(EPDS; Cox, Holden & Sagovsky, 1987). The EPDS is a 10-item instrument developed to detect mothers suffering from postnatal depression and has been used prenatally and over the first year after birth. The scale indicates how the mother has felt during the previous week. Mothers who score above 12/13 on the scale "(0–30 range) are likely to be suffering from a depressive illness. The EPDS has a sensitivity of 86% and a specificity of 78% in predicting depressive illnesses "(Cox et al., 1987). Cronbach's alphas were 0.85 at enrollment and 0.70 at one month in this sample.

Posttraumatic stress symptoms in response to the infant's birth were measured with the Perinatal PTSD Questionnaire "(PPQ; DeMier, Hynan, Harris & Manniello, 1996; Quinnell & Hynan, 1999). The PPQ has 14 yes–no items measuring intrusive thoughts since delivery "(e.g., bad dreams of giving birth), avoidance or numbing "(e.g., inability to remember parts of the hospitalization), and increased arousal "(e.g., irritability or anger). The yes answers are summed. Scores of 6 or greater indicate elevated post-traumatic stress disorder "(PTSD) symptoms "(DeMier et al., 1996; Quinnell & Hynan, 1999). PPQ scores were correlated with scores on general PTSD scales that are not specific to perinatal events "(Callahan & Hynan, 2002; Quinnell & Hynan, 1999). PPQ scores have been correlated with other measures of distress in mothers of preterm infants, including depressive symptoms, stress about the infant's illness, situational anxiety, and daily hassles "(Holditch-Davis et al., 2009). Cronbach's alphas for internal consistency ranged from .80 to .87 in mothers of preterm and full-term infants "(DeMier et al., 1996; Holditch-Davis et al., 2009) and were 0.55 at enrollment and 0.63 at one month in this sample.

Worry about child health was assessed with the Child Health Worry Scale "(CHWS; Docherty, Miles, & Holditch-Davis, 2002; Miles, Holditch-Davis, Burchinal, & Nelson, 1999). Mothers are asked to rate the degree to which they are worried about infant medical problems, development, whether the infant will get sick or might die, and about whether the baby is eating and sleeping enough. Worry is rated on a 5-point scale ranging from 1 "(not at all) to 5 "(very much). Higher scores indicate more worry. Worry scores of mothers of preterm infants were related to parenting "(Holditch-Davis, Schwartz, Black, & Scher, 2007) and with other measures of emotional distress in mothers of infants in the neonatal intensive care unit, including depressive symptoms, situational anxiety, post-traumatic stress symptoms, and daily hassles "(Holditch-Davis et al., 2009; Miles et al., 2007). Internal consistency for mothers of preterm and full-term infants ranged from .71 to .90 "(Docherty et al., 2002; Miles et al., 2007; Miles & Holditch-Davis, 1995). Cronbach's alphas for this sample were 0.90 at enrollment and 0.89 at one month.

Maternal Interviews—The interview following enrollment focused on the mother's story of her delivery and her infant's care. The interview began with a global statement asking the mother to tell her story about how she "came to deliver" "(see Table 3). Probes were asked to elicit greater detail when needed and to fill in areas not covered such as "have any of your

plans about the care of your infant changed since the delivery?" At one month postpartum, the interviews explored how things had been going with the mother and her infant since the previous interview. Once the mother told her story, probes were used to cover the mother's and infant's health, feeding method and experiences, interim diagnoses, and rehospitalizations.

Descriptive Variables—Reviews of maternal and infant medical records were conducted to describe the sample. In addition, mothers completed a questionnaire about their demographic characteristics. Nine descriptive variables were used as covariates in analyses of the maternal emotional distress data: parity "(first born or later born), maternal ethnicity/racial group "(African American, non-Hispanic White, or other), marital status "(married or single), maternal educational level, whether the mother was on Medicaid, infant birth weight group "(< 2500 grams, 2500–3000 grams, and > 3000 grams), whether the infant spent the entire neonatal hospitalization in the term nursery, length of infant hospitalization, and feeding type "(receiving any human milk or not) at discharge. Birth weight was categorized into three groups to better examine the overlap between the late-preterm and full-term infants.

Procedures

Following Institutional Review Board approval, mothers from both groups were approached for enrollment during the mother's postpartum hospitalization. Mothers provided informed written consent for their participation and review of their own and their infant's medical records. Mothers then completed the questionnaires and the audiotaped interviews in their hospital rooms. One month after delivery, mothers were phoned at home and completed the questionnaires and interviews again over the phone. Mothers showing significant emotional distress during data collection were referred to a mental health professional. Interviews were transcribed verbatim, and the audio files were destroyed once the transcriptions were checked for accuracy.

Data Analyses

Maternal Emotional Distress Questionnaires—Maternal emotional distress data were analyzed using linear mixed effects models for repeated measures. The core model included the fixed effects of infant group "(late preterm and full term), time "(enrollment and one month), and the Group × Time interaction as well as the random effects of individual infants "(intercept) and the Infant × Time interaction "(trajectories). First, the core model was applied to determine the effects of infant group on change over time on each continuous summary outcome derived from the four questionnaires. Next, the effects of the nine covariates on the outcomes were examined individually by conducting nine separate mixed models in which each covariate was added as a term to the core model. Any covariate that reached a 0.10 probability level in the individual models were retained and added to the core model. The final analytic model included the core terms plus covariates that were significant at the 0.05 probability level. All quantitative analyses were performed using Statistical Analysis Software "(SAS) Version 9.2.

Maternal Interviews—Qualitative content analysis was used to analyze the maternal interviews with Atlas.Ti "(6.2). First, interviews were read and reread by the first and second authors to get a sense of the mother's story as a whole "(Tesch, 1990). Interviews were then read again to derive codes and their definitions "(Miles & Huberman, 1994). Next, the codes were reviewed, refined, and then grouped into meaningful themes "(Patton, 2002). Last, the postpartum and one-month interviews were rated by two investigators and categorized through consensus into one global rating representing none, minimal, or significant maternal distress. Spearman correlations and Kruskal-Wallis tests were used to examine the association between distress level and scores on the four scales of psychological distress at enrollment. A nonparametric approach was applied because the assumptions of the equivalent parameter tests were not met.

Results

Maternal Emotional Distress

Table 4 includes the mean scores and mixed model results of all emotional distress variables at enrollment and one month after infant hospital discharge. Among the nine potential covariates evaluated, parity was the only significant predictor of any distress variable and then only for worry scores. Parity was retained in the final analytic model for that outcome. No other maternal or infant characteristic was significantly related to maternal emotional distress.

Mothers of the late-preterm infants had significantly more situational anxiety following infant delivery and at one month after infant hospital discharge, $F''(1, 50.9) = 27.8$, $p < .001$. Only mothers of late-preterm infants had anxiety scores in the clinical range: two at enrollment and one at one month. For both groups situational anxiety decreased significantly over time, $F''(1, 50.7) = 6.9$, $p < .02$, but the Time × Group interaction was not significant, $F''(1, 50.7) = 1.3$, $p > .05$.

Mothers of late-preterm infants also had significantly more depressive symptoms after delivery and at one month, $F''(1, 52.5) = 26.5$, $p < .001$. After delivery, one mother of a late-preterm infant and one of a full-term infant had elevated depressive symptoms, but at one month no one had elevated scores. Depressive symptoms decreased over time for both groups, $F''(1, 53.7) = 7.0$, $p < .02$; the Time × Group interaction was not significant, $F''(1, 53.7) = 0.5$, $p > .05$.

Posttraumatic symptoms were higher in mothers of late-preterm infants following delivery and at one month, $F''(1, 46.2) = 20.0$, $p < .001$. One mother of a late preterm had elevated scores at enrollment and two at one month. No mother of a full term had elevated posttraumatic symptom scores. The amount of posttraumatic symptoms was stable over time for both groups, $F''(1, 48) = 0.0$, $p > .05$. The Time × Group interaction was not significant, $F''(1, 48) = 0.1$, $p > .05$.

Worry about child health was also higher in mothers of late-preterm infants following delivery and at one month, $F''(1, 53.6) = 26.3$, $p < .001$. Worry also decreased significantly over time for both groups, $F''(1, 50.1) = 13.4$, $p < .001$, and the Time × Group interaction

was not significant, F "(1, 49.8) = 1.1, p > .05. First-time mothers averaged higher worry scores, F "(1, 54.8) = 4.3, p < .05.

Maternal Interviews

The overarching theme from the interviews was that of altered trajectories in the late-preterm dyads, compared to the more transient challenges that occurred among full-term dyads. The prenatal indications for medical intervention "(for the mother or fetus), unexpected timing of delivery, shock about the delivery mode, and poorer-than-expected infant health outcomes exacerbated each other and influenced late-preterm mothers' postpartum responses. Mothers of late-preterm infants experienced repeated interruptions on multiple levels in their birth and postpartum experiences. A late-preterm mother summarized that, "Probably the hardest part when we got home is like not feeling ready in a lot of ways." Overall, the mothers in the two groups differed on their concerns about their altered delivery plans, lack of preparation for the delivery and the baby, maternal health, infant health, and ongoing issues at one month postpartum.

Altered Delivery Plans. Maternal plans for the timing of delivery, mode of childbirth, anesthesia use, and infant feeding were often altered in both groups. Mothers were concerned about labor induction and augmentation, episiotomy, and Cesarean. The degree of distress was not necessarily related to the extent of the change in plans. Some mothers were as upset by delivery a couple of days earlier than the date of a planned Cesarean as other mothers were by delivering 6 weeks prematurely. Overall, the mothers of full-term infants generally described the hospitalization and subsequent events in a linear fashion, focusing on reporting events in chronological order because of the largely "smooth sailing" or straight-forward but intense progression; whereas the storytelling for mothers of late-preterm infants was more intricate and often progressed in a nonlinear fashion. "There was just so much more than that" was a common feeling among late-preterm mothers when discussing the decisions and outcomes.

Late preterm mothers were often distressed about multiple experiences, and this distress persisted over time compared to the largely isolated "bumps in the road" that full-term mothers encountered but easily moved past. For example, an unexpected Cesarean was upsetting for many mothers, but the usual outcome of a "normal" infant facilitated adjustment among full-term mothers. In contrast, mothers of late-preterm infants were generally distressed about the health of their infants, whether the delivery was initiated by medical indications or via spontaneous labor, and this distress was further exacerbated by their lack of mental preparation for becoming a mother at this stage in their pregnancy and inability to have completed practical preparations. As two late-preterm mothers reported, "I had mentally prepared myself to have the baby late [after her due date] because I thought things [in the pregnancy] would go so well" and "I felt guilty about leaving that unfinished work … and the house was a mess and I planned to have at least 2 weeks … to get the baby's room ready."

Lack of Preparation—The early delivery did not allow late-preterm mothers to reach the "nesting phase" phase of pregnancy and led to delayed acquisition of the maternal role. For

example, one mother said, “It was really strange at first because I knew he was mine but because everything happened so fast I wasn’t really … I guess I wasn’t prepared for it to happen … cause the first couple days that I was sitting beside his bed looking at him I didn’t feel a connection to him.” Most late-preterm mothers felt overwhelmed from events occurring “out of order,” but an exception was a participant who actively sought premature delivery due to her own complex health concerns and previous preterm birth of a healthy infant. This participant utilized a patient advocate because she felt her needs were “brushed off” to extend pregnancy as long as possible for the infant’s sake, and that she was treated “like an incubator, a piece of equipment.”

Concerns about Maternal Health—One half of the mothers in both groups expressed concerns about their health due to pregnancy symptoms, a preexisting illness like hypertension, “having to be cut” for a cesarean or extreme fatigue. Mothers were also concerned about the lack of timely information from the health care team. This was especially salient for the late-preterm group, who attempted to “hold it together” and keep their “cool” after receiving a poor prognosis at a prenatal scan or after experiencing decreased fetal movement. As one mother reported, “I was thinking that I’d really like to talk to a doctor … they hadn’t done anything yet except told me I was going to have the baby. And I didn’t know how … nobody had told me anything.” Another mother said, “It was just hours of noninformation [in the triage] driv[ing] me crazy.”

Concerns about Infant Health—Mothers in both groups also had concerns about their infants’ health, but mothers of late-preterm infants had a greater number of concerns and a wider range of responses. Some late-preterm mothers conceptualized their infants as having been “ready to be born” as indicated by spontaneous onset labor, whereas others were fearful for their infants’ outcomes. All late-preterm mothers who described distress about the timing of their deliveries also reported concern for infant health. These responses did not always correspond with the severity of the fetal or newborn conditions. As one mother stated, “I’m sorry [tearful] I’m happy now because she’s fine, but at the time I didn’t know if she was going to be okay ‘cause she was so early … it was like exactly a month [before the due date].” Many mothers of late-preterm infants expressed initially having concerns about the infant’s survival. Except for the two term infants with potential life-limiting anomalies "(possible kidney disease and congenital heart disease), mothers of term infants did not express the same magnitude of concerns about infant health. Some late-preterm mothers said that because their delivery was uneventful, they were surprised at the need for infant treatment postpartum and that their newborns “looked smaller” in the days following delivery than they had a birth. These women described eventually realizing that their infants were more fragile and in need of special care than they initially perceived.

The peak of women’s emotional responses to late-preterm delivery occurred when the infant remained hospitalized after maternal discharge. The need for prolonged hospitalization signaled the severity of the infants’ conditions and disrupted intended parenting. Mothers were “heartbroken” at the need for nurses to look after their infants. One late-preterm mother explained, “I thought I was his mama and I’m supposed to take care of him.” The physical separation created feelings of emotional separation, whether the hospitalization was

a day or months. Separate infant discharges occurred only in the late-preterm group. A mother said, “So for the first 2 weeks I cried every time we’d leave "(the hospital). I missed him … I was scared I was going to miss something that was going to happen when he was there and I was home.”

Finally, feeding concerns involving the quantity and quality of intake regardless of feeding method were common for the mothers of late-preterm infants. Most late-preterm mothers discussed feeding difficulties while referring to their infants’ prematurity. As one mother stated, “the coordination problem with the sucking and the breathing … that is definitely an issue because he was premature so that was a little bit of a concern.” Late preterm mothers reported having to take their infant to see the pediatrician more often because of concerns over weight gain. Mothers, and presumably their health care providers, equated infant size with health. This conceptualization led to concern for facilitating neonatal weight gain, which was a theme in the late-preterm and full-term groups but was more intense in the context of “small babies.” Feeding issues among mothers of full-term infants were largely maternal "(such as learning to read infant cues or perception of an inadequate milk supply) or focused on how infants’ were doing with a particular formula "(reflux or constipation) rather than about infant feeding abilities.

Concerns at 1 Month—Most mothers reported moving forward from their early postpartum experiences, whether negative or positive. Particular outcomes were either not thought of much as time went on or carried less importance when viewed in “bigger picture.” However, emotional well-being was hampered by confusion about why late-preterm delivery occurred instead of “normal” or “regular” "(referring to full term) childbirth. In contrast, most full-term mothers were able to move beyond any “necessary evil[s]” they experienced: “I look at her [the infant] I just think that it was totally worth it.”

Relation to Standardized Emotional Distress Assessments—Global ratings of maternal distress were scored for 54 of the 60 infants in the study because of missing interviews or lack of interview quality. Among these 54 mothers, 8 "(14.8%) were rated as having no distress, 27 "(50.0%) had minimal distress, and 19 "(35.2%) had significant distress. Spearman rank correlation indicated a moderate positive association between distress levels "(coded as 0, 1, 2) and severity of situational anxiety "($r = .46$, $p < .001$), depressive symptoms "($r = .42$, $p < .01$), and posttraumatic stress symptoms "($r = .38$, $p < .01$) at enrollment. A nonsignificant correlation was observed for the worry scores "($r = .26$, $p < .10$). Kruskal-Wallis tests also confirmed that mothers with higher maternal distress ratings had significantly higher scores on all four measures of maternal emotional distress at enrollment than those with no maternal distress "($p < .05$).

Discussion

As expected, the late-preterm infants in this study had longer birth hospitalizations than full-term infants, but the median length of stay was only 4 days compared to 2 days for full-term infants. Yet findings from this study suggest that mothers of late-preterm infants experience significantly greater psychological distress immediately following delivery, and their distress persisted for at least one month postpartum even though few mothers experienced

clinically significant amounts of distress. These findings were consistent across the four psychological distress scales as well as in the maternal interviews. Mothers' accounts of their experiences were positively related to each measure of psychological distress. For example, mothers with the highest anxiety scores also had significant talk about distress. The psychological distress described in the interviews came from interrelated and compounding obstacles experienced by the late-preterm dyads that led to a more challenging experience over the first postpartum month compared to the relatively transient nature of events for the full-term group.

The finding of higher distress for the mothers of late-preterm infants on the four emotional distress scales is similar to the findings of the few other studies that examined distress in mothers of late-preterm infants "(Laney & Sandler, 1982; Voegtline et al., 2010; Zanardo et al., 2011). However, none of these studies examined distress at one month postpartum, and only one examined distress at more than one time point "(Voegtline et al., 2010). Understanding the trajectory of distress for mothers of late-preterm infants will require that future studies be longitudinal and examine multiple time points in the first year. In addition, previous studies with early preterm and full-term infants have shown that distress is related to a mother's ability to parent and to infant health and development "(Holditch-Davis et al., 2007; Holditch-Davis, Miles, Burchinal, & Goldman, 2001; Muller-Nix et al., 2004; Murray, Fiori-Cowley, Hooper, & Cooper, 1996; Singer et al., 2003). Distress in mothers of late-preterm infants has been shown to be related to breastfeeding success "(Zanardo et al., 2011) and maternal perceptions of infant behaviors "(Voegtline et al., 2010). Late preterm infants have an increased incidence of neurodevelopmental problems, including cerebral palsy, mental retardation, and socioemotional and behavioral problems as compared to full-term infants "(Petrini et al., 2009; Schendel & Bhasin, 2008; Talge et al., 2010). Thus, there is also a need for future studies to examine the relationship between maternal distress and the health and development of late-preterm infants.

The finding that none of the maternal or infant characteristics, except parity for worry, was related to the maternal emotional distress is somewhat surprising. A number of studies of mothers of early preterm and full-term infants have found effects of infant illness and socioeconomic status on distress "(DeMier et al., 1996, 2000; Holditch-Davis et al., 2003, 2009; Miles et al., 2007). Even parity did not explain the differences in the two groups of mothers on worry. These findings suggests that the distress of mothers of late-preterm infants is not an artifact of differences in the baseline characteristics of the two groups and is most directly related to their late-preterm delivery and the interaction of the unexpected nature of the delivery, shock about delivery mode, poorer-than-expected infant health outcomes, and the mothers' relationships with the health care team. Our interviews of the mothers support this suggestion. Thus, to develop a more complete understanding of the responses of mothers of late-preterm infants, future longitudinal studies are needed.

Information from this study is limited by the small sample size and follow-up data to only one month following delivery. We did not have baseline measures of emotional distress before delivery to compare to the postpartum and one month data, however there were no mothers in the late-preterm group with a history of mental illness or depressive therapy prior to delivery and two mothers of full-term infants who had a history of depression. Additional

research should examine long-term maternal distress of late-preterm infants and the impact on parenting. In addition the tertiary referral setting resulted in a study population with high rates of maternal and infant complications in the late-preterm and full-term groups. Therefore, study findings may not be transferable to infants and mothers cared for in community hospitals. There is a need for further study of the emotional distress of mothers of late-preterm infants born at hospitals of different acuity levels to determine how their emotional responses differ from those of mothers of full-term infants, when and how these factors change over time, and how this interacts with parenting, and infant health and development.

Implications for Practice

The findings of this study underscore the importance of not treating the late-preterm experience as a normal delivery, postpartum, and neonatal period for the mother/infant dyad. The mother's psychological distress may not be in proportion to the objective seriousness of maternal complications or the infant's condition. Consequently, mothers require support during the postpartum hospitalization, infant hospitalization, and at least throughout the first month. Focus should be given to allowing mothers to express their concerns and provide education as appropriate "(Mally, Bailey, & Hendricks-Munoz, 2010). In particular feeding concerns should be addressed because late-preterm infants are at greater risk for poor feeding outcomes and in particular poor breastfeeding outcomes "(Radtke, 2011; Zanardo et al., 2011).

Ongoing psychological support for mothers is essential because they are one of, if not the most, responsible parties for child care over time"(Bauer & Msall, 2010), and maternal distress may have the potential to affect the health and development of late-preterm infants. Our findings indicate that the mothers of late-preterm infants are different from mothers of full-term infants and should not be expected to respond to interventions in the same ways. Thus, hospital practices for late-preterm infants need to address the unique context of the late-preterm experience, including infant and maternal needs.

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Table 1

Comparison of the Late Preterm and Fulterm Groups on Maternal and Infant Characteristics

	Late Preterm "(n=29)	Fullterm "(n=31)
	Mean "(SD)	**Mean "(SD)**
Maternal Age in Years	27.9 "(6.0)	28.5 "(4.6)
Infant Gestational Age "(wks)	35.6 "(0.9)	39.6 "(1.1)***
Apgar Scores: 1 Minute	7.4 "(2.1)	7.6 "(1.9)
5 Minute	8.6 "(0.9)	8.8 "(0.8)
Length of Infant Hospitalization	9.0 "(14.4)	3.5 "(4.6)**
Birth Weight in Grams	2489.3 "(483.6)	3393.9 "(487.1)***
	Percent "(n)	Percent "(n)
% Married	63.0% "(17)	46.7% "(14)
Race/Ethnicity: % White	51.7% "(15)	50.0% "(15)
% African American	31.0% "(9)	40.0% "(12)
% Hispanic and Other	17.2% "(5)	10.0% "(3)
% First-Time Mothers	41.4% "(12)	40.0% "(12)
% on Medicaid	42.3% "(11)	41.4% "(12)
% Cesarean Section	51.7% "(15)	43.3% "(13)
% Breastfeeding at Discharge	74.1% "(20)	70.0% "(21)
Birthweight under 2500 Grams	58.6% "(17)	0.0% "(0) ***
2500 to 3000 Grams	24.1% "(7)	23.3% "(7)
Over 3000 Grams	17.2% "(5)	76.7% "(23)
Infant Gender: % Male	55.2% "(16)	60.0% "(18)

Note: Between-group mean differences on continuous variables were tested using *t*-tests, with the exception of length of infant hospitalization that was tested with a non-parametric Wilcoxon Two-Sample Test due to a non-normal distribution. Between-group differences in proportions were tested using chi-square and with the Fisher's Exact Test when observed cell frequency was less than 5.

* $p < .05$ for group differences;

** $p < .01$;

*** $p < .001$.

Table 2

Comparison of the Late Pretem and Fullterm Groups on Maternal and Infant Medical Complications

	Late Preterm "(n=29)	Fullterm "(n=31)
	Percent "(n)	**Percent "(n)**
Pregnancy Complications	55.2% "(16)	40.0% "(12)
No Prenatal Care	6.9% "(2)	10.0% "(3)
Diabetes	6.9% "(2)	0.0% "(0)
Hypertension	44.8% "(13)	24.1% "(7)
Antepartum hemorrhage	0.0% "(0)	3.3% "(1)
Chorioamnionitis	6.9% "(2)	20.0% "(6)
Prolonged ROM "(> 24 hours)	17.9% "(5)	13.3% "(4)
Received Prenatal Steroids	11.5% "(3)	0.0% "(0)
Received Prenatal Antibiotics	64.3% "(18)	30.0% "(9) **
Only in Term Nursery	55.2% "(16)	86.7% "(26)**

Note: Between-group differences in proportions were tested using chi-square and with Fisher's Exact Test when observed cell frequency was less than 5. Pregnancy complications were defined as the occurrence of any of the following: diabetes, hypertension, antepartum hemorrhage, chorioamnionitis, and prolonged ROM "(rupture of membranes).

* $p < .05$ for group differences;

** $p < .01$;

*** $p < .001$.

Table 3

Questions Used in the Interviews at Enrollment and 1 Month

Enrollment

Tell me the story about how you came to deliver.

How long in advance did you know you were going to deliver then?

What were the reasons for it?

How did you feel about it when you first knew you would deliver then?

How did the delivery go?

How do you feel about the care you received?

Tell me the story about how things have been going here since your delivery…

Once the mother has appeared to have completed her story, questions should be asked to fill in areas that may not have been covered:

1. How do you feel about the decisions that have been made about your "(and infant's) care?
2. How is your relationship with the health care providers?
3. Do you know who to go to when asking questions about your infant's treatment?
4. Have any of your plans regarding the care of your infant changed since the delivery?

Is there anything else that would be helpful for me to know about your experience?

1 Month

Tell me about what has been going on with you and your infant since I last spoke with you.

Once the parent has appeared to have completed her/his story, questions should be asked to fill in areas that may not have been covered.

1. How has ____ been feeding since I spoke with you last?
2. When did you last take him/her to see the doctor?
3. What were the reasons for the visit?
4. How many visits since hospital discharge?
5. Have you needed to take him/her back to the hospital?
6. Do you plan to have additional children?
7. We would like to know what it has been like for you to be in this study.

Table 4

Mixed Effects Model Results for Emotional Distress at Birth and 1 Month for the 29 Mothers of Late Preterm Infants and the 31 Mothers of Fullterm Infants.

	STAI-S		EPDS		PPQ		Worry	
	Birth	**1 Month**	**Birth**	**1 Month**	**Birth**	**1 Month**	**Birth**	**1 Month**
Unadjusted Means	Mean "(SD)	Mean "(SD)	Mean "(SD)	Mean "(SD)	Mean "(SD)	Mean "(SD)	Mean "(SD)	Mean "(SD)
LPI	36.6 "(9.5)	31.4 "(7.5)	5.7 "(3.3)	3.5 "(3.1)	1.9 "(1.6)	2.0 "(1.9)	18.8 "(5.7)	15.0 "(5.4)
FT	27.6 "(6.1)	25.6 "(2.9)	2.4 "(3.8)	1.1 "(1.7)	0.8 "(1.2)	0.7 "(1.1)	12.2 "(5.0)	9.8 "(3.1)
Adjusted[1,2]	Mean "(SD)	Mean "(SD)	Mean "(SD)	Mean "(SD)	Mean "(SD)	Mean "(SD)	Mean "(SD)	Mean "(SD)
LPI	36.6 "(0.2)	31.4 "(0.2)	5.7 "(0.2)	3.5 "(0.1)	2.0 "(0.1)	1.9 "(0.3)	18.7 "(2.1)	14.8 "(2.1)
FT	27.6 "(0.1)	25.6 "(0.1)	2.4 "(0.1)	1.1 "(0.2)	0.8 "(0.1)	0.8 "(0.1)	12.3"(1.8)	10.1"(1.8)
Model Effects[3]	Estimate "(SE)		Estimate "(SE)		Estimate "(SE)		Estimate "(SE)	
Group	5.83 "(2.04)***		2.42 "(0.73)***		1.23 "(0.45)***		4.68 "(1.40)***	
Time	2.06 "(1.99) *		1.25 "(0.93)*		−0.02 "(0.47)		2.18 "(1.20)**	
GxT	3.15 "(2.77)		0.92 "(1.29)		−0.07 "(0.66)		1.71 "(1.67)	

[1] Adjusted means were estimated by the mixed model that takes into account the fixed and random effects specified in the model.

[2] A statistically significant difference was observed between the late preterm and fullterm groups at birth and 1 month for all four measures "(all $p < .05$). The effect size was > 1.0 at each time point for all measures except PPQ where the effect size was greater than .78 at each time point.

[3] Estimates of effects and standard error "(SE) for terms in the final model: group, time, and group-by-time interactions "(GxT). The analysis of the worry outcome included the effects of being a first time mother as a covariate "(estimate = 2.32. SE = 1.12, $p < .05$).

* $p < .05$;

** $p < .01$;

*** $p < .001$.