Abstract
This longitudinal study of maternal responsiveness included a sample of 23 mothers of preterm infants. The mothers completed questionnaires at three intervals: 2 weeks postpartum, 2 weeks after the infant’s discharge from the neonatal intensive care unit, and 3 months postpartum. Factors that have a potential effect on maternal responsiveness including postpartum depression, social support, stressors, self-esteem, maternal well-being, and maternal attitude were also examined. There were no significant changes in these variables or in maternal responsiveness over time. Social support and self-esteem were found to have a significant positive relationship with maternal responsiveness. Stressors had a significant inverse relationship with maternal responsiveness. There were no significant relationships between maternal well-being, postpartum depression, and maternal attitude about being a mother and maternal responsiveness. The findings suggest that although maternal responsiveness may be stable over time, it may be associated with other characteristics of the mother that need to be assessed.

Keywords: Infant
Preterm
Maternal role
Postpartum depression

Maternal Responsiveness in Mothers of Preterm Infants

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Maternal responsiveness is critical to the interaction between a mother and her infant. The effect of maternal responsiveness on infant development has been explored over the years by numerous researchers. Among the outcomes of effective maternal responsiveness is secure attachment between a mother and her infant, which is necessary for healthy child growth and development. Ineffective maternal responsiveness is associated with lack of attachment, low self-esteem, and problems in the growth and development of children. For example, diminished infant responses, lower intelligence, depression, social incompetence, and high-risk behavior have all been related to inadequate or ineffective maternal responsiveness. In addition, early maternal responsiveness has been found to be a strong predictor of a child’s cognitive competency.

Effective maternal responsiveness includes a sequence of synchronous, reciprocal exchanges or expressions between the mother and her infant. Maternal responsiveness thus includes appropriate maternal behaviors that are prompt in contingent, identifiable, and direct antecedents to the behavior of an infant. Another attribute of maternal responsiveness is the mother’s ability to recognize her infant’s cues consistently and to act on the cues given to her by her baby. In essence, the child sends a cue of need to the mother, and the mother responds to the need. Cues are bids for interaction or signs of infant need states such as hunger and discomfort including wetness, change in temperature, or noise. Common infant cues for attention include crying, movement, and eye contact. Types of interactions between mother and infant include touch, play, and talk. In an effective responsive interaction, the mother recognizes the need to respond to her infant, and then the mother responds with sensitivity, respect, warmth, and appropriateness.

Factors that contribute to ineffective maternal responsiveness may be categorized as either infant or maternal. Infant factors may include prematurity, disorganized sleep-wake cycles, irritability, and infant need states. Maternal factors include a labile emotional state, lack of social support, fatigue, pain, suffering, and socioeconomic stressors. In particular, depression, social support, stress, self-esteem, maternal well-being, and attitude about being a mother may affect a mother’s response to her infant. These factors may have a particularly important effect on mothers of preterm infants.

Maternal-infant interaction is known to be affected by maternal mood. One of the mood disorders that may occur during the postpartum period is...
postpartum depression. Postpartum depression occurs in about 13 of every 100 mothers and is defined as depression during the weeks and months after the birth of a baby. Symptoms of postpartum depression include lack of concentration, loss of interest in things in which one normally finds pleasure in, loneliness, insecurity, obsessive thinking, lack of positive emotions, loss of self, anxiety attacks, loss of control, and guilt. Less frequently, another symptom is contemplating death of oneself, a family member, or the infant. Maternal responsiveness may be affected by postpartum depression because mothers who are depressed may be less able to focus their attention on the needs and cues of the infant. Vulnerability due to postpartum depression may be increased in mothers of preterm infants because of the added stressors of caring for a sick infant.

Social support is documented to be one of the most influential predictor variables of postpartum depression and is possibly one of the greatest negative factors affecting maternal responsiveness. Social support is defined as the assistance received during the postpartum period and differs from general social support. It has been suggested that unmet expectations for postpartum support and the failure to receive anticipated support may lead to negative consequences.

Mothers of preterm infants experience decidedly different stressors and amounts of stressors than mothers of term infants. Everyday stressors are defined as those activities or concerns that mothers face daily and thus may impact their care on their children. These stressors may place the well-being of mothers of preterm infants in jeopardy because postpartum depression and maternal stress tend to be positively correlated. Indeed, life stress was found to be one of the top three predictors of postpartum depression.

Self-esteem is a measure of self-valuing and worth. Low self-esteem is one of the predictors of postpartum depression in mothers and often accompanies depression. Low self-esteem or low feelings of self-worth place mothers in a susceptible mental health state and make them vulnerable to postpartum depression. In addition, self-esteem is reported to affect one’s ability to cope with new experiences, manage day-to-day stressors, and adapt to significant changes in life.

Maternal postpartal well-being is defined as the state of the mother’s emotional health during the first several weeks and months after the birth of the preterm infant. Subjective well-being is a measure of a person’s happiness and satisfaction with life. In effect, maternal well-being is the measure of how good a mother feels about herself during the time of change and transition after the birth of her infant. Well-being is thus a subjective, positive, and cognitive appraisal that things are going well.

Maternal attitude, defined as role change, expectations of motherhood, and expectation of the self as a mother may also have some bearing on the outcome of maternal depression and thus on maternal responsiveness. Cognitive appraisal of motherhood is concerned with how mothers feel about motherhood, their expectations of motherhood, and changes that motherhood presents for them. Postpartum depression may affect this appraisal process. Thus, maternal responsiveness is potentially affected by these factors.

Maternal responsiveness can be measured by behaviors exhibited by the mother and can be observed by others. Behaviors by the mother that indicate maternal responsiveness include comforting the infant, cuddling the infant, playing with the infant, talking to the infant, feeding the infant, smiling, and watching the infant respond to these actions. Researchers suggest that a heightened sense of responsiveness is needed for mothers of preterm infants because the infants’ cues are often less noticeable and require much more energy than those of term infants. In addition, mothers of preterm infants often have more stressors than mothers of term infants. This creates a double jeopardy for the mother of the preterm infant. Maternal responsiveness is thus an important aspect of caregiving in the neonatal intensive care unit.

The purpose of this study was to examine maternal responsiveness in mothers of preterm infants. The following were the research questions: (1) How do mothers of preterm infants perceive their responsiveness to their preterm infants? (2) How does this responsiveness change over time? (3) How do other characteristics of the mother (depression, social support, stressors, self-esteem, well-being, and attitude) relate to maternal responsiveness?

**Design**

A nonexperimental, longitudinal, correlation design was used to examine data. Data were collected from mothers whose infants were enrolled in a study of preterm infant feeding. All data were collected for this study between August 2002 and August 2003 at three collection points. The study was approved the university’s institutional review board, and all participants gave informed, written consent by a registered nurse.

**Setting**

Infants of participating mothers were hospitalized in a level three nursery at a university medical center. Data collection occurred in a quiet room located in the school of nursing.
Sample

The sample consisted of 23 mothers of preterm infants; mothers were eligible for the study if their infants had participated in a larger feeding study. Additional inclusion criteria were the ability to read and comprehend English and being 18 years old or older. Participating mothers’ ages ranged from 18 to 42 years. There were 15 African-American and 5 white mothers; 3 mothers indicated they were of more than one race. Most mothers had incomes less than $20,000, with 10 indicating an income of less than $10,000. Five of the mothers had not completed high school, five were high school graduates, eight had completed some college, and five were college graduates. Only two of the participants were first-time mothers; six mothers had previously given birth to a preterm infant.

Measures

Data were collected from mothers by questionnaire. Mothers completed questionnaires at three intervals—6 weeks postpartum, 2 weeks after the infant’s discharge to home from the neonatal intensive care unit, and 3 months postpartum. Data were collected using the following instruments: Edinburgh Postnatal Depression Scale; Postpartum Support Questionnaire; Everyday Stressors Index; Rosenberg Self-Esteem (RSE) Scale; Subjective Well-Being Scale; Maternal Attitude Questionnaire; and the Maternal Infant Responsiveness Instrument (MIRI).

The Edinburgh Postnatal Depression Scale is a 10-item scale used in screening for postpartum depression. Each item has four possible answers scored 0, 1, 2, or 3 according to the severity of the symptom. The scores indicate how the mother felt during the previous week. It has been suggested that women scoring 12 to 13 out of 30 were likely to be suffering from a depressive illness within the last 2 weeks. The reported split-half reliability of the scale is .88, and the internal consistency is .87.

The Postpartum Support Questionnaire is a 34-item questionnaire that measures the importance of specific support and actual support received. The tool is specific for the type of assistance requested by postpartum mothers. Each item has four levels of response. Higher scores indicate greater support. A reliability score of .93 was found for both the importance of support and the support received portions of the scale.

The Everyday Stressors Index consists of 20 items that assess chronic everyday stressors such as financial concerns, role overload, employment issues, parenting concerns, and interpersonal conflicts. Stressors are rated on a zero to three-point scale, with zero indicating not bothered at all, and three indicating that the individual was bothered a great deal by the particular stressor. The total score can range from 0 to 60 points, with higher scores indicating greater stress. Internal consistency has been reported at 0.80 to 0.85.

The RSE Scale is a 10-item questionnaire that measures such concepts as self-worth, attitude toward self, and respect of self. Each item has four choices. The RSE was used in a sample of 56% African-American postpartum mothers with a reported scale reliability of .84.

The Subjective Well-Being Scale measures life satisfaction or positive affective appraisal. This scale consists of five statements, each with seven responses. Total scores of 35 to 31 are classified as extremely satisfied, scores of 26 to 30 are satisfied, scores of 21 to 25 are slightly satisfied, scores of 20 are neutral, scores of 15 to 19 are slightly dissatisfied, scores of 10 to 14 are dissatisfied, and scores of 5 to 9 are extremely dissatisfied. The scale has an internal consistency of 0.87 to 0.92.

The Maternal Attitude Questionnaire measures concepts such as expectations of motherhood, expectations of the self as mother, and role conflicts. There are 4 options to each

Table 1. Descriptive Data on Variables at Measurement Intervals

<table>
<thead>
<tr>
<th>Interval</th>
<th>Depression</th>
<th>Support</th>
<th>Stressors</th>
<th>Self-Esteem</th>
<th>Well-Being</th>
<th>Attitude</th>
<th>Responsiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Weeks postpartum</td>
<td>0–25</td>
<td>77–121</td>
<td>0–22</td>
<td>10–26</td>
<td>19–35</td>
<td>0–7</td>
<td>71–110</td>
</tr>
<tr>
<td></td>
<td>7.87 (6.17)</td>
<td>102.8 (10.81)</td>
<td>16.33 (5.69)</td>
<td>15.2 (5.0)</td>
<td>26.73 (4.93)</td>
<td>2.67 (1.6)</td>
<td>95 (11.58)</td>
</tr>
<tr>
<td>2 Weeks after discharge</td>
<td>1–24</td>
<td>87–119</td>
<td>0–43</td>
<td>10–24</td>
<td>11–35</td>
<td>0–5</td>
<td>81–110</td>
</tr>
<tr>
<td></td>
<td>6.33 (5.79)</td>
<td>99.6 (8.59)</td>
<td>14.47 (11.58)</td>
<td>16.6 (4.81)</td>
<td>27.13 (6.86)</td>
<td>2.4 (1.59)</td>
<td>96.53 (8.65)</td>
</tr>
<tr>
<td>3 Months postpartum</td>
<td>2–17</td>
<td>88–121</td>
<td>5–34</td>
<td>10–22</td>
<td>17–35</td>
<td>1–5</td>
<td>82–110</td>
</tr>
<tr>
<td></td>
<td>5.5 (3.67)</td>
<td>100.29 (9.53)</td>
<td>14.93 (8.75)</td>
<td>16.14 (4.11)</td>
<td>26.93 (5.64)</td>
<td>2.43 (1.34)</td>
<td>93.86 (8.8)</td>
</tr>
<tr>
<td>Overall</td>
<td>0–25</td>
<td>77–121</td>
<td>0–43</td>
<td>10–26</td>
<td>11–35</td>
<td>0–7</td>
<td>71–110</td>
</tr>
<tr>
<td></td>
<td>6.59 (5.33)</td>
<td>100.9 (9.57)</td>
<td>15.25 (8.82)</td>
<td>15.98 (4.60)</td>
<td>26.93 (5.74)</td>
<td>2.5 (1.5)</td>
<td>95.16 (9.63)</td>
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</table>

*Reported as minimum-maximum score, mean (SD).
of the 14 statements: strongly agree, agree, disagree, and strongly disagree. In a study of maternal attitudes toward motherhood, the reported reliability was .84.

The MIRI is a 22-item scale measuring maternal responsiveness to infant cues; it is a measure of the mother’s recognition of her own responsiveness, her recognition of her infant’s responsiveness to her, and difficulties in responsiveness. Face and content validity have been established using maternal child nursing experts and advanced practice nurse practitioners. In this study, the α reliability was .87.

**Procedures**

Mothers were enrolled in this study at the same time their infants were enrolled in the feeding study. Mothers completed questionnaires at three intervals: 2 weeks postpartum, 2 weeks after the infant’s discharge from the neonatal intensive care unit, and 3 months postpartum. Questionnaires were read to mothers who requested assistance.

**Analysis**

Data were analyzed using descriptive statistics. Pearson r was used to examine the relationship among variables. Three data points, along with the longitudinal analyzes, are presented in the result.

**Results**

Only 15 of the mothers completed questionnaires at all three data collection points. Results on the variables of interest at each data collection interval are shown in Table 1; there were no significant differences across time. That is, scores for depression, social support, stressors, self-esteem, maternal well-being, attitude, and responsiveness did not differ significantly from one time to the next. Although the changes were not significant, scores for well-being, self-esteem, and maternal responsiveness increased slightly from 6 weeks postpartum to 2 weeks after the infant’s hospital discharge, whereas social support, stressors, depression, and maternal attitude decreased slightly. Mothers in this sample had relatively high levels of well-being, social support, self-esteem, and maternal responsiveness. Although mothers in this sample reported relatively high levels of everyday stressors, they did not report high levels of depression. Mothers reported moderately high expectations on the maternal attitude scale.

The relationships among variables are shown in Table 2. Social support and self-esteem had significant positive relationships to maternal responsiveness, whereas stressors had a significant inverse relationship to responsiveness. That is, when social support or self-esteem was high, maternal responsiveness was also high. At the same time, when mothers perceived more stressors, they scored lowered on maternal responsiveness. Other relationships among variables were also found. Well-being had a significant positive relationship to self-esteem and significant inverse relationships to stressors and depression. Stressors also had a significant positive relationship to self-esteem and depression.

**Discussion**

Although mothers of both term and preterm infants experience the process of maternal role attainment, the process is different for mothers of preterm infants. Rubin and Mercer suggest that preterm birth disrupts the normal transition to maternal role attainment. This disruption may be seen in the increased incidence of postpartum depression in mothers of preterm infants. Although factors such as adequate social support, positive attitude, self esteem, and minimal stressors may buffer the effects of the transition, effects of postpartum depres-

<table>
<thead>
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<th>Table 2. Relationships Among Variables*</th>
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<tbody>
<tr>
<td>Support</td>
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</tr>
<tr>
<td>Depression</td>
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<td>Stressors</td>
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<td>Attitude</td>
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* Significant at P < .05.
sion may yet be observed in a mother’s responsiveness to her infant. This responsiveness may be further affected by the preterm infant who, unlike a normal term infant, is not able to give clear cues to the mother, has difficulty with state modulation, and responds differently to auditory and visual stimuli. Consequently, the mother of a preterm infant must be more emotionally available and attuned to the preterm infant’s cues to respond appropriately and in a timely manner to the preterm infant.

Although the study sample was quite small, the results of this study reveal that when mothers feel supported and have high self-esteem, they perceive themselves to be more responsive to their preterm infants. This finding is consistent with findings of previous studies. In particular, appropriate type and amount of social support have been found to reduce stress and raise levels of self-esteem in many populations, including mothers of newborns. The study findings also suggest that stress may negatively affect maternal responsiveness. This finding is also consistent with the literature. In fact, it is everyday stressors that create the most difficulty for mothers of preterm infants. Although perception of stress did not correlate to levels of depression in this study, the relationship between stress and depression should remain a concern for care providers of mothers of preterm infants. In this small study, the high levels of perceived social support and self-esteem may have moderated the effect of high stress levels on depression.

Factors affecting maternal responsiveness are many and complex. In this study, several of these factors were examined in relation to mothers’ perceptions of their responsiveness to their preterm infant using a new instrument. The findings here are consistent with those of previous studies, suggesting that the MIRI may be a useful tool for assessing maternal responsiveness. Although additional work remains to be done in this area, these results provide further evidence of the need to examine carefully how a mother is responding to her infant and to provide appropriate support and resources to assist her in her development into the mother she wishes to be.

The literature is quite clear as to the importance of emotionally available mothers and the impact of providing emotional care to newborn infants. Although some factors were teased out in this process of studying maternal responsiveness with preterm infants, other factors may be important to add to this process in future research attempts. Much more research is needed to single out the factors that are more likely to show a difference in a mother’s responsiveness to her premature infant. The factors studied in this article are a first step in that direction.

**Conclusion**

Neonatal intensive care unit nurses have the ability to observe mother-infant interaction on a daily basis. They are very likely to notice the difference between a mother who is responsive and one who is not responsive to her infant. Infants whose mothers “pick-up on” their infants’ cues, whether they be cues for feeding, fatigue, or readiness for interaction may develop more normal patterns of behavior, which ultimately increases their likelihood of survival and quality of life.

**References**


