

Maternal Depressive Symptoms at 2 to 4 Months Post Partum and Early Parenting Practices

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Objective: To determine whether maternal depressive symptoms, reported when infants are 2 to 4 months old, are associated with mothers' early parenting practices.

Design: Secondary data analyses collected from the National Evaluation of Healthy Steps for Young Children. Data sources included newborn enrollment questionnaires and parent interviews when infants were 2 to 4 months old. Maternal depressive symptoms were assessed using the Center for Epidemiological Studies Depression Scale.

Setting: Twenty-four pediatric practices across the United States.

Participants: A total of 5565 families enrolled in Healthy Steps; 4874 mothers (88%) completed 2- to 4-month interviews and provided Center for Epidemiologic Studies Depression Scale data; 17.8% of mothers reported having depressive symptoms.

Main Outcome Measures: Ten parenting practices assessed in 3 domains: safety (sleep position and low-

ering water temperature), feeding (cereal, water, or juice; continuing breastfeeding), and practices to promote child development (showing books, playing with infant, talking to infant, and following 2 or more routines).

Results: Mothers with and without depressive symptoms reported similar uses of safety and feeding practices. Mothers with depressive symptoms had reduced odds of continuing breastfeeding (adjusted odds ratio [AOR], 0.73; 95% confidence interval [CI], 0.61-0.88), showing books (AOR, 0.81; 95% CI, 0.68-0.97), playing with the infant (AOR, 0.70; 95% CI, 0.54-0.90), talking to the infant (AOR, 0.74; 95% CI, 0.63-0.86), and following routines (AOR, 0.61; 95% CI, 0.52-0.72).

Conclusion: Maternal depressive symptoms are common in early infancy and contribute to unfavorable parenting practices.

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DEPRESSION IS A PREVALENT health problem among women of childbearing age, with mothers of infants and young children being at particular risk in part because of the routine demands of parenting.¹ Prevalence rates vary depending on the population being studied. The prevalence of depressive symptoms among mothers of children younger than 3 years ranged from 19% to 24% in 2 nationally representative US samples.^{1,2} For low-income mothers with young children, depressive symptoms are more prevalent,³⁻⁵ whereas longitudinal studies of pregnant and postpartum women consistently find that 9% to 12% of mothers have depressive symptoms.⁶⁻⁸

Many investigators, using both observational and interview methods, have demonstrated that maternal depressive symptoms are related to adverse caregiving and health-related behaviors, which in turn influence children's health and development.⁹⁻¹² A meta-analysis¹³ of small direct-

observation studies found associations between maternal depression and impaired parenting, especially among mothers of infants. Depressed mothers were less likely to engage in positive behaviors during play and feeding opportunities and were more likely to be disengaged and display higher levels of hostile behaviors.

In large national samples, investigators reported that mothers with depressive symptoms engaged in poorer preventive health practices with their toddlers, such as decreased use of car seats and electrical outlet covers.^{2,14} Maternal depressive symptoms have been associated with lower levels of positive parent-child interactive behaviors, such as playing, reading, following routines, and cuddling, and higher levels of negative behaviors, such as being irritable, yelling or spanking in the first 3 years of life, and decreased use of health care seeking for their young children.^{1,2,5,15}

Only a few large studies have focused on maternal depressive symptoms in the postpartum period and their association with

early parenting behaviors. Using a community sample of low-income women, the presence of postpartum depressive symptoms was associated with decreased odds of having a smoke detector or placing the infant on his or her back to sleep and increased odds of using corporal punishment during the first year of life.⁵ Smaller direct-observation studies have found that depressed mothers were less likely to engage in positive developmental behaviors during early interactions, such as talking, playing, or being affectionate with their newborns, and were more likely to display anger and disengagement.¹⁶⁻¹⁸

The science of early development is clear about the importance of parenting and early caregiving relationships, especially during infancy, when there is total dependency for safety, health, protection, nurturing, and stability.^{9,11} Infants' early development also depends on the health and well-being of their parents. When a mother is coping with postpartum depressive symptoms, it places a burden on the caregiving relationship at a time when early patterns of parenting are established.^{9,11,19} Despite this fact, we are unaware of any studies that have used a diverse, large nationwide sample to determine whether the presence of depressive symptoms in mothers is associated with a broad array of caregiving practices related to health and development in the postpartum period.

In this study, we examined whether maternal depressive symptoms at 2 to 4 months post partum are associated with parenting practices in a large nationwide sample of mothers and infants. We posited that depressive symptoms exhibited in the early months of caring for an infant were associated with lower levels of engagement in positive parenting behaviors to promote child health and development. The diversity and size of our sample allowed us to address limitations of smaller studies and adjust for possible confounders of the relationship between maternal depressive symptoms and parenting practices. We examined 10 parenting practices that fall into 3 domains: safety practices, feeding practices, and behaviors that promote early development. Extensive evidence, professional guidelines, and the American Academy of Pediatrics (AAP) policy statements highlight the importance of these practices.^{11,20-27}

METHODS

SAMPLE

Data for this study were obtained from a sample of intervention and control group families at 15 sites across the United States that participated in the National Evaluation of Healthy Steps for Young Children.²⁸ Healthy Steps is a new model of pediatric care that incorporates child development specialists and enhanced developmental services into pediatric practices that serve families with young children. The design was a randomization trial at 6 sites (up to 400 enrolled) and quasi-experimental at 9 sites (up to 200 enrolled at the intervention site and 200 at the comparison site). Sites began staggered enrollment in September 1996 with completion at the last site in November 1998.

Newborns whose families intended to use the Healthy Steps sites for their care were enrolled consecutively in the hospital at birth or at the first office visit within the first 4 weeks of life. Newborns were ineligible if they did not complete an office visit

within the first 4 weeks, they were to be adopted or placed in foster care, their mother did not speak English or Spanish, or their parents expected to move within 6 months. The eligible sample for the analyses reported in this article included mothers who completed forms at enrollment and a telephone interview at 2 to 4 months and who provided self-reported data of depressive symptoms using a 14-item modified Center for Epidemiologic Studies Depression Scale (CES-D) at 2 to 4 months.

DATA SOURCES

Two data sources, available in English and Spanish, were used. The first was a short questionnaire completed by parents at the time of entry into Healthy Steps; this questionnaire provided maternal and family demographic characteristics. The second was a computer-assisted Healthy Steps telephone interview conducted with the mother (virtually all respondents) when the child was 2 to 4 months of age. The structured interview included questions about the presence of depressive symptoms, early parenting practices, and additional demographic characteristics.²⁹

The 10 early parenting practices included in this study were selected from 17 parenting practices included in the Healthy Steps interview. They were selected based on evidence of their importance for child health and development, near complete data, and variability at 2 to 4 months. Two dichotomous variables were chosen to assess infant safety practices: using the prone sleep position at both naptime and bedtime and lowering the temperature of the hot water heater in the home. Placing an infant to sleep in the supine or stomach position is associated with sudden infant death syndrome, the leading cause of postneonatal mortality in the United States.³⁰ Since 1992, the AAP has recommended that newborns be placed on their backs to sleep.²¹ Lowering the hot water temperature is an important preventive safety measure to decrease tap water scald burns, especially among infants and young children.^{25,31,32}

The 4 infant feeding practices included continuation of breastfeeding at 2 to 4 months among mothers who had ever put the infant to the breast and whether or not the infant had been given water, juice, or cereal during the last week. The AAP advises that breast milk or infant formula provides sufficient nutrients in the first 4 to 6 months. Breastfeeding is associated with decreased infectious and chronic diseases and has shown a modest positive influence on infant cognitive development.^{24,33} The early use of juice in the diet can result in insufficient nutrition, dental caries, and short stature³⁴; early water use is associated with electrolyte imbalance and can lead to water intoxication and even death³⁵; and there is no nutritional indication to introduce cereal before the age of 4 months.³⁶ Four practices to foster healthy development included showing books daily to the infant, playing daily with the infant, talking daily to the infant while working in the home, and following 2 or more routines at meals, naptime, and bedtime. To promote development, showing books from infancy onward has been positively associated with subsequent language acquisition and school achievement.^{37,38} The 3 other parenting practices—talking to, playing with, and establishing predictable routines for infants—provide important opportunities to stimulate cognitive, social, physical, and emotional development.^{37,39}

The presence of maternal depressive symptoms was measured in the 2- to 4-month interview using a modified version of the CES-D. The CES-D is a 20-item self-report scale designed to measure the frequency of depressive symptoms experienced in the previous week.⁴⁰ Using the modified 14-item CES-D, scores of 11 or higher indicated the presence of maternal depressive symptoms; this value was calibrated against the cutoff of 16 used for the 20-item scale. Correlation of the reduced-item version with the full 20-item scale exceeded 0.95 in a sample of high-risk pregnant women.⁴¹ The α coefficient

for the 14-item CES-D for Healthy Steps mothers was .85, similar to that for the total scale for the general population.⁴⁰

STATISTICAL ANALYSIS

We used χ^2 statistics to compare parenting practices among mothers with and without depressive symptoms at 2 to 4 months post partum. Multiple logistic regression models were used to estimate the overall unadjusted and adjusted relations of the presence of maternal depressive symptoms with parenting practices. These models assessed whether differences by depressive symptoms were due to covariates that may potentially be associated with both depressive symptoms and parenting practices. These covariates were mother's age, race, ethnicity, marital or partner status, level of education, and employment status; whether she was a first-time mother; father's employment status; household income; whether the family owned their home; and child's age (**Table 1**).

In addition, because of a possible correlation of observations among families receiving pediatric care at the same site, multiple logistic regression analyses were also adjusted for the site of health care and enrollment in the Healthy Steps intervention group. Analyses were conducted using SAS statistical software, version 8.2 (SAS Institute Inc, Cary, NC).

The Committee on Human Subjects Research of the Johns Hopkins Bloomberg School of Public Health and the institutional review board of Columbia University College of Physicians and Surgeons granted study approval. For participants in this study, written informed consent was obtained at the time of enrollment, and oral consent was obtained before the 2- to 4-month interview.

RESULTS

STUDY SAMPLE

A total of 5565 families completed enrollment forms; 4891 mothers (87.9%) completed the 2- to 4-month survey, and 4874 (87.6%) also provided depressive symptom data. When compared with nonresponders, mothers in the sample were more likely to be older than 20 years, white, non-Hispanic, married, and high school graduates and to report that the infant's father was employed.

Table 1 shows the percentage of women with depressive symptoms by demographic characteristics and the distribution of the demographic characteristics for the total sample. At 2 to 4 months post partum, 17.8% of mothers reported depressive symptoms. Mothers who were younger than 20 years, from a minority background, Hispanic, and not living with the biological father of the child, who had low incomes, and who had less than a high school education were more likely to report depressive symptoms than mothers without these characteristics (Table 1). Depressive symptoms were not associated with mothers being employed or parity.

SAFETY PRACTICES

Significantly fewer mothers with depressive symptoms than mothers without depressive symptoms lowered the temperature on water heaters (24.3% vs 31.0%) (**Table 2**). Comparable percentages used the wrong sleep position (14.3% vs 11.9%). The unadjusted odds ratios for lowering temperature on the water heater indicated decreased odds for mothers with depressive symptoms;

Table 1. Mothers With Depressive Symptoms and All Mothers by Parent and Family Characteristics at 2 to 4 Months Post Partum

Demographic Characteristic	Mothers With Depressive Symptoms, No. (%) (n = 867)	Mothers With Specific Characteristic,* No. (%) (n = 4874)	P Value
Mother's age at child's birth, y			
<20	172 (26.6)	646 (13.3)	<.001
20-29	455 (18.5)	2460 (50.6)	
≥30	239 (13.6)	1760 (36.2)	
Mother's race			
African American	285 (24.6)	1158 (24.1)	<.001
Non-African American	570 (15.6)	3650 (75.9)	
Mother's ethnicity			
Hispanic	190 (20.4)	930 (19.8)	.02
Non-Hispanic	651 (17.3)	3771 (80.2)	
Mother's marital status at 2-4 months			
Married, living with child's biological father	393 (13.0)	3027 (64.6)	<.001
Not married, living with child's biological father	149 (23.8)	627 (13.4)	
Other	294 (28.5)	1033 (22.0)	
Mother's educational level at 2-4 months			
<High school graduate	219 (28.0)	781 (16.1)	<.001
High school graduate	267 (20.9)	1276 (26.3)	
Some college or vocational school	227 (15.9)	1424 (29.3)	
College graduate or beyond	152 (11.0)	1376 (28.3)	
Mother's employment status at 2-4 months			
Employed	288 (16.4)	1754 (36.0)	.06
Not employed	579 (18.6)	3120 (64.0)	
Maternal parity			
First-time mother	424 (17.9)	2370 (48.6)	.86
Not first-time mother	443 (17.7)	2504 (51.4)	
Household income at 2-4 months, \$			
<20 000	444 (27.6)	1607 (33.0)	<.001
20 000-44 999	274 (16.2)	1695 (34.8)	
≥45 000	149 (9.5)	1572 (32.2)	
Home ownership at 2 to 4 months			
Owens home	368 (14.6)	2529 (51.9)	<.001
Rents home	499 (21.3)	2345 (48.1)	

*Less than 2% missing data except for mother's ethnicity (3.6%) and marital status (3.8%).

however, it was not significant when adjusted for covariates (**Table 3**).

FEEDING PRACTICES

The frequencies of less-than-optimal newborn feeding practices at 2 to 4 months (giving cereal, water, or juice) differed between mothers with and without depressive symptoms, ranging from 11.9% to 40.0% in mothers without depressive symptoms and 16.8% to 50.5% in mothers with depressive symptoms (Table 2). Although the unadjusted regression model indicated that mothers with depressive symptoms had increased odds of engaging in

Table 2. Percentages and Unadjusted Odds Ratios of Mothers With and Without Depressive Symptoms Reporting Parenting Practices at 2 to 4 Months Post Partum

Parenting Practices	With Depressive Symptoms, % (n = 867)	Without Depressive Symptoms, % (n = 4007)	Total Sample, % (n = 4874)	Unadjusted Odds Ratio (95% CI)	P Value
Safety					
Used wrong sleep position	14.3	11.9	12.3	1.24 (1.00-1.53)	.05
Lowered water temperature*	24.3	31.0	29.8	0.72 (0.60-0.85)	<.001
Feeding					
Gave cereal	34.6	27.0	28.4	1.43 (1.22-1.67)	<.001
Gave water	50.5	40.0	41.8	1.53 (1.32-1.78)	<.001
Gave juice	16.8	11.9	12.8	1.50 (1.22-1.83)	<.001
Continued to breastfeed*	43.8	56.9	54.7	0.59 (0.50-0.70)	<.001
Developmental					
Showed book to infant at least once a day	22.4	28.2	27.1	0.74 (0.62-0.87)	<.001
Played with infant at least once a day	87.4	91.9	91.1	0.61 (0.49-0.77)	<.001
Always talked to infant while working	59.6	64.1	63.3	0.83 (0.71-0.96)	.01
Followed 2 or more routines	59.6	66.9	65.6	0.66 (0.57-0.78)	<.001

Abbreviation: CI, confidence interval.

*Among the 3670 mothers who ever breastfed.

Table 3. Odds Ratios for Parenting Practices Among Mothers With Depressive Symptoms Compared With Those With No Symptoms, Adjusted Models

Parenting Practices	Odds Ratio (95% CI)*	P Value
Safety		
Used wrong sleep position	1.13 (0.91-1.42)	.24
Lowered water temperature	0.93 (0.78-1.22)	.46
Feeding		
Gave cereal	1.11 (0.94-1.32)	.13
Gave water	1.05 (0.90-1.25)	.47
Gave juice	1.09 (0.88-1.35)	.37
Continued to breastfeed	0.73 (0.61-0.88)	<.001
Developmental		
Showed book to infant at least once a day	0.81 (0.68-0.97)	.02
Played with infant at least once a day	0.70 (0.54-0.90)	.004
Always talked to infant while working	0.74 (0.63-0.86)	<.001
Followed 2 or more routines	0.61 (0.52-0.72)	<.001

Abbreviation: CI, confidence interval.

*Adjusted for the following covariates: parity, maternal age, race, ethnicity, marital status, maternal educational level, maternal employment income, home ownership, child's age, site, and intervention status.

these practices, the adjusted odds ratios for these variables were not significant (Table 3). Among mothers who had ever breastfed (76% for women without depressive symptoms and 71% for women with depressive symptoms), mothers with depressive symptoms had more than one-quarter reduced odds of continuing to breastfeed at 2 to 4 months compared with mothers without depressive symptoms (Tables 2 and 3).

DEVELOPMENTAL PRACTICES

Smaller percentages of mothers with depressive symptoms reported positive developmental parenting practices than mothers without symptoms; the odds of each practice also differed significantly in both the unadjusted and adjusted logistic regression models. Playing

with the infant was the most frequent developmental practice, with 87.4% of mothers with depressive symptoms and 91.9% of mothers without depressive symptoms reporting they played with their infant at least once a day (Table 2). Frequencies of the 3 other developmental practices ranged from 28.2% to 66.9% in mothers without depressive symptoms and from 22.4% to 59.6% in mothers with depressive symptoms (Table 2). After adjusting for covariates, mothers with depressive symptoms had 19% reduced odds of showing a book to their infants at least once a day, one-quarter reduced odds of playing with their infant at least once a day and talking to their infants while working in the home, and one-third reduced odds of following 2 or more daily routines (Table 3).

COMMENT

The findings from this study provide a snapshot of early parenting practices among mothers with depressive symptoms in the critical first months post partum. Although we posited that there would be a significant relation between each of the parenting practices and the presence of maternal depressive symptoms, we found that the safety and feeding practices did not vary by depressive symptoms, after adjustment for covariates, with 1 exception. After controlling for covariates, we found that mothers with depressive symptoms had decreased odds of continuing breastfeeding. Our breastfeeding findings are different from those reported by Chung et al,⁵ who found no difference in breastfeeding duration for longer than 1 month. Their study used a smaller, community-based low-income sample, whereas this study used a larger, diverse national sample.

After adjusting for covariates, we also found that mothers with depressive symptoms had decreased odds of showing picture books, playing and talking with their infants, and following daily routines. These findings suggest that parenting practices that require more active interaction with infants, such as continuing breastfeeding and playing or talking with the infant, were reduced. Similar results have

been found in direct-observation studies of mothers.^{13,16} As other experts have noted, the presence of elevated maternal depressive symptoms often results in the increased feelings of hopelessness and helplessness that can discourage mothers from engaging in parenting practices that have less concrete tangible outcomes.⁴²

In this study, although depressive symptoms did not appear to influence several preventive parenting practices for mothers with newborns after adjustment for covariates, other studies² with mothers of toddlers found differences in practices such as car seat use and covering electrical outlets. This may be due to the more demanding nature of parenting toddlers. In both studies, however, the presence of depressive symptoms resulted in reduced odds of mothers showing books or reading to their children on a daily basis, a parenting behavior that requires more sustained interaction from the mother.

Several limitations to this study should be noted. First, self-report measures of parenting may lead to overreporting of behaviors that are socially desirable among mothers who do not have depressive symptoms. In this study, which used a broad array of parenting practices, we have no evidence of overstating for mothers with or without depressive symptoms. Among mothers with depressive symptoms, the bias may be in the opposite direction, with the depressive symptoms leading to underestimates of actual parenting practices as a result of feelings of decreased self-efficacy about parenting ability.² However, the review by Richters⁴³ of 22 studies suggests that depressed mothers do not have distorted perceptions of their children. In addition, D'Souza-Vazirani et al⁴⁴ found no difference in the validity of maternal report for children's short-term health care use based on the presence of maternal depressive symptoms. Our study findings suggest that it is possible to identify reduced positive parenting practices among mothers with depressive symptoms without having to use expensive direct-observation measures. Although a recent study⁴⁵ suggests variability in the validity of self-reported home safety practices, lowering water temperature was among the more reliable measures and sleep position was not assessed.

Second, we used a self-report measure for depressive symptoms as opposed to a structured diagnostic instrument. Nevertheless, prior studies² have found significant relationships between diminished parenting and self-reported depressive symptoms and suggest that the nondiagnostic CES-D may be more appropriate and preferable for pediatric practice and policy.

The findings from this study offer important implications for pediatric health care professionals and practice. The first is the need to screen for maternal depressive symptoms among all mothers during the postpartum period, when parenting practices are being established and when pediatric practices have frequent contact with families to provide guidance. Experts have stated that the scope of professional responsibility for pediatric physicians includes universal screening, guidance, and referrals for maternal depression.^{2,20,46,47} The US Preventive Services Task Force has recommended 2-item screeners by primary care professionals to detect depressive symptoms.⁴⁸ A recent study⁴⁹ in a busy urban pediatric practice found a significant increase in the detection of de-

pressive symptoms among mothers during the first postpartum year following implementation of a universal postpartum depression screening during well-child care visits. Second, the challenge and opportunity for pediatricians when providing anticipatory guidance to mothers with depressive symptoms are to discuss the mother's engagement in parenting practices that require more ongoing interactions, such as continuing breastfeeding, playing, talking, providing routines, and showing books.

The results of this study add to the burgeoning evidence that highlights the importance of screening for maternal depressive symptoms in the postpartum period. Once depressive symptoms are identified, pediatric health care professionals have an important role in providing ongoing counseling and anticipatory guidance to enhance parental efficacy, as well as in referring mothers to appropriate health care professionals to assist with their depressive symptoms.^{4,50} To maximize pediatric physician interactions with mothers with depressive symptoms, further efforts are needed to ensure that linkages exist between adult and pediatric systems of care and that communities have adequate mental health resources. Such an approach has the potential to foster positive parenting, child health and development, and family well-being.

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"You can be a warm father and a real man at the same time."
 —From *Handbook on Baby and Child Care*, by Dr Benjamin Spock, 1947