

PEDIATRICS®

Maternal Depressive Symptoms and Infant Health Practices Among Low-Income Women

Esther K. Chung, Kelly F. McCollum, Irma T. Elo, Helen J. Lee and Jennifer F. Culhane

Pediatrics 2004;113;523-529
DOI: 10.1542/peds.113.6.e523

This information is current as of May 10, 2005

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://www.pediatrics.org/cgi/content/full/113/6/e523>

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2004 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



Maternal Depressive Symptoms and Infant Health Practices Among Low-Income Women

Esther K. Chung, MD, MPH*; Kelly F. McCollum, MPH‡; Irma T. Elo, MPA, PhD§; Helen J. Lee, MA§; and Jennifer F. Culhane, PhD, MPH‡

ABSTRACT. *Objectives.* To determine the relationships between maternal depressive symptoms and the use of infant health services, parenting practices, and injury-prevention measures.

Methods. A prospective, community-based survey of women attending Philadelphia public health centers between February 2000 and November 2001 was conducted. Women were surveyed at 3 time points before and after parturition. Depressive symptoms were determined with the Center for Epidemiologic Studies Depression Scale at each time point. We studied 6 outcomes, clustered into 3 categories: 1) infant health service use (adequate well-child care and ever being hospitalized); 2) parenting practices (breastfeeding for ≥ 1 month and use of corporal punishment); and 3) injury-prevention measures (having a smoke alarm and using the back sleep position).

Results. The sample consisted of 774 largely single (74%), uninsured (63%), African American (65%) women, with a mean age of 24 ± 6 years and a mean annual income of \$8063. Forty-eight percent of women had depressive symptoms at 1 or 2 time points (ever symptoms) and 12% had depressive symptoms at all points (persistent symptoms). Compared with women who never had depressive symptoms (without symptoms), women with persistent symptoms were nearly 3 times as likely to have their child ever hospitalized (adjusted odds ratio: 2.89; 95% confidence interval: 1.61–5.07) and twice as likely to use corporal punishment (adjusted odds ratio: 1.90; 95% confidence interval: 1.08–3.34). Mothers with persistent depressive symptoms were nearly three-quarters less likely to have smoke alarms in their homes (adjusted odds ratio: 0.28; 95% confidence interval: 0.11–0.70) and one-half as likely to use the back sleep position (adjusted odds ratio: 0.56; 95% confidence interval: 0.35–0.91), compared with women without symptoms. There was no association between maternal depressive symptoms and infant receipt of well-child care or the likelihood of breastfeeding for ≥ 1 month.

Conclusions. Maternal depressive symptoms persisting from the prepartum to postpartum periods were associated with increased risks of infant hospitalization and use of corporal punishment and with lower likelihood of having a smoke alarm and using the back sleep

position. Additional efforts are needed to identify and evaluate mothers with depressive symptoms to improve the health and safety of young infants. *Pediatrics* 2004; 113:e523–e529. URL: <http://www.pediatrics.org/cgi/content/full/113/6/e523>; *maternal depression, health services use, preventative health measures, safety, well-child care.*

ABBREVIATIONS. CES-D, Center for Epidemiologic Studies Depression Scale; MDD, major depressive disorder.

Depression affects 12% to 48% of mothers with young children.^{1–5} Although depression affects mothers of all socioeconomic groups, the highest rates of maternal depression are reported among low-income women.^{1–5} Risk factors for maternal depression other than low income include young maternal age, low education levels, single marital status, nonwhite race/ethnicity, poor health status, psychosocial stress, and lack of social support.^{2,5–7}

Maternal depression has been shown to be associated with many adverse health outcomes among the offspring of depressed women, including preterm birth, low birth weight, newborn irritability, developmental delays, somatic complaints, sleep problems, child abuse, and psychiatric and neurobehavioral disorders.^{8–21} Although considered to be attributable in part to genetic factors, some of the behavioral problems observed among children of depressed women are thought to arise from the negative parenting behaviors that these women display.^{22–24} Such negative parenting behaviors include inconsistent discipline and control, unavailability, and emotional insensitivity.^{22–24}

It is unclear how the parenting of depressed women affects the use of health services and preventative practices for their children. A recent study by McLennan and Kotelchuck²⁵ found that mothers of toddlers and preschool-aged children with high levels of depressive symptoms were less likely to apply preventative practices such as using a car seat and/or using electrical plug covers. Another study, by Mandl et al,²⁶ showed that women whose newborns experienced ≥ 1 emergency- or problem-oriented visits in the first month of life were more likely to have symptoms of depression, suggesting that certain patterns of health care use may help to identify some women with depression.

The purpose of our study was to determine whether, among low-income women, associations

From the *Division of General Pediatrics, A.I. duPont Hospital for Children and Thomas Jefferson Medical College, Philadelphia, Pennsylvania; ‡Department of Obstetrics and Gynecology, Thomas Jefferson Medical College, Philadelphia, Pennsylvania; and §Department of Sociology, University of Pennsylvania, Philadelphia, Pennsylvania.

Received for publication Oct 3, 2003; accepted Jan 26, 2004.

Address correspondence to Esther K. Chung, MD, MPH, Department of Pediatrics, Jefferson Pediatrics/duPont Children's Health Program, 833 Chestnut St, Suite 300, Philadelphia, PA 19107. E-mail: echung@nemours.org

PEDIATRICS (ISSN 0031 4005). Copyright © 2004 by the American Academy of Pediatrics.

exist between maternal depressive symptoms and the use of infant health services, parenting practices, and/or infant safety measures. We hypothesized that maternal depressive symptoms negatively affect compliance with recommended well-child care visits and the use of preventative health practices.

METHODS

Study Design

This research was part of a larger, prospective, community-based study on maternal stress, birth outcomes, and infant health. Our study included data from 3 surveys, the first of which was conducted with pregnant women at their first prenatal clinic visit after written consent. During a 2-year period, from February 2000 to November 2001, we consecutively recruited women who were receiving prenatal care at a consortium of public health centers in Philadelphia, Pennsylvania. Our inclusion criteria at enrollment were a singleton intrauterine pregnancy and the ability to speak English or Spanish. Ninety percent of all eligible women enrolled in the study. The second and third surveys were conducted with these women in their homes, at ~3 to 4 months and 9 to 12 months after parturition, respectively. Eighty-four percent of all enrolled study participants with known live-birth outcomes completed the first postpartum survey, and 85% of those women subsequently completed the second postpartum survey. Eligible study participants were lost to follow-up after the initial survey for the following reasons: 4% refused, 3% moved out of the Philadelphia area, and 9% could not be contacted. Similarly, study participants were lost to follow-up after the second survey for the following reasons: 2% refused, 3% moved out of the Philadelphia area, 9% could not be contacted, and 1% were dropped because of death or severe mental illness. There were no significant differences with respect to race/ethnicity, education, or marital status between study participants who were interviewed and those who were lost to follow-up. However, study participants who were interviewed were on average ~1 year younger than those who were lost to follow-up.

Structured surveys were conducted in English and Spanish by trained female interviewers using standardized questionnaires. At the first interview, we assessed chronic stress, sociodemographic factors, and behavioral practices. The second and third interviews contained information on the health of the child, including maternal reports on the cognitive, social, and behavioral development of the child, and the use of infant health services, parenting practices, and the use of injury-prevention measures. We also asked questions regarding parenting attitudes, the mother's social support network, and her neighborhood and financial conditions. As part of all 3 surveys, we used the Center for Epidemiologic Studies Depression Scale (CES-D) to measure maternal depressive symptoms. Details of the larger aforementioned study were published previously.²⁷

For this analysis, we included women living with the index child at the time of both postpartum surveys (98% of all study participants) and those who completed the CES-D at all 3 time points. A total of 778 mothers completed all 3 surveys and were still living with their infants. Four mothers were dropped because they did not complete the CES-D at all 3 time points, resulting in a total of 774 subjects.

Study Variables

Maternal depressive symptoms were measured with the CES-D, a reliable valid scale that has been used widely for more than a decade.²⁸⁻³⁰ We defined depressive symptoms as a CES-D score of ≥ 16 . This cutoff point corresponds to 80th percentile scores for community samples and has a 95% sensitivity for diagnosing major depressive disorder (MDD) among low-income women, although the specificity and positive predictive value for MDD are low (70% and 0.28, respectively).^{29,30} The cutoff point of 16 has been used by many investigators assessing depressive symptoms in a variety of cohorts, including pregnant women.²⁸⁻³³ When studying depressive symptoms during pregnancy, some investigators chose to use a higher CES-D cutoff point (eg, the 90th percentile) to account for the possibility that symptoms of normal pregnancy may overlap with symptoms of depression.^{9,18} There is no evidence that this approach is more accurate or preferable to

using the cutoff point of 16, and the use of higher cutoff points increases specificity but decreases sensitivity for MDD.²⁸ We used a consistent cutoff point of 16 to define depressive symptoms before and after parturition. Mothers were identified as having persistent depressive symptoms if their scores on the CES-D were ≥ 16 at all 3 time points, as ever having depressive symptoms if their scores were ≥ 16 at 1 or 2 time points, and as never having depressive symptoms if their scores were always < 16 .

We studied 6 dependent variables, which were clustered into 3 categories: 1) infant health services use (adequate well-child care and ever being hospitalized); 2) parenting practices (breastfeeding for ≥ 1 month and using corporal punishment); and 3) injury-prevention measures (having a smoke alarm and using the back sleep position). The dependent variables used in our study were chosen because they are health-related topics that have been discussed widely in the lay press and medical literature and they have all been shown to be related to the well-being of young infants.³⁴⁻³⁹

Adequate well-child care was defined as the appropriate number of well-child care visits for the age in months, as recommended by the American Academy of Pediatrics,³⁶ and was based on the answer at 3 to 4 months after parturition (second survey) to the following question: "How many times has [child] been to a doctor or nurse for routine well-infant care? Don't count the times you took your infant for care when he or she was sick." For this variable, adequate well-child care was determined for each child on the basis of his or her age, providing a 1.5-month allowance. The American Academy of Pediatrics recommends at least 1 visit by 1 month of life, and our criterion for adequate well-child care was having at least 1 visit by age 2.5 months, 2 visits by age 4.5 months, and so forth.

Two other dependent variables were assessed by using data from the second survey, when the infants were an average of 3 to 4 months of age. Breastfeeding for ≥ 1 month was determined with the following questions: "How long did you breastfeed [child] for? How many days, weeks, or months?" Similar to surveys conducted by the Centers for Disease Control and Prevention,⁴⁰ use of the back position was determined with the following questions: "In what position do you usually put [child] down to sleep? On his or her side, back, or stomach?"

Ever being hospitalized in the first year of life, use of corporal punishment in the past week, and having a smoke alarm in the house were determined with information obtained at 9 to 12 months after parturition (third survey), with the following questions. "How many times has [child] been admitted to a hospital since he or she was born?" "About how many times, if any, have you had to spank your child in the past week?" "Please answer 'yes' or 'no' to: your home has a working smoke alarm." For the question on spanking, we dichotomized responses into "0" and " ≥ 1 " episode of spanking, with the latter defining use of corporal punishment in the past week.

Control variables that were selected for possible inclusion in ≥ 1 of the multivariate models were as follows: sociodemographic characteristics (maternal race/ethnicity, education, age, marital status, parity, income, nativity, Women, Infants, and Children Supplemental Nutrition Program (WIC) use, employment, housing stability [measured by address changes and homelessness], and child's age and insurance status), maternal health behaviors and health status (smoking status, physical health, and postpartum hospitalization), and infant health characteristics (gestational age at birth, birth weight, admission to the intensive care nursery at birth, health status as perceived by the mother, and special medical needs).

Statistical Analyses

Unadjusted group differences were tested by using analysis of variance with Bonferroni posthoc tests (to adjust for multiple comparisons) for continuous variables and the χ^2 test for categorical variables. To estimate the risk of adverse infant health practices associated with maternal depression, odds ratios were calculated as approximations of relative risks. To adjust for potential confounding variables and to derive maximal likelihood estimates of combined relative odds with 95% confidence intervals, multivariate, unconditional, logistic regression analyses were performed for each of the 6 dependent variables. The α level was set at .05 (2-sided), and Stata 6.0 software (Stata Corp, College Station, TX) was used for all analyses.⁴¹

TABLE 1. Sociodemographic Characteristics of the Study Population (N = 774)*

Maternal characteristics	
Mean age \pm SD, y	24 \pm 6
Marital status, single, %	74
United States-born, %	76
Race/ethnicity, African American (%)	65
Mean annual personal income	\$8063
Parity, primiparous, %	49
Uninsured, %	63
Education, %	
Less than high school	41
High school/GED diploma	42
Infant characteristics	
Gestational age, term (≥ 37 wk), %	83
Birth weight, normal (≥ 2500 g), %	88

* Based on data obtained at the time of enrollment. GED, General Educational Development.

For possible inclusion in these models, candidate risk factors and confounders were identified a priori on the basis of our review of the literature and theoretical considerations. The following variables were included in all 6 multivariate models: maternal race/ethnicity, education, age, income, and nativity. Other variables (maternal parity, housing stability, hospitalization, perceived health status, employment, use of the Women, Infants, and Children Supplemental Nutrition Program, and cigarette smoking; whether the mother was living with a partner; and infant gestational age, birth weight, need for transfer to an intensive care nursery, health insurance, special needs, health status as perceived by the mother, and age at the time of the survey) were included if the adjusted odds ratio differed from the crude odds ratio by at least 10%, which is a well-accepted method of confounder selection when the decision of whether to adjust is unclear.^{42,43} Any variable associated with both the predictor (depression) and the outcome (infant health services use, parenting practices, or injury-prevention measures) at $P < .25$, as suggested by Mickey and Greenland,⁴² was also included. The α level was set at .25 to provide sufficient statistical power to detect important confounder effects.⁴³ Interactions (none of which were identified) were assessed by stratification and by testing of interaction terms for statistical significance. Table 3 provides details of the final variables in each of the 6 models. The goodness-of-fit χ^2 statistic described by Lemeshow and Hosmer⁴⁴ was calculated to assess the fit of each multivariate model. This research was approved by the institutional review boards at Thomas Jefferson University and the University of Pennsylvania as part of a larger study.

RESULTS

Subject Characteristics and Maternal Depression

Sociodemographic characteristics for the 774 subjects are presented in Table 1. The majority of participants were single, United States-born, low-income, young, African American women. Approximately one half were primiparous. Sixty-three percent were uninsured at the time of the first prenatal visit, and 83% did not have an education beyond high school. Most infants were born at term and were of normal birth weight (Table 1).

On the basis of CES-D scores at all 3 time points, participants were divided into 3 symptom categories; 40% of all participants never had depressive symptoms, 48% ever had depressive symptoms, and 12% had persistent depressive symptoms. Of those who ever had depressive symptoms, 25% had symptoms in the antepartum and postpartum periods, 26% in the antepartum period only, and 49% in the postpartum period only.

The 3 symptom groups were similar with respect to race/ethnicity and marital status. Women who

TABLE 2. Characteristics of the 3 Depressive Symptom Groups (N = 774)

	Never (N = 307)	Ever (N = 372)	Persistent (N = 95)
African American, %	66	65	64
Mean age \pm SD, y*	25 \pm 6	24 \pm 6	24 \pm 6
Marital status, single, %	72	75	78
Less than high school completed, %†	32	46	51
Multiparous, %†	48	52	63
Cigarette smoking, %†	30	39	54
Child in excellent health, %†	62	52	48

* Statistically significant differences by analysis of variance, $P < .05$.

† Statistically significant differences by χ^2 test, $P < .05$.

never had depressive symptoms were younger, on average, than women who ever or persistently had depressive symptoms. Those with persistent symptoms were more likely to have less than a high school education, be multiparous, and smoke cigarettes and were less likely to describe their child's health as excellent (Table 2).

Dependent Variables

For our study population, we assessed the overall prevalence of each of the 6 outcomes. Ninety percent of participants reported adequate well-child care for

TABLE 3. Associations Between Depressive Symptom Groups and Infant Health Practices*

Dependent Variables	Adjusted Odds Ratio (95% Confidence Interval)	
	Ever	Persistent
Infant health services use		
Adequate well-child care†	0.59 (0.33–1.07)	0.54 (0.25–1.19)
Ever hospitalized‡	1.16 (0.76–1.77)	2.89 (1.61–5.07)§
Parenting practices		
Breastfeeding	1.10 (0.77–1.57)	0.84 (0.47–1.52)
Use of corporal punishment¶	0.61 (0.39–0.95)§	1.90 (1.08–3.34)§
Injury prevention measures		
Have smoke alarm#	0.51 (0.24–1.11)	0.28 (0.11–0.70)§
Use of back sleep position**	0.78 (0.57–1.08)	0.56 (0.35–0.91)§

* Results based on multivariate logistic regression models, with all models controlling for the following variables (collected at the first survey): maternal race/ethnicity, education, age, income, and nativity.

† Additional variables in the model (collected at the second survey): maternal parity and housing stability and infant gestational age and health insurance. Lemeshow-Hosmer goodness-of-fit $\chi^2(df) = 9.86(8)$, $P = .28$, suggesting a good fit of the logistic model to the study data.

‡ Additional variables in the model (collected at the third survey): housing stability, perceived maternal health status and smoking, and infant age, health status, insurance, and gestational age. $\chi^2(df) = 1.94(8)$, $P = .98$.

§ Additional variable in the model (collected at the second survey): maternal smoking. $\chi^2(df) = 8.39(8)$, $P = .40$.

¶ $P < .05$.

|| Additional variables in the model (collected at the third survey): parity, infant age and health status. $\chi^2(df) = 5.95(8)$, $P = .65$.

Additional variable in the model (collected at the third survey): infant age. $\chi^2(df) = 10.64(8)$, $P = .22$.

** Additional variables in the model (collected at the second survey): perceived maternal health status and infant age. $\chi^2(df) = 4.86(8)$, $P = .77$.

their young infants, and 21% reported their infant ever being hospitalized in the first year of life. Thirty percent breastfed for ≥ 1 month, and 16% reported the use of corporal punishment in the week before the survey. Ninety-four percent reported having a smoke alarm, and 52% reported using the back sleep position (results not shown).

Figure 1 shows the prevalence of infant health practices for each of the 3 symptom groups, ie, never, ever, and persistent. Women with persistent symptoms were less likely to obtain adequate well-child care, have a smoke alarm, and use the back sleep position but were more likely to have an infant ever hospitalized and use corporal punishment than those who never had symptoms. When the 3 groups were compared, there was no statistical difference in the prevalence of breastfeeding for ≥ 1 month, but the overall trend showed a decline in breastfeeding rates with increasing depressive symptoms.

Associations between the dependent variables and depressive symptoms, after adjustment for confounding variables, are shown in Table 3. Women with persistent depressive symptoms were nearly 3 times as likely to have their infant ever hospitalized than were those who never had symptoms (Table 3). Although Fig 1 shows that infants of women with persistent symptoms had a lower prevalence of adequate well-child care, no difference in adequate well-child care was found between women with persistent or ever symptoms and those without symptoms, after adjustment for confounding variables. In the adjusted analysis, there was no association between maternal depressive symptoms and breastfeeding for ≥ 1 month.

Women with persistent depressive symptoms were nearly twice as likely to use corporal punishment, compared with women who never had symptoms. Those who ever had depressive symptoms were 39% less likely to use corporal punishment than were those who never had symptoms. Mothers with persistent symptoms were approximately one-fourth

as likely to have smoke alarms in their homes and nearly one-half as likely to use the back sleep position than mothers without symptoms.

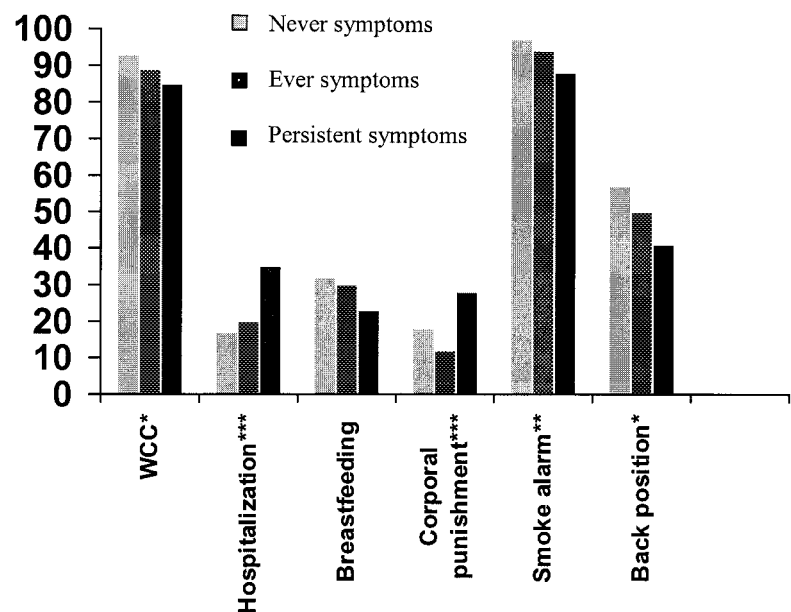
DISCUSSION

Few studies have assessed the relationship between maternal depression and maternal use of health services and preventative practices for their children.^{25,26} This study assessed the relationship between maternal depressive symptoms and the use of infant health services and other infant health practices among women at high risk for maternal depression, ie, low-income, African American women. Our hypothesis was that persistent maternal depressive symptoms negatively influence infant health services use, parenting practices, and injury-prevention measures.

In support of our hypothesis, we found that women with depressive symptoms persisting from the prepartum to postpartum periods were more likely to have an infant ever hospitalized and to use corporal punishment than were women without depressive symptoms. Women with persistent symptoms were also less likely to have a smoke alarm and to use the back sleep position than women without depressive symptoms. Our findings are consistent with the results of a recent study using 1988 and 1991 data, which showed maternal depressive symptoms to be associated with reduced use of car seats and electrical plug covers, as noted above.²⁵

Infants of women with persistent depressive symptoms were nearly 3 times more likely to be hospitalized in the first year of life than were infants of unaffected women. In our study, we did not determine the reason for hospitalization; therefore, it is difficult to know to what extent the hospitalizations were preventable or related to ambulatory care-sensitive conditions. Additional studies are needed to determine why infants of women with persistent depressive symptoms are more likely to be hospitalized than infants of mothers without symptoms.

Fig 1. Prevalence of infant health practices among the various depressive symptom groups ($N = 774$). Statistical significance was determined with χ^2 analyses (* $P < .05$; ** $P \leq .01$; *** $P \leq .001$).



Mothers with persistent depressive symptoms had twice the likelihood of using corporal punishment with their infants at ~9 to 12 months of age than mothers without depressive symptoms. This result raises concerns, because child abuse has been linked to maternal depression.²¹ The increased use of corporal punishment may not be surprising, because depressed mothers have been shown to display many of the characteristics of abusive mothers, often showing hostility and negativity toward their children.²²⁻²⁴

Women with persistent depressive symptoms were much less likely to have smoke detectors in their homes and to use the back sleep position for their infants than were women without depressive symptoms. The reduced use of these important preventative measures may be attributable to many factors. Depressed women, compared with unaffected women, are more likely to live in adverse circumstances, have fewer supports, be withdrawn and unavailable to their children, be distracted or preoccupied with their own mental health issues, or be hospitalized.^{45,46} It may be difficult for mothers to focus on preventative measures if they are dealing with more immediate and pressing needs.

Nearly one half of the women (48%) studied had depressive symptoms sometime during their pregnancy and/or in the year after the birth of their child. Of those women, 49% had postpartum depressive symptoms. As many as 1 in every 8 women had persistent depressive symptoms from before parturition to after parturition. Given the high prevalence of depressive symptoms among low-income women and the association between depression and adverse infant health outcomes, programs should be developed to assist women with depressive symptoms with their parenting and understanding of child development.

Our study has several limitations. This study of low-income women in Philadelphia may not be generalizable to all women with young children. We used the CES-D to measure depressive symptoms, but we did not determine whether the women had MDD or other psychiatric illnesses. Although the sensitivity of the CES-D among low-income women is high, the positive predictive value remains low.³⁰ Data obtained in our study were based on maternal reports, which may be subject to reporting bias; however, there is no reason to suspect differential reporting among the 3 symptom groups.

The rates of adequate well-child care, as determined by the number of well-child care visits, were high ($\geq 85\%$ for each symptom group) and did not differ among the 3 groups in the adjusted analysis. Although this finding was not significant in the multivariate analysis, we did notice a trend in the bivariate analysis toward a decline in adequate well-child care rates with increasing depressive symptoms. The prevalence of adequate well-child care was highest among women who were never depressed, followed by those ever having and persistently having depressive symptoms. Our relaxed criteria and early assessment of well-child care in the first 3 to 4 months of life might have resulted in overestimates of adequate

well-child care. This might have biased our findings toward no effect. Additional studies examining well-child care among older infants and children may be necessary to determine whether an association exists between maternal depressive symptoms and adequate well-child care. Similarly, we did not find an association between depressive symptoms and breastfeeding rates in our adjusted analysis. Although the overall trend in the bivariate analysis showed a decline in breastfeeding rates with increasing depressive symptoms, this finding was not statistically significant.

Findings from our study support previous studies, which have called for increased screening, detection, and treatment of maternal depression. Developing strong relationships between health care providers and families on a continual basis may be the first step toward detecting depressive symptoms among mothers of young children. African American and low-income women, who are at high risk for depression, are unlikely to seek care in mental health care settings and often use primary care settings for treatment of their psychosocial problems.⁴⁷ A recent study by O'Malley et al⁴⁸ found that primary care providers who met all of the medical needs of low-income, nonwhite women and had sustained relationships with their patients were more likely to ask about and treat for depression. Similarly, mothers assessed by their child's primary care provider were more likely to be identified accurately as having depressive symptoms, compared with those who were assessed by a trainee or nurse practitioner.⁴⁹

Screening and treatment for depression should begin during pregnancy, because as many as 50% of women with postpartum depression report symptoms of depression before parturition.⁵⁰ Health care professionals who provide obstetric care, ie, family physicians and obstetricians, have an obligation to treat pregnant women with depressive symptoms and/or to refer them to mental health care providers.

Some have advocated the use of validated screening tools as part of routine care in the postpartum period.⁵¹ Such tools, including the CES-D and the Edinburgh Postnatal Depression Scale,⁵² have been used previously and may assist clinicians in detecting women with significant depressive symptoms and those at high risk for MDD. Others have suggested asking simple screening questions based on criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed), such as, "Have you had a depressed mood . . . nearly every day for the past 2 weeks?"⁵³ There is evidence to suggest that asking the following 2 questions may be as effective as screening with longer instruments: "Over the past 2 weeks, have you felt down, depressed, or hopeless?" "Over the past 2 weeks, have you felt little interest or pleasure in doing things?"⁵⁴

Pediatricians can play a role in detecting signs of maternal depression and also can serve as advocates for their patients. Attitudinal and educational changes must be made, because several studies showed that the current attitudes and skills of pediatricians limit their ability to recognize and assist in the management of maternal depression.^{49,55} In gen-

eral, primary care providers infrequently inquire about and treat depression.⁴⁹ Primary care providers should refer women with evident depressive symptoms to mental health care professionals for evaluation and treatment. Novel approaches are needed to diagnose and treat maternal depression. Primary care practices should consider a multidisciplinary approach, incorporating social workers, psychologists, and psychiatrists as part of a group practice.

This study provides additional evidence that maternal depressive symptoms have negative effects on maternal use of infant health services and preventative health measures for their infants. The increased risk of infant hospitalization and the rates of using corporal punishment, having a smoke alarm, and using the back sleep position found in this study highlight the need to identify and evaluate maternal depressive symptoms to improve the health and safety of young children.

ACKNOWLEDGMENTS

This research was funded in part by grants from the Centers for Disease Control and Prevention (grant TS-286-14/14) and the National Institute of Child Health and Human Development (grant 1-RO1-HD36462-01A1).

We thank Tina Riley, Margarita Rubio, and Shafi Rahman for support and assistance with this project. We express our sincere thanks to all the women who participated in this study.

REFERENCES

- Zuckerman BS, Beardslee WR. Maternal depression: a concern for pediatricians. *Pediatrics*. 1987;79:110–117
- Hopkins J, Marcus M, Campbell SB. Postpartum depression: a critical review. *Psychol Bull*. 1984;95:498–515
- Hall LA, Williams CA, Greenberg RS. Supports, stressors, and depressive symptoms in low-income mothers of young children. *Am J Public Health*. 1985;75:518–522
- Orr ST, James SA, Burns BJ, Thompson B. Chronic stressors and maternal depression: implications for prevention. *Am J Public Health*. 1989;79:1295–1296
- Heneghan AM, Johnson Silver E, Bauman LJ, Westbrook LE, Stein REK. Depressive symptoms in inner-city mothers of young children: who is at risk? *Pediatrics*. 1998;102:1394–1400
- Kemper KJ, Babonis TR. Screening for maternal depression in pediatric clinics. *Am J Dis Child*. 1992;146:876–878
- Herrick H. *Postpartum Depression: Who Gets Help?* Raleigh, NC: Department of Health and Human Services State Center for Health Statistics; 2002. Statistical Brief 24.
- Orr ST, Miller CA. Maternal depressive symptoms and the risk of poor pregnancy outcome. *Epidemiol Rev*. 1995;17:165–171
- Orr ST, James SA, Blackmore Prince C. Maternal prenatal depressive symptoms and spontaneous preterm births among African-American women in Baltimore, Maryland. *Am J Epidemiol*. 2002;156:797–802
- Beardslee WR, Bemporad J, Keller MB, Klerman GL. Children of parents with major affective disorder: a review. *Am J Psychiatry*. 1983;140:825–832
- Field T. Infants of depressed mothers. *Dev Psychopathol*. 1992;4:49–66
- Weissman MM, John K, Merikangas KR, et al. Depressed parents and their children: general health, social, and psychiatric problems. *Am J Dis Child*. 1986;140:801–805
- Weissman MM, Gammon GD, John K, et al. Children of depressed parents: increased psychopathology and early onset of major depression. *Arch Gen Psychiatry*. 1987;44:847–853
- Hammen C, Gordon D, Burge D, Adrian C, Jaenicke C, Hiroto D. Maternal affective disorders, illness, and stress: risk for children's psychopathology. *Am J Psychiatry*. 1987;144:736–741
- Beck CT. The effects of postpartum depression on child development: a meta-analysis. *Arch Psychiatr Nurs*. 1998;12:12–20
- Lee CM, Gotlib IH. Maternal depression and child adjustment: a longitudinal analysis. *J Abnorm Psychol*. 1989;98:78–85
- Hiscock H, Wake M. Infant sleep problems and postpartum depression: a community-based sample. *Pediatrics*. 2001;107:1317–1322
- Zuckerman B, Bauchner H, Parker S, Cabral H. Maternal depressive symptoms during pregnancy, and newborn irritability. *J Dev Behav Pediatr*. 1990;11:190–194
- Zuckerman B, Stevenson J, Bailey V. Sleep problems in early childhood: continuities, predictive factors and behavioral correlates. *Pediatrics*. 1987;80:664–671
- Zuckerman B, Stevenson J, Bailey V. Stomachaches and headaches in a community sample of preschool children. *Pediatrics*. 1987;79:677–682
- Kotch JB, Browne DC, Dufort V, Winsor J. Predicting child maltreatment in the first 4 years of life from characteristics assessed in the neonatal period. *Child Abuse Negl*. 1999;23:305–319
- Susman EJ, Trickett P, Iannotti RJ, et al. Child rearing patterns and depressed, abusive and normal mothers. *Am J Orthopsychiatry*. 1985;55:237–249
- Cummings ME, Davies PT. Maternal depression and child development. *J Child Psychol*. 1994;35:73–112
- Field T. Emotional care of the at-risk infant: early interventions for infants of depressed mothers. *Pediatrics*. 1998;102:1305–1310
- McLennan JD, Kotelchuck M. Parental prevention practices for young children in the context of maternal depression. *Pediatrics*. 2000;105:1090–1095
- Mandl KD, Troncik EZ, Brennan TA, Alpert HR, Homer CJ. Infant health care use and maternal depression. *Arch Pediatr Adolesc Med*. 1999;153:808–813
- Culhane JF, Rauh V, McCollum KF, Hogan VK, Agnew K, Wadhwa PD. Maternal stress is associated with bacterial vaginosis in human pregnancy. *Matern Child Health J*. 2001;5:127–134
- Okun A, Stein REK, Bauman LJ, Johnson Silver E. Content validity of the Psychiatric Symptom Index, CES-Depression Scale, and State-Trait Anxiety Inventory from the perspective of DSM-IV. *Psychol Rep*. 1996;79:1059–1069
- Radloff LS, Locke BZ. The community mental health assessment survey and the CES-D Scale. In: Weissman M, Myers J, Ross C, eds. *Community Surveys of Psychiatric Disorders*. New Brunswick, NJ: Rutgers University Press; 1986
- Thomas JL, Jones GN, Scarinci IC, Mehan DJ, Brantley PJ. The utility of the CES-D as a depression screening measure among low-income women attending primary care clinics. *Int J Psychiatry Med*. 2001;31:25–40
- Zhu SH, Valbo A. Depression and smoking during pregnancy. *Addict Behav*. 2002;27:649–658
- Wu J, Viguera A, Riley L, Cohen L, Ecker J. Mood disturbance in pregnancy and the mode of delivery. *Am J Obstet Gynecol*. 2002;187:864–867
- Dieter JN, Field T, Hernandez-Reif M, et al. Maternal depression and increased fetal activity. *J Obstet Gynaecol*. 2001;21:468–473
- American Academy of Pediatrics Task Force on Infant Positioning and SIDS. Positioning and sudden infant death syndrome (SIDS): update. *Pediatrics*. 1996;98:1216–1218
- American Academy of Pediatrics Work Group on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics*. 1997;100:1035–1039
- American Academy of Pediatrics Committee on Practice and Ambulatory Medicine. Recommendations for preventative pediatric health care. *Pediatrics*. 2000;105:645–646
- American Academy of Pediatrics Committee on Injury and Poison Prevention. Selecting and using the most appropriate car safety seats for growing children: guidelines for counseling parents. *Pediatrics*. 2002;109:550–553
- American Academy of Pediatrics, Committee on Psychosocial Aspects of Child and Family Health. Guidance for effective discipline. *Pediatrics*. 1998;101:723–728
- American Academy of Pediatrics, Committee on Injury and Poison Prevention. Reducing the number of deaths and injuries from residential fires. *Pediatrics*. 2000;105:1355–1357
- Centers for Disease Control and Prevention. Progress in reducing risky infant sleeping positions: 13 states, 1996–1997. *MMWR Morb Mortal Wkly Rep*. 1999;48:878–882
- Stata Corp. *Stata Statistical Software: Release 6.0*. College Station, TX: Stata Corp; 1999
- Mickey RM, Greenland S. The impact of confounder selection criteria on effect estimation. *Am J Epidemiol*. 1989;129:125–137
- Rothman KJ, Greenland S. *Modern Epidemiology*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1998
- Lemeshow S, Hosmer D. A review of goodness-of-fit statistics for use in the development of logistic regression models. *Am J Epidemiol*. 1982;115:92–106
- Downey G, Coyne JC. Children of depressed parents: an integrative review. *Psychol Bull*. 1990;108:50–73

46. Dodge KA. Developmental psychopathology in children of depressed mothers. *Dev Psychol.* 1990;26:3–6
47. Leaf P, Livinston M, Tischler G, et al. Contact with health professionals for the treatment of psychiatric and emotional problems. *Med Care.* 1985;23:1322–1337
48. O'Malley AS, Forrest CB, Miranda J. Primary care attributes and care for depression among low-income African American women. *Am J Public Health.* 2003;93:1328–1334
49. Heneghan AM, Johnson Silver E, Bauman LJ, Stein REK. Do pediatricians recognize mothers with depressive symptoms? *Pediatrics.* 2000;106:1367–1373
50. Yonkers KA, Ramin SM, Rush AJ, et al. Onset and persistence of postpartum depression in an inner-city maternal health clinic system. *Am J Psychiatry.* 2001;158:1856–1863
51. Georgiopoulos AM, Bryan TL, Wollan P, Yawn BP. Routine screening for postpartum depression. *J Fam Pract.* 2001;50:117–122
52. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Scale. *Br J Psychiatry.* 1987;150:782–786
53. Wisner KL, Parry BL, Piontek CM. Postpartum depression. *N Engl J Med.* 2002;347:194–199
54. Whooley MA, Avins AL, Miranda J, Browner WS. Case-finding instruments for depression: two questions are as good as many. *J Gen Intern Med.* 1997;12:439–445
55. Olson AL, Kemper KJ, Kelleher KJ, Hammond CS, Zuckerman BS, Dietrich AJ. Primary care pediatricians' roles and perceived responsibilities in the identification and management of maternal depression. *Pediatrics.* 2002;110:1169–1176

Maternal Depressive Symptoms and Infant Health Practices Among Low-Income Women

Esther K. Chung, Kelly F. McCollum, Irma T. Elo, Helen J. Lee and Jennifer F. Culhane

Pediatrics 2004;113:523-529
DOI: 10.1542/peds.113.6.e523

This information is current as of May 10, 2005

Updated Information & Services

including high-resolution figures, can be found at:
<http://www.pediatrics.org/cgi/content/full/113/6/e523>

References

This article cites 51 articles, 27 of which you can access for free at:
<http://www.pediatrics.org/cgi/content/full/113/6/e523#BIBL>

Citations

This article has been cited by 2 HighWire-hosted articles:
<http://www.pediatrics.org/cgi/content/full/113/6/e523#otherarticles>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):
Office Practice
http://www.pediatrics.org/cgi/collection/office_practice

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<http://www.pediatrics.org/misc/Permissions.shtml>

Reprints

Information about ordering reprints can be found online:
<http://www.pediatrics.org/misc/reprints.shtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

