

# Postnatal Depression and Infant Health Practices Among High-Risk Women

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**Abstract** Women's postnatal depressive symptoms have been associated with many adverse outcomes for children. The current study examined the frequency association with relative risk between postnatal depressive symptoms and mothers' use of preventative infant health practices. The study used the Edinburgh Postnatal Depression Scale (EPDS) and Parental Health and Depression Questionnaire (PHDQ) to identify women's depressive symptoms in a prospective longitudinal sample of 134 high-risk non-white mothers receiving well-baby health services. Unadjusted frequency comparisons examined the effect of women's postnatal depressive symptoms on infant outcomes. Results found that compared to 60 women without postnatal depressive symptoms, 74 women with symptoms engaged in significantly fewer well-child health-visits, were less likely to use home safety devices or place their infants in the preferred back-to-sleep position, and did not complete immunizations. Depressed women were also more likely to lack knowledge of nurturing and sensitive parenting, use corporal punishment and inappropriate foods, and to show poor parenting practices. These findings provide additional supportive evidence that more efforts are needed to identify and assess women's depressive symptoms to promote health and safety of young children. Methodological limitations and recommendations for future research are addressed.

**Keywords** Postnatal depression · Infant health practices · Edinburgh Postnatal Depression Scale (EPDS) · Parenting practices · Injury-prevention measures

## Introduction

The prevalence of postnatal depression may range from 10 to 18% of women in population-based studies extended through the first six months after birth (Lumley et al. 2004). Rates of postpartum depression of Latina and African American women are thought to be similar to epidemiologic rates for Caucasian postpartum and non-postpartum women (Yonkers et al. 2001). Although depression affects mothers from all socioeconomic strata, the highest rates are reported among low-income women (Heneghan et al. 1998). Other risk factors for maternal depression other than low income are young age, low education, single marital status, nonwhite ethnicity, poor health status or high levels of psychosocial stress, and lack of social support (Herrick 2002).

Postnatal depression is similar to depression occurring at other times (Small et al. 1994). Such depression is usually not self limiting and it may not be minor (Murray et al. 1993; Small et al. 2000). Research indicates that women who have had one pre-childbirth depressive significant experience are at an increased risk of its occurrence after birth (Beck 2001), and such women have a threefold increase in the onset of postnatal depression in the first five weeks after birth (Cox et al. 1993). Apart from having negative consequences for women themselves, maternal depression impacts on mother-child interaction and on the child's emotional, behavioral, and cognitive development (Civic and Holt 2000; Murray et al. 2001). In particular, maternal depression has been associated with many

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adverse health outcomes for children including preterm birth, low birth weight, newborn irritability, developmental delays, somatic complaints, sleep problems, and neurobehavioral disorders (Orr et al. 2002; Hiscock and Wake 2001). Many infants of depressed mothers show high levels of distress, negativity, and avoidance of the mother (Murray et al. 1996). They are more likely to be less sociable and more fearful of strangers, and to exhibit more behavioral problems and delayed cognitive milestones (Lyons-Ruth et al. 1997). These infants are also at an increased risk for developing depressive disorder in childhood and anxiety or alcohol dependence in adolescence (Weissman et al. 1997).

There is growing evidence that some of the difficulties seen in children of depressed mothers may arise from unhelpful or negative parenting practices including inconsistent approach to discipline or caregiving, emotional unavailability, or insensitivity to children's needs (Field 1998; Tronick and Weinberg 1997; van Doesum et al. 2008). Possessing adequate knowledge of childrearing or having empathy for children's developmental needs and heeding early pediatric guidance are, however, thought to be important in promoting good health and development of children (American Academy of Pediatrics (AAP) 2003). However, not much evidence exists about depressed women's use of preventive health services for their children in early childhood. Few such studies exist to date. For example, Brown and Davidson (1978) demonstrated that depressed more than nondepressed mothers had reported their children had accidents. Mandl et al. (1999) have shown that infants who experienced more than one emergency- or problem-oriented visit had mothers who were more likely to be depressed, and suggested that certain patterns of health care use may help to identify women with depression. McLennan and Kotelchuck (2000) found that depressed mothers with very young children were less likely to apply recommended preventive practices such as using a car seat and/or electric plug covers. Shalowitz et al. (2001) found that children with asthma whose mothers were depressed were more likely to have higher morbidity. Casey et al. (2004) found that positive maternal depression screen status in clinical samples of infants and toddlers was associated with poorer child health, household food insecurity, and loss of federal financial support and food stamps. Chung et al. (2008), reanalyzing a large sample of women using public health centers, found that compared to women without depressive symptoms, women with persistent symptoms were nearly three times as likely to have their child ever hospitalized, twice as likely to use corporal punishment, three-quarters less likely to have smoke alarms, and one-half as likely to use the back-to-sleep position for their child. McLearn et al. (2006) also examined a large sample of women involved in the National

Evaluation of Healthy Steps for Young Children. They found that mothers with depressive symptoms had reduced likelihood of continuing breastfeeding, showing books or playing or talking with their infants, and had more difficulty following routines. In contrast to other studies, they found that mothers with and without depressive symptoms reported similar uses of safety and feeding practices.

Thus, the purpose of this study was to examine whether the presence of maternal postnatal depression affects the use of infant health services, parenting approach to infant care, and the use of recommended infant safety measures. The study tested the hypothesis that mothers who evidenced postnatal depression would be less likely to engage in preventative health practices.

## Method

### Design

This study is part of a larger prospective study examining the effectiveness of parent mentoring during home visiting with high-risk urban families receiving well-baby health care services in a community health center in Washington, DC (Zajicek-Farber 2008). The design of the current study represents a secondary data analysis for data collected during two waves of project implementations between 2002 and 2006.

### Sample Participants

Participants in both waves of project implementations were recruited through similar processes or referrals from local prenatal obstetrics clinics and other community services during the last months of pregnancy or within one month of the child's birth. They represent a self-selected sample meeting specific criteria. In each implementation, the project inclusion criteria required that the focus infant have medically normal birth status and that the mother be 17 years or older at the time of the child's birth, have an incomplete educational status (GED or less), and be able to speak English or Spanish. There were no significant demographic differences between the women in the two project implementations, and thus all 138 (79%) fully served women were included in the current study. Of these women, 134 (97%) met the necessary criteria for the project and had sufficient data on the selected variables for investigation in this study. Four women did not meet these criteria and were excluded.

The characteristics of current study participants are presented in Table 1. There were no major significant differences in the women's demographic profile by their designated depression status.

**Table 1** Enrollment characteristics of women by postnatal depression status

Characteristics	Depressed N = 74	Not ever depressed N = 60
<b>Ethnicity</b>		
Latina	41 (55%)	35 (58%)
African-American	33 (45%)	25 (42%)
<b>Mothers' age</b>		
Mean	22.3 years	22.6 years
SD	4.3 years	3.9 years
<b>Spouse/partners' age</b>		
	N = 52	N = 45
Mean	24.5 years	24.3 years
SD	6.1 years	5.1 years
<b>Education</b>		
Lacks high school diploma	65 (88%)	52 (87%)
GED diploma	9 (12%)	8 (13%)
<b>Marital status</b>		
Legally married with spouse	22 (30%)	23 (38%)
Divorced or separated but living with a partner	25 (34%)	20 (33%)
Never married but occasionally living with a partner	27 (36%)	17 (28%)
<b>Health insurance</b>		
For child	37 (50%)	28 (47%)
<b>Child's gender</b>		
Male	35 (47%)	27 (45%)
Female	39 (53%)	33 (55%)
<b>Siblings</b>		
Living at home	35 (47%)	29 (48%)
Living elsewhere	9 (12%)	7 (12%)
Only child	30 (41%)	24 (40%)

Overall, the participants in this study included women of whom slightly more than half were Latina and the rest were US-born African American. Most of the Latina women immigrated from South or Central America and Puerto Rico. Most preferred to speak their native Spanish language and around one-half were able to converse and write in basic English; the rest had some difficulty. The average age of the women in this study was around 24 years. Slightly over a third of the women were legally married; a third were divorced or separated and living with a partner, and a third of the women were never married but occasionally living with a partner. Most of the women lacked basic education. That is, a majority (87%) did not have a high school diploma. The rest (13%) had minimal education, having completed their GED. A third of the women also reported that they needed special education assistance for learning difficulties during their prior schooling.

In this study, women had similar numbers of focus boys and girls with a medically normal birth (i.e., no special medical intervention following birth and both mother and baby discharged within three days). About two-fifths of the children were the only child, while close to one-half had siblings living in the home, and the rest, living elsewhere. Typically, the low family income level made the focus children eligible for Medicaid, but one-half of the families of these women did not have any health insurance (private or Medicaid) for their child at enrollment. Over one-half of the women also did not have a steady (full-time) family income for at least one parenting adult within the past year of enrollment. The family income was usually derived through a combination of periodic employment, some public benefits (TANF, SSI, child support), and some support from extended family or friends.

### Measurement

The independent variable for maternal depressive symptoms was measured and established by two scales. The Edinburgh Postnatal Depression Scale (EPDS) (Cox et al. 1987) is a 10-item four-point self-reported rating scale developed specifically for the assessment of postnatal depression in a community setting. The scale has a Spanish version and good research criterion validity (Cox and Holden 1994; Garcia-Estevé et al. 2003; Teissendré and Chabrol 2004). Scores on the scale range from 0 to 30 and higher scores indicate more depressive symptoms. The score of  $\geq 11$  was used to establish postnatal depression symptoms in this study (Jevitt et al. 2006). The EPDS was collected at three points of time: at 2 months of infants' age, six months, and at exit from the project at 16–18 months of infants' age.

The Parental Health and Depression Questionnaire (PHDQ), is a 3-item depression screening tool with a good sensitivity, specificity, and predictive value (Lanzi et al. 1999). If a woman responded *yes* to 2 or 3 screening questions, she was deemed as showing depressive symptoms prior to her child's birth. This information was collected at exit.

All women in the study had data for PHDQ and EPDS. Cronbach alpha equaled .80 or higher in all administrations and thus both measures showed good research consistency. Thirty (22%) women in the study were missing data for EPDS at baseline or at 6 months. Women's symptoms of postpartum depression were established by the two scales across all periods. A woman was classified as *not ever depressed*, if she had no reported depression (on either of the two scales) at all the time points. She was classified as *depressed*, if she reported symptoms prior to birth or at any of the other subsequent times. All women in this study who reported (retrospectively) having symptoms prior to birth

also had postpartum symptoms at least at one other time point. This classification process yielded 60 (45%) women as not ever depressed and 74 (55%) women as depressed. Four women were excluded because they were missing other relevant data. Of the 74 women who were classified as depressed, one-half ( $n = 37$ ) had symptoms during a shorter period or only prior to birth and at two or six months time frame but not at 16–18 months. The other one-half of the women had reported depressive symptoms persistently at all periods.

In addition, there was no significant association between depression status of these women and their research group status assignment (intervention vs. control status) in the original project. There was also no significant difference in the mean depression of women by their ethnicity at any of the postnatal time points in the study.

Ten outcome variables denoted the concept of women's preventative infant health practices. These dependent variables in the study were selected because they tend to be included in medical literature and have been shown to be related to the well-being of very young children (AAP 1996, 2000). Specifically, the use of health services was measured by three variables: the number of child's well-health visits, having complete immunizations, and the number of emergency room (ER) visits for acute care. The adequate levels for these variables were established by the Medicaid Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) protocol (Centers for Medicare and Medicaid Services 2003). Between birth and 18 months, a child would typically complete at least six or seven well-health visits, have all immunizations, and have at maximum one ER visit for acute care in order to be considered as having adequate use of health services.

Parenting practices were measured by four variables: the knowledge of age-appropriate nurturing and sensitive parenting, and the use of corporal punishment, inappropriate feeding practices prior to 4 months of age, and parenting practices. The knowledge of nurturing parenting practices and childrearing beliefs including empathy, developmental expectations, and use of age-appropriate discipline were measured by 40 five-point scaled items on the Adult-Adolescent Parenting Inventory (AAPI-2) (Bavolek and Keene 1999). Responses provide a standard for risk in five parenting factor constructs known to contribute to the maltreatment of children: 1) inappropriate parental expectations of children's growth and development; 2) an inability for parents to be empathically aware of the needs of their children; 3) a strong belief in the use of corporal punishment as a means of disciplining their children; 4) reversing parent-child family roles and expecting the child to "parent" the adult; and 5) oppressing children's power and independence through strict and rigid adherence to obedience. This five-factor scale has research-adequate

construct validity and consistency. Responses on the AAPI-2 were analyzed or classified by the number of failures on the five factors-subcales. Failing on at least one factor was classified as being at risk for lacking adequate parenting knowledge of appropriate nurturing or empathic practices.

Assessing the use of corporal punishment, women were also asked one dichotomous question; i.e., they were asked about how many times they had to spank the focus child within the past week. The use of spanking on one or more occasion was designated as using inappropriate discipline. Women were also examined for using inappropriate feeding practices prior to 4 months of child's age; i.e., women were asked if they had fed their child juice, water, or cereal more than once during the past month. The early use of juice in the diet can result in insufficient nutrition, dental carries, and short stature (AAP Committee on Nutrition 2001). The early use of water has been associated with water imbalance that can lead to water intoxication and even death (Keating et al. 1991), and AAP (2004) does not recommend introducing cereals before the age of 4 months. In addition, based on these three parenting variables, this study constructed a new variable that identified women with adequate or poor parenting practices. Women classified as having *adequate parenting practices* were women who acted appropriately in disciplining and feeding their child and/or displayed adequate knowledge on the AAPI-2 scale. In contrast, women classified as having *poor parenting practices* were women who failed both in their knowledge and in their discipline and feeding practices. This classification allowed women to have less than adequate knowledge or beliefs about nurturing or sensitive parenting yet still be considered adequate if they acted appropriately toward their child.

Safety approach was measured by three variables: i.e., dichotomous questions asking about having a smoke alarm, electric plug covers, and in what position the child was usually placed to sleep (Center for Disease Control and Prevention 1999). Having a smoke alarm, electric wall plugs (outlet covers) on at least 75% of all electric outlets in the kitchen and main living areas, and placing a child in the preferred back-to-sleep position were considered as adequately heeding the AAP preventive approach. All outcome measures demonstrated good research consistency with Cronbach alpha of .70 or above.

#### Data Collection

Data for variables were collected through structured paper and pencil interviews from mothers by trained interviewers during designated data collections in the main project. These designated periods were at enrollment, at two months, six months, one year, and at exit when the child

turned around 16–18 months of age. With a separate written consent, data for health service use were extracted from the child's health record during the original project execution. Participants were interviewed in their preferred language. The original project was approved by the participating hospital Internal Review Board at the primary service site. All project participants completed Informed Consent procedures that followed expected ethical conduct for research with human subjects as set by the US Department of Health and Human Services (DHHS), Office for Human Research Protections (OHRP) (see: <http://www.hhs.gov/ohrp/>). To assure confidentiality, a numerical code substituted for the participants' names on all forms. Data entry was accomplished through a restricted and password protected process with trained staff and/or graduate students supervised by the author. The author has completed certificate training for conducting ethical research as expected by the OHRP and university IRB standards. As a reward for time spent in completing evaluations in the main project, all participants were provided with age-appropriate toys or books for their focus child, and participants in the first pilot implementation also received grocery gift-certificates.

#### Data Analysis

*Statistical Package for Social Sciences* (SPSS, version 15) software was used for data entry and analyses. Measures of central tendency and percentages describe sample participants. Independent *t*-test was used for examining two-group comparisons with continuous outcomes. Repeated analysis of variance compared the mean depression levels of women across several time points by their ethnicity. Chi-square ( $\chi^2$ ) test was used to analyze the frequency associations between the discrete predictor (depressed and not ever depressed status) and the selected discrete outcomes. Relative risk (RR) analyses evaluated the effects on the selected categorical outcomes (Tabachnick and Fidell

2007, p. 463). Because the analyses are regarded as exploratory (rather than confirmatory), the study conducted unadjusted tests of the significance of differences in the selected outcomes (Schochet 2008). The criterion alpha of  $p < .05$  was used to benchmark the statistical significance.

## Results

### Use of Health Services

Compared to not ever depressed women, depressed women significantly differed in their use of health services for their focus child (Table 2). In well-child visits, depressed women were less likely to complete expected well-health visits for their child by exit from the project. On average, they completed 5.91 (SD = 1.03) well-child health visits whereas not ever depressed women completed 6.42 (SD = .77) visits ( $t(132) = 3.18, p < .002, \eta^2 = .07$ ). In this study, significantly fewer not ever depressed women compared to depressed women (16.7% vs. 33.8%) had inadequate (five or less) well-child visits. Thus, the relative risk (RR) for having inadequate well-child visits was 2 times greater for depressed women than for those not ever depressed (RR = .338/.167).

Children of depressed women were also less likely to complete their child-immunizations by the expected time frame. Significantly fewer of not ever depressed women compared to depressed women (11.7% vs. 39.2%) had incomplete immunization series. Thus, the relative risk (RR) for having incomplete child-immunizations was 3 times greater for depressed women than for those not ever depressed.

Similarly, children of depressed women also made significantly more visits to emergency room (ER) for acute care. On average, children of depressed mothers made 1.32 (SD = 1.4) acute care visits whereas children of not ever depressed mothers made no such visits to the emergency

**Table 2** Comparison of the use of infant health services by women's postnatal depression status

Infant health services	Depression status		$\chi^2$	df	<i>p</i>	Phi
	Depressed N = 74	Not ever depressed N = 60				
Well-child visits			5.03	1	.025	.19
Adequate (6–7 visits)	66.2%	83.3%				
Inadequate (5 or less visits)	33.8%	16.7%				
Child immunizations			12.77	1	.001	.31
Complete	60.8%	88.3%				
Incomplete	39.2%	11.7%				
ER visits for acute care			34.08	1	.001	.50
0–1 visit	56.8%	100%				
2 or more visits	43.2%	0%				

room ( $t(132) = -7.6, p < .001, \eta^2 = .30$ ). In particular, of the children with depressed mothers, 15% made at least one visit for acute emergency care, 15% made two visits, 23% three, and 5% made four acute emergency visits. In a further analysis, making two or more ER visits for acute care was designated as making more than typically expected visits to an emergency room. Table 2 shows that 43.2% of children of depressed mothers made two or more such visits compared to zero percent of children of not ever depressed mothers. Examining the type of acute care visits listed child accidental injuries (falling from bed or other locations, scalding by hot food items, bite by pet animals, car accidents, stroller accidents) and common illnesses such as colds, earaches, fever, vomiting, skin rashes, and prolonged crying.

Parenting Practices

Examining women’s parenting practices by their depression status revealed similar significant differences (Table 3). Significantly more of depressed women failed at least one factor on the AAPI-2 scale compared to not ever depressed women (68.9% vs. 38.3%). In the depressed mothers, 31% had adequate parenting response on all five factors, while 43% failed 1–2 factors and 26% failed 3–5 factors. The relative risk (RR) for failing at least 1 factor in their knowledge of parenting was 1.8 times greater for depressed women than those not ever depressed.

Most women (76.9%) in the study did not use corporal punishment in parenting their child. However, significantly more of depressed women spanked their infant within past week compared to not ever depressed women (35.1% vs. 8.3%). The relative risk (RR) for spanking a child was 4.2 times greater for depressed women than those not ever depressed. Further, close to three-fifths (59.7%) of the women in the sample also used appropriate feeding practices and did not feed their infant juice, or water, or cereals

prematurely (or prior to 4 months and on more than one occasion). However, significantly more of depressed women fed children prematurely and inappropriately compared to not ever depressed women (54.1% vs. 23.3%). The relative risk (RR) for feeding inappropriately was 2.3 times greater for depressed women than those not ever depressed.

In examining adequate and poor parenting practices (based on parenting knowledge and use of disciplinary and feeding practices), slightly over one-half (53%) of women in the study demonstrated adequate parenting practices. However, as expected, significantly more of depressed women had poor parenting practices compared to not ever depressed women (63.5% vs. 26.7%). The difference was statistically significant ( $\chi^2(1, N = 134) = 18.05, p < .001$ ). The relative risk (RR) for having poor parenting practices was 2.4 times greater for depressed women than those not ever depressed.

Safety Practices

Examining infant safety practices revealed similar troubling differences between depressed and not ever depressed women (Table 4). Significantly more of depressed women did not have a smoke alarm anywhere in their household compared to not ever depressed women (24.3% vs. 7%). The relative risk (RR) of missing a smoke alarm in the household was 3.6 times greater for depressed women.

Significantly more of depressed women were also missing electric wall plugs in the main living areas (kitchen, living room, or rooms where the focus child spent more than 2 h at a time) compared to not ever depressed women (29.7% vs. 15.0%). The relative risk (RR) of missing electric wall plugs was 1.9 times greater for depressed women. In addition, around 34% of depressed women did not have a smoke alarm or electric wall plugs or both items compared to 17% of not ever depressed women

**Table 3** Comparison of parenting practices by women’s postnatal depression status

Parenting practices	Depression status		$\chi^2$	df	p	Phi
	Depressed N = 74	Not ever depressed N = 60				
Knowledge of nurturing practices			12.53	1	.001	.31
Adequate knowledge (0 failures)	31.1%	61.7%				
Inadequate (1 or more failures)	68.9%	38.3%				
Use of corporal punishment			13.38	1	.001	.32
Appropriate (did not spank)	64.9%	91.7%				
Inappropriate (spanked)	35.1%	8.3%				
Feeding appropriately			12.99	1	.001	.31
Yes	45.9%	76.7%				
No (used water, juice, or cereal < 4 mo)	54.1%	23.3%				

**Table 4** Comparison of safety practices by women's postnatal depression status

Safety practices	Depression status		$\chi^2$	df	<i>p</i>	Phi
	Depressed N = 74	Not ever depressed N = 60				
Smoke alarm on premises			7.53	1	.006	.23
Present	75.7%	93.3%				
Absent	24.3%	6.7%				
Electric outlet covers			4.04	1	.044	.17
Present	70.3%	85.0%				
Absent	29.7%	15.0%				
Child's sleeping placement			4.71	1	.030	.19
Back-to-sleep position	68.9%	85.0%				
Other-to-sleep position	31.1%	15.0%				

( $\chi^2(1, N = 134) = 5.03, p = .025, \text{Phi} = .19$ ). The relative risk (RR) of missing these safety devices was 2 times greater for depressed women.

Lastly, significantly fewer children of depressed women were placed in the recommended back-to-sleep position compared to children of not ever depressed women (68.9% vs. 85.0%). The relative risk (RR) of sleeping in a 'wrong' position was 2 times greater for children of depressed women than those of not ever depressed women.

## Discussion

Postnatal depression is becoming a recognized risk factor for maternal development and thus also poses an inherent risk for early child development (Halfon and McLearn 2002). Based on this connection, studies are starting to examine the empirical link between maternal depression and maternal use of health services and preventative practices for infants and young children. The current study also examined this relationship in a small sample of high-risk non-white women with low income who were receiving well-baby health care services at an inner city community health center. The study specifically examined the association between women's postnatal depression and their completion of well-child health care visits, immunizations, and the number of emergency room visits for acute care by the time the focus child turned 16–18 months. In addition, the study investigated the association between women's depression and their knowledge of nurturing sensitive parenting, the use of corporal punishment and inappropriate premature feeding practices, and overall poor parenting practices. The study examined the use of recommended household safety devices and the use of child's back-to-sleep position.

In support of the hypothesized empirical relationships between postnatal depression and selected outcomes, the study found that women with postnatal depression were less likely to complete all of the expected well-child health

visits and completed less of them than women not ever depressed. They were also less likely to have their child immunized. They were more likely to have taken their child to an emergency room for acute care and to have made more than two such visits by the time their child turned 16–18 months. These findings are in line with previously reported studies by Mandl et al. (1999) and McLennan and Kotelchuck (2000).

In addition, more women with postnatal depression did not engage in positive parenting. They were more likely to have failed in their knowledge of what constitutes nurturing and sensitive parenting. They were more likely to have used corporal punishment and fed their child inappropriately prior to 4 months. Overall, they were more likely to exhibit poor parenting practices (in knowledge and actions). These results are supportive of the study by Chung et al. (2008). They are also in-line with previous smaller observational studies (Field 1995; Fleming et al. 1990) as well as more recent large or longitudinal studies which have found that maternal depressive symptoms are associated with lower levels of positive parent-child interactive behaviors and higher levels of negative harsh parenting approach (being irritable, yelling, spanking) in the first 3 years of life (Lyons-Ruth et al. 2002; Luoma et al. 2001; Minkowitz et al. 2005).

Furthermore, in this study, women with postnatal depressive symptoms were less likely to have household safety devices such as a smoke alarm or electric wall plugs in their home. They were also less likely to place their infant in the recommended back-to-sleep position. These findings are also supportive of the findings in the Chung et al. (2008) study.

In examining this study, some limitations need to be considered. First, the small self-selected sample size derived from one setting precludes generalizations. However, the participating non-white ethnically diverse women in the study had similar demographic characteristics and their depressive symptoms were not affected by their

ethnicity. It is, however, possible that this result is an artifact of a unique local population that may not be true in other settings, and thus, women's ethnicity or their demographic characteristics bear further investigation using a large sample (e.g., see McLearn et al. 2006).

Women's self-reported measures of parenting may also lead to overreporting of behaviors that are socially desirable. A review by Richters (1992), however, suggested that mothers do not tend to distort their reports about children. Recently, D'Souza-Vazirani et al. (2005) reported that there were no differences in the validity of mothers' reports for children's short-term health care use based on the presence of their depressive symptoms. In view of this evidence, it is reasonable to suggest that it is possible to identify poor parenting practices among mothers with depressive symptoms by their self-report without having to use expensive direct-observation measures.

Further, the finding on women's reports about safety measures in the home or with their infants' sleep position needs further study. For example, Roberston et al. (2005) reported a great variability in the validity of self-reported home safety practices, but their study did not assess infant sleep position. McLearn et al. (2006) found that depressive symptoms did not play a role in women's reports of safety practices (sleep position and lowering water temperature) while Chung et al. (2008) found that depressive symptoms reduced the likelihood of using a smoke alarm or the back-to-sleep position. Based on other studies (Downey and Coyne 1990; Dodge 1990), it is possible that women who live in socioeconomically and educationally adverse or deprived circumstances have fewer supports, are more distracted, and thus do not pay sufficient attention to their family needs or the needs of their children despite pediatric recommendations. It may be more difficult for these mothers to focus on preventative measures when they are dealing with more immediate and pressing needs.

Because this study is exploratory and subject to small sample size limitations, the study could not control for possible effects of other extraneous but important variable influences. For example, the presence of these women's social support or quality of support from their partner or the support derived from their immediate quality of life environment might have also influenced the women's report on their depression (Martinez-Schallmoser et al. 2003) or their infant health related practices, and thus needs to be considered in future studies.

Although the study used two well-known scales to classify women's postnatal depressive symptoms, the study did not consider whether women may have had pre-existing major depressive disorder (MDD) or other concurrent psychiatric illnesses. The study also did not examine the possible differential outcomes on selected variables by the length of women's depressive symptoms. Future studies

need to examine whether and how interventive practices may make an impact on women's and children's needs in view of the length of mothers' symptoms during the early years. Because the current results provide exploratory information about the relationships between women's postnatal depressive symptoms and selected infant health practices, these findings may warrant further examination in more rigorous studies (Schochet 2008).

The current results do, however, support previous studies, which have called for increased screening, detection, and interventive support for women's depressive symptoms. Developing sensitive and strong relationships between health providers and high-risk families is very much needed in detecting as well as treating depressive symptoms. Both Latina and African American women with low income and education are particularly at an increased risk for depression and often prefer to use primary care settings for addressing their psychological or psychosocial difficulties, rather than designated mental health settings (Heneghan et al. 2000; O'Malley et al. 2003). The current study provides additional evidence that women's depressive symptoms can exert negative effects on maternal use of infant health services, their parenting practices, and the use of preventative safety measures for their infants. In this context, primary care health practices should consider a multidisciplinary approach, incorporating social workers, psychologists, and other health related professionals in devising novel approaches to treatment of depressed women in order to promote and improve the health and safety of young children in high-risk families.

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