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The Relationship Between Postpartum Depression, Domestic Violence, Childhood Violence, and Substance Use: Epidemiologic Study of a Large Community Sample

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Abstract

The objective of this study was to determine the contribution of interpersonal violence and substance use to the prediction of postpartum depressive symptomatology. A community-based sample of 634 women in British Columbia, Canada was screened for interpersonal violence and substance use using the Antenatal Psychosocial Health Assessment (ALPHA) form. Of these women, 497 (78%) subsequently completed questionnaires at 8 weeks postpartum to assess for depressive symptomatology using the Edinburgh Postnatal Depression Scale (EPDS). A predictive model for postpartum depressive symptomatology (EPDS > 9) was developed using regression analysis. Findings suggest that women who experience past or current interpersonal violence or personal or partner substance use problems should be considered for targeted screening for postpartum depression (PPD).

Keywords

child abuse, interpersonal violence, postpartum depression (PPD), risk factors, substance abuse, woman abuse

Introduction

Depression is among the most disabling disorders for women in their childbearing years. For women aged 15 to 44 years around the world, it is second only to HIV/AIDS

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in terms of total disability (World Health Organization, 2001) and is the leading cause of nonobstetric hospitalization among women aged 18 to 44 years in the United States (Jiang et al., 2002). Postpartum depression (PPD) is often defined in research and clinical practice as clinical depression occurring within the first year after childbirth, and its impact extends to the offspring of afflicted women as well as their families. The most adequate analysis of all prevalence studies concluded that as many as 7.1% of women may experience a major depressive episode in the first 12 weeks postpartum; including minor depression, the rate increases to 19.2% (Gavin et al., 2005). Episodes of depression occurring in the first year postpartum are estimated to occur in up to 20% of births in the United States (Centers for Disease Control and Prevention, 2008).

Auspiciously, a critical review of PPD treatment interventions suggests that this affective condition is amenable to treatment (Dennis, 2004; Dennis & Stewart, 2004) and may be identified through early detection procedures. However, inadequate administrative and financial resources may preclude adoption of universal screening in some settings. Furthermore, there is limited research so far that suggests such universal screening procedures improve clinical outcomes as integrative care pathways are required (Butler, Hatcher, Price, & Von Korff, 2007). As such, it may be more useful to screen women for early intervention who are at a particularly high risk of developing PPD. Yet, targeted screening necessitates the accurate identification of high-risk women.

To address this issue, numerous epidemiological studies and meta-analyses of predictive studies have been conducted to identify PPD risk factors. Consistent risk factors include antenatal depression, past psychiatric history, life stress, childcare stress, marital conflict, and the lack of social support (Beck, 2001; O'Hara & Swain, 1996). Despite this research, few studies have examined the impact of specific psychosocial risk factors such as domestic violence (physical, emotional, or sexual abuse by a partner), childhood abuse (physical or sexual), and substance use (personal or partner). This is a significant limitation since research with nonpostpartum samples clearly demonstrates a link between the development of depression and physical, emotional, and sexual abuse by a partner (Diaz-Olavarrieta, Ellertson, Paz, de Leon, & Alarcon-Segovia, 2002; Fikree & Bhatti, 1999; Hathaway et al., 2000; Hegarty, Gunn, Chondros, & Small, 2004), childhood abuse (Bohn, 2003; Lansford et al., 2002; Nagy, DiClemente, & Adcock, 1995; Stevens-Simon & McAnarney, 1994), and substance abuse (Bohn, 2003).

A recent systematic review (Ross & Dennis, 2009) identified only eight studies on the relationship between interpersonal violence (past or current) and PPD. Although the studies suggested interpersonal violence is strongly associated with PPD, there was minimal consensus across studies about the types of violence that are most important (e.g., past, current, physical, emotional, or sexual) in the prediction of PPD. In addition, many of the studies were performed in clinical populations, making it difficult to determine the usefulness of screening for these risk factors in the general population. In addition, the same systematic review identified only five studies focused on the relationship between substance abuse and PPD. Taken together, the studies suggested that substance use is an important risk factor for PPD. However, limitations of the studies in the review included the inability to account for sociodemographic risk factors such as marital status and income that are highly associated with both

substance use and depression and could therefore potentially confound the interpretation of the relationship between the two variables.

A number of studies on the relationship between interpersonal violence and PPD have become available in the 2 years since the systematic review was conducted, suggesting that this area has recently begun to receive more substantial research attention. For example, in one U.S. study, 139 women were assessed in their third trimester of pregnancy and followed for 2-, 4-, 6-, and 8-months postpartum for abuse status and depression symptoms (Records & Rice, 2009). This study found women with a lifetime history of abuse were 3.6 to 8.4 times more likely to experience PPD than their nonabused peers at each measurement time. In another U.S. study, elevated rates of PPD among women with a recent partner abuse history were found (Valentine, Rodriguez, Lapeyrouse, & Zhang, 2011). In this study, 210 Latina, predominantly low-income, women were interviewed in their third trimester of pregnancy with the Abuse Assessment Screen (AAS) to detect history of partner abuse. The AAS was modified to distinguish lifetime from more recent exposure to partner violence, and depression symptoms were assessed at 3, 7, and 13 months postpartum using the Beck Depression Inventory—Fast Screen (BDI-SF). In this study, multivariate regression analysis found only recent partner violence, including physical, psychological and/or sexual, and not past history of partner violence, was a significant predictor of PPD (*OR* [odds ratio] = 5.38, 95% CI [confidence intervals] = 2.21-13.08).

In a longitudinal study investigating the association between prepregnancy history of abuse and depression in the postpartum period, a large ($n = 510$) sample of U.S. women were recruited from a hospital-based urban clinic and assessed at their 6-week postpartum visit (Silverman & Loudon, 2010). This study found history of physical or sexual abuse, and not exposure to family violence, was associated with an elevated risk of EPDS score ≥ 9 (*OR* = 2.43, 95% CI = 1.28-4.61). In another large ($n = 5{,}380$) U.S. study, women from the Kentucky Women's Health Registry (KWHR) who reported at least one live birth were assessed for violence/abuse exposures and depressive symptoms (Garabedian et al., 2011). Violence against women, including intimate partner violence (IPV) in its various forms (physical, sexual, or stalking) and childhood violence (sexual or physical) as well as self-reported history of PPD were examined. In bivariate analysis, all the adult violence exposures were associated with PPD. After controlling sociodemographic, smoking status, other substance abuse, and obstetrical factors, it was found that women with a history of violence against women exposures were approximately 40% more likely to report a history of PPD (aRR = 1.37, 95% CI = 1.04-1.81), and childhood physical abuse (aRR = 1.47, 95% CI = 1.04-2.07), but not childhood sexual abuse (aRR = 1.22, 95% CI = 0.80-1.88), was associated with PPD.

Although recent research has examined the relationship between interpersonal violence and PPD, there is still minimal consensus across studies about the types of violence that are most important in the prediction of PPD. Importantly, studies do not often differentiate current from lifetime abuse (Records & Rice, 2009), and research suggests that women with lifetime abuse experiences are more likely than nonabused women to have more recent abusive relationships that include multiple types of violence (Thompson et al., 2006). Furthermore, although recent research has continued to

demonstrate the significance of substance use as an important risk factor for PPD, few studies have controlled for other factors and the complex relationships between interpersonal violence, substance use, and PPD risk are poorly understood.

The purpose of this community-based study was to determine the contribution of both interpersonal violence (past and current) and substance use (personal and partner) to the prediction of clinically significant depressive symptomatology in women at 8 weeks postpartum. The study results could be used to assist in the assessment and targeting of women at risk for PPD such that early interventions could be initiated.

Method

Design and Sample

Participants completed questionnaires as part of a longitudinal study conducted in a health region near Vancouver, British Columbia from April 2001 to January 2002. Eligible women, who were at least 18 years of age and able to understand English, were recruited after receiving approval from the university ethics committee and study authorization from the participating health region. To obtain a population-based sample, study packages that included informed consent procedures were provided antenatally through family physician, obstetrician, and midwifery offices for women > 32 weeks gestation and postnatally during the standard 48-hour posthospital discharge call delivered to all new mothers. All participants were mailed the same follow-up questionnaires at 1, 4, and 8 weeks postpartum; reminder telephone calls were provided to women who did not return their questionnaires within 2 weeks of mailing. One hundred and sixty-six participants agreed to participate in the study antenatally, with 115 (69%) returning the 1-week postpartum questionnaire. Of the approximately 971 women screened postnatally, 857 were eligible; the most common reason for ineligibility was inability to read English (n = 27). Of the eligible women, 190 (22%) declined enrollment, most frequently citing stress (n = 61, 32%) or lack of interest (n = 59, 31%). Of the 667 women who agreed to participate in the study postnatally, 479 (72%) returned the 1-week postpartum questionnaire. In total, 594 participants returned the 1-week postpartum questionnaire. All women who answered a standardized questionnaire at recruitment and the items related to interpersonal violence and substance use were included in the analysis (N = 634). Of these women, 497 (78%) returned the 8-week questionnaire and completed a measure of depressive symptomatology. No data from the 4-week questionnaire were used in this study. There were no statistically significant differences in sociodemographic factors, interpersonal violence, or substance use variables between women who completed the 8-week questionnaire and those who did not.

Measures

Assessment of Interpersonal Violence and Substance Use. The ALPHA form (Reid et al., 1998) is a self-report questionnaire based on a systematic literature review of

Table 1. Descriptive Statistics for Interpersonal Violence and Substance Use Items From ALPHA Form.

Domain	Item	*n* (%)
Childhood abuse	Father scared or hurt mother	133 (21.0)
	Parents hit in order to discipline	331 (52.2)
	Sexually abused as a child	104 (16.4)
	Involvement with child protection agency	19 (3.0)
Woman abuse	Hit/pushed/slapped by partner	49 (7.7)
	Humiliated or psychologically abused by partner	78 (12.3)
	Frightened by what partner says or does	63 (9.9)
	Forced to have sex against will	91 (14.4)
Maternal substance use	Smokes cigarettes	100 (15.8)
	Uses recreational drugs	29 (4.6)
	Has problem with alcohol or drugs	4 (0.6)
Partner substance use	Partner smokes cigarettes	163 (25.7)
	Partner uses recreational drugs	86 (13.6)
	Partner has problem with alcohol or drugs	38 (6.0)

Note. $N = 634$

antenatal risk factors associated with poor postpartum family outcomes (Wilson et al., 1996). This questionnaire was developed to assist in the psychosocial assessment of pregnant women and is used in various urban, rural, and culturally diverse locations across Ontario, Canada by obstetricians, family physicians, midwives, and antenatal clinic nurses. Fourteen items related to childhood abuse (e.g., witness violence as child, harsh discipline as child, sexual assault as child, involvement with child protection agency), past or current woman abuse (e.g., physical, emotional, sexual abuse by partner), and substance abuse (by woman and partner) were included in the baseline questionnaire that all study participants completed at recruitment. Current smoking status (personal and partner) was also included. Table 1 shows the distribution of responses for each item. Yes/no responses to items were summed to produce a total score ranging from 0 to 14, with higher scores indicating higher psychosocial risk.

Assessment of Depressive Symptoms. The EPDS (Cox, Holden, & Sagovsky, 1987), a 10-item self-report instrument, was used to assess depressive symptomatology at 8 weeks postpartum. Items were rated on a 4-point scale to produce a summative score ranging from 0 to 30, with higher scores indicating lower maternal mood. This instrument is the most frequently used instrument to assess postpartum depressive symptomatology and to identify at-risk mothers (Beck, 2001). In this study, women who scored above 9 on the EPDS were defined as exhibiting depressive symptomatology. This cutoff point has been recommended for community-based screening (Murray & Carothers, 1990; Zelkowitz & Milet, 1995) and has been shown to have high sensitivity, specificity, and positive predictive power for PPD (Harris, Huckle, Thomas, Johns,

& Fung, 1989; Murray & Carothers, 1990). Furthermore, this cutoff point was selected due to research that suggests that more than 50% of first-onset depression cases are associated with the earlier presence of minor depression (Horwath, Johnson, Klerman, & Weissman, 1992). While it is understood that the EPDS is a proxy measure and does not provide a clinical diagnosis, this study is discussing risk factors and early identification, not treatment. As such, the EPDS is an appropriate measure for the purpose of this study and is a clinically realistic measure for practitioners who would be caring for women in the early postpartum period.

Assessment of Sociodemographic and Obstetrical Factors. We examined a number of sociodemographic and obstetrical variables that have been suggested as potential predictors of PPD in the existing literature (Beck, 2001; O'Hara & Swain, 1996). The sociodemographic and obstetrical factors included marital status, ethnicity, education level, and socioeconomic status (household income) and parity as these variables may be helpful in identifying women who may be suffering from PPD.

Statistical Analysis

The data are presented using descriptive statistics (means, standard deviations, or proportions). Pearson's Product Moment correlations were used to examine the relationship between EPDS scores and total ALPHA scores. Pearson χ^2 analyses were used to examine associations between binary data; *OR* and corresponding 95% CI were calculated. A logistic regression analysis was performed to predict depressive symptomatology at 8 weeks postpartum as measured by an EPDS score > 9. In the analysis, variables were retained in the model if the p-value for the β-estimate was 0.05 or less as derived from the Wald statistic. Goodness of fit for the model was assessed using the χ^2 statistic derived from the log-likelihood; variables were entered into the model concurrently. All data analysis was performed using SPSS (SPSS, 2010) and a two-tailed significance level of 0.05.

Results

Sample Characteristics

The mean age of the sample was 28.5 years (*SD* = 5.0), with a range from 18 to 44 years. Ninety-two percent of the women were Caucasian (*n* = 585) with 90% indicating they were married or living common law (*n* = 574). Thirty-five percent (*n* = 250) of mothers had a high school diploma or less, 39% (*n* = 246) had a college diploma, and 21% (*n* = 135) had a university degree or higher. In relation to annual household income, 37.6% (*n* = 238) of women had an income less than C$40,000, 25.1% (*n* = 159) had incomes between C$40,000-C$60,000, and 30.5% (*n* = 193) had incomes greater than C$60,000. Forty-four percent (*n* = 281) of the women were primiparous, 68% (*n* = 432) delivered vaginally, and 24.8% (*n* = 157) of women reported a history of depression.

Prevalence of Domestic Violence and Substance Abuse

In this study, 7.7% ($n = 49$) of women indicated that their partner physically assaulted them, 10% ($n = 63$) were frightened by what their partner says or does, and 12.3% ($n = 78$) indicated that their partner humiliated or psychologically abused them. Sixteen percent ($n = 104$) indicated that they were sexually abused as a child and 14.4% ($n = 91$) had been forced to have sex against their will at some point in their lives. Fifty-two percent ($n = 331$) reported their parents hitting them as a form of childhood discipline, 21% ($n = 133$) felt their father scared or hurt their mother, and 3% ($n = 19$) had a history with a child protection agency. With respect to substance use, while 15.8% ($n = 100$) of women indicated that they smoked cigarettes, less than 1% ($n = 4$) reported having a drug or alcohol problem; 4.6% ($n = 29$) indicted that they used recreational drugs such as marijuana. Similarly, 25.7% ($n = 163$) of partners smoked cigarettes and 6% ($n = 38$) were reported to have a drug or alcohol problem. However, 13.6% ($n = 86$) of partners used recreational drugs.

Relationship Between Depressive Symptomatology and Antenatal Risk Factors

Among the 497 women who completed the EPDS at 8 weeks postpartum, 20.7% ($n = 103$) scored > 9 on the EPDS. Household income was the only sociodemographic variable significantly associated with depressive symptomatology at 8 weeks (Table 2). Total ALPHA scores were significantly correlated to EPDS scores at 8 ($r = 0.23$, $p < .01$) weeks postpartum. Women were significantly more likely to experience depressive symptomatology at 8 weeks postpartum than those who did not if they reported (a) having a drug or alcohol problem, (b) that their partner had a drug or alcohol problem, (c) that they experienced physical and emotional abuse by their partner, (d) being sexually abused as a child, (e) being forced to have sex, and (f) being hit by their parents. Maternal and partner use of recreational drugs or smoking status were not associated with depressive symptomatology.

Prediction of Depressive Symptomatology

A standard logistic regression was performed to determine which ALPHA variables were predictive of depressive symptomatology at 8 weeks. All variables were entered into the model of which three were significantly predictive of an EPDS score > 9 in a final model and explained 6.7% of the variance: "frightened by what partner says or does" ($OR = 2.72$, $p = .002$), "parents hit in order to discipline" ($OR = 1.57$, $p = .05$), and sexual abuse ($OR = 1.82$, $p = .04$). A test of the full model with all three predictors against a constant-only model was statistically reliable (χ^2 [3, $n = 495$] = 21.78, $p < .001$) indicating that the predictors, as a set, reliably distinguished between women with or without depressive symptomatology at 8 weeks postpartum. When sociodemographic characteristics and maternal history of depression were taken into account, two ALPHA variables remained significant predictors of EPDS > 9 at 8 weeks

Table 2. Characteristics of Depressed and Nondepressed Mothers Reporting Childhood Abuse, Past or Current Woman Abuse, and Substance Abuse.

Characteristic	Depressed (EPDS > 9) (*n* = 103) *n* (%)	Nondepressed (EPDS ≤ 9) (*n* = 392) *n* (%)	χ^2	*p*	*OR*	95% CI
Sociodemographic						
Marital status: single	6 (5.8)	27 (6.9)	0.13	.72	0.85	0.34-2.11
Ethnicity: non-Caucasian	9 (8.7)	26 (6.6)	0.60	.44	1.37	0.62-3.04
Education: high school or less	42 (40.8)	135 (34.4)	1.88	.17	1.37	0.87-2.14
Household income: < C$40,000	43 (41.7)	117 (29.8)	6.53	.01	1.82	1.15-2.88
Parity: primiparous	40 (38.8)	186 (47.4)	2.04	.15	1.38	0.89-2.15
Childhood abuse						
Father scared or hurt mother	25 (24.3)	77 (19.6)	1.12	.29	1.32	0.79-2.21
Parents hit in order to discipline	64 (62.1)	190 (48.5)	6.33	.01	1.76	1.13-2.75
Sexually abused as child	23 (22.3)	51 (13.0)	5.68	.02	1.93	1.12-3.35
Involvement with child protection agency	4 (3.9)	11 (2.8)	0.33	.56	1.41	0.44-4.51
Woman abuse						
Hit/pushed/slapped by partner	12 (11.7)	19 (4.8)	6.43	.01	2.59	1.21-5.53
Humiliated or psychologically abused by partner	21 (20.4)	37 (9.4)	9.45	.002	2.46	1.37-4.42
Frightened by what partner says or does	21 (20.4)	29 (7.4)	15.16	< .001	3.21	1.74-5.90
Forced to have sex against will	23 (22.3)	45 (11.5)	8.23	.004	2.23	1.28-3.89
Maternal substance use						
Smokes cigarettes	16 (15.5)	48 (12.2)	0.82	.37	1.33	0.72-2.45
Uses recreational drugs	4 (3.9)	16 (4.1)	0.007	.94	0.95	0.31-2.92
Problem with alcohol or drugs	2 (1.9)	0 (0.0)	7.68	.006	—	—
Partner substance use						
Partner smokes cigarettes	31 (30.1)	87 (22.2)	2.90	.09	1.52	0.94-2.46
Partner uses recreational drugs	16 (15.5)	48 (12.2)	0.82	.37	1.33	0.72-2.46
Partner has problem with alcohol or drugs	11 (10.7)	10 (2.6)	13.37	< .001	4.59	1.89-11.14

Note. EPDS = Edinburgh Postnatal Depression Scale. *N* = 495

Table 3. Predictors of Depressive Symptomatology at 8 Weeks Postpartum*.

Risk factor	β (Unstandardized)	S.E. β	*OR*	95% CI	*p*-value
Partner has a problem with alcohol or drugs	1.04	0.497	2.83	1.07-7.51	.036
Parents hit in order to discipline	0.524	0.250	1.69	1.04-2.75	.036
Household income: less than C$40,000	0.503	0.248	1.65	1.02-2.69	.043
Personal history of depression	0.894	0.273	2.45	1.43-4.18	.001

*Adjusted for other covariates in the model, $N = 446$.

postpartum in the final model explaining 11% of the variance: "partner has a problem with alcohol or drugs" ($OR = 2.83$, $p = .036$) and "parents hit in order to discipline" ($OR = 1.69$, $p = .036$) (Table 3). A test of the full model with all predictors against a constant-only model was statistically reliable (χ^2 [4, $n = 446$] = 33.40, $p < .001$).

Discussion

This is one of the first studies to examine the impact of both interpersonal violence and substance use on rates of PPD in the same sample. The findings reveal that significant depressive symptomatology at 8 weeks postpartum is associated with childhood physical and sexual abuse, physical and emotional abuse by a partner, lifetime history of forced sex, as well as personal and partner substance use problems. Three items on our standardized psychosocial questionnaire were found to be independent predictors of having an EPDS score > 9 at 8 weeks postpartum: "frightened by what partner says or does," "parents hit in order to discipline," and lifetime history of "sexual abuse." In addition, two items remained significant predictors of having an EPDS score > 9 after accounting for other major predictors of PPD such as maternal history of depression and sociodemographic factors such as low socioeconomic status: "partner has a problem with alcohol or drugs" and "parents hit in order to discipline."

The major strengths of this study include the community-based sample, high questionnaire response rate at 8 weeks postpartum (78%), and the use of a standardized screening tool for antenatal psychosocial risk factors (the ALPHA) that has been shown in randomized controlled trials to improve detection of antenatal psychosocial risk factors over clinical practice alone (Blackmore et al., 2006). Although we did not conduct diagnostic interviews for PPD, we used a valid and reliable measure of postpartum depressive symptomatology with a cutoff score known to be appropriate for community-based identification of PPD. Unfortunately, of the 857 eligible women for this study, 61 (32% of those who declined enrollment) did not agree to participate, citing stress as the reason. While stress during the postpartum period constitutes a major health concern, a limitation of this study was the inability to capture the true rate of PPD in this sample of women. Depressed new mothers may be more stressed postnatally than their nondepressed counterparts, which may have slightly biased our sample

to individuals with lower risk of PPD. Another potential limitation of our study is that the sample was primarily composed of Caucasian women, 90% of whom identified themselves as being married or in common-law relationships. As such, the generalizability of our findings to single mothers, immigrants, or women from other ethnic backgrounds is limited. However, the results do appear to be consistent with findings in diverse populations. For example, in a prospective cohort study of 838 Chinese mothers, women who were verbally abused over the past year had significantly higher EPDS scores in the immediate postpartum period and at 6 weeks postdelivery (Leung, Kung, Lam, Leung, & Ho, 2002). As well, a link between PPD and physical and sexual abuse was found in another longitudinal study following an ethnically diverse sample of 95 U.S. adolescent mothers (Lesser & Koniak-Griffin, 2000). Finally, the focus of this study was not on the additive effects of interpersonal violence and substance abuse on PPD, and while we recognize that such analyses might further clarify the most appropriate strategy for screening of PPD risk, we were not able to control for some of the other known risk factors for PPD such as life stress, childcare stress, and lack of social support. Furthermore, although there is growing evidence that women reporting the most cumulative exposure to violence are most likely to report PPD (Garabedian et al., 2011), we were not able to focus on the cumulative effects of violence on PPD risk in this study.

The findings of our study are consistent with previous literature suggesting that there are high rates of interpersonal violence (past and present) in new mothers and that a history of interpersonal violence is a predictor of mental health difficulties in the perinatal period (Buist & Janson, 2001). Interestingly, after adjusting for a history of maternal depression and socioeconomic status and substance abuse, the only interpersonal violence variable found to independently predict postpartum depressive symptoms was physical discipline by a parent. Consistent with the bivariable analysis in this study, previous studies note relationships between PPD and both childhood and adult experiences of interpersonal violence (Ross & Dennis, 2009). However, few accounted for a history of maternal depression in their analyses. It is plausible that the results of our multivariable analysis reflect the strong association between interpersonal violence and lifetime depressive illness (Bernazzani & Bifulco, 2003; Buist, 1998), such that only childhood physical discipline remained a predictor of postpartum depressive symptoms after controlling for prior history of depression. This is similar to the findings of an Australian prospective cohort study (n = 154) examining antenatal psychosocial risk factors for PPD who found that emotional abuse as a child was the only factor that independently predicted postpartum after adjusting for antenatal depression (Edwards, Galletly, Semmler-Booth, & Dekker, 2008).

The mechanism that underlies this observed association between childhood physical discipline and PPD is likely complex, involving the interaction of multiple factors. Childhood interpersonal violence (physical, sexual and/or emotional) is an established risk factor for nonperinatal depression as well, and there is evidence to suggest that neurobiological changes take place in the developing brain that leave abuse survivors at higher risk, not only of posttraumatic stress disorder, but also of major depressive illness (Vigod & Stewart, 2009). Evidence suggests that children who are subject to

physical discipline are more likely than other children to display externalizing behaviors such as bullying in later childhood, begging the question of whether neurobiological changes may occur in such children as well that put them at risk for future depressive illness (Slade & Wissow, 2004). It is plausible that the psychological and physical stress of parenting along with the rapid hormonal shifts of the postpartum period may make women who experienced childhood physical discipline particularly vulnerable at the puerperal transition.

With respect to substance use, the findings of our study were inconsistent with previous research suggesting a relationship between maternal cigarette smoking and PPD (Freeman et al., 2005; McCoy, Beal, Shipman, Payton, & Watson, 2006). Previous studies on cigarette smoking and depression have demonstrated that cigarette smoking is associated with major depression and other psychiatric disorders (Lindeman et al., 2000; Quattrocki, Baird, & Yurgelun-Todd, 2000). Depressed individuals are more likely to smoke than are nondepressed persons and, conversely, smokers are more likely than nonsmokers to experience depression in their lifetimes (Quattrocki et al., 2000). Furthermore, cigarette smoking has been found to be a strong predictor of other substance use (i.e., alcohol and illicit drug use), which is also associated with increased risk of moderate and severe depression (Chasnoff, Neuman, Thornton, & Callaghan, 2001). In our study, we did not observe a significant association between personal cigarette smoking or recreational drug use and depressive symptoms. With respect to substance abuse, the findings of our study were consistent with previous research suggesting a relationship between maternal substance abuse and PPD (Bryan et al., 1999; Pajulo, Savonlahti, Sourander, Helenius, & Piha, 2001). Unfortunately, we were not able to generate a stable estimate of the association between personal substance abuse and postpartum depressive symptoms since the prevalence of reported maternal substance abuse in our sample was low. However, the relationship that we found between partner substance abuse and postpartum depressive symptoms has not been previously investigated. As our analysis was able to account for potential confounding factors such as history of maternal depression and socioeconomic status, our results lend support to the importance of partner substance abuse as an independent predictor of PPD. It was outside the scope of the present study to investigate the mechanism behind this observed association; however, it is plausible that it may reflect a lack of social support in the postpartum period, which is known to be a major risk factor for the development of PPD.

Although the exact mechanisms behind the observed associations remain to be elucidated, the results of our study are important in that they can be applied on a population level to improve targeted screening practices for PPD. Our results demonstrate that clinicians can administer a set of standardized psychosocial history questions to identify women at high risk for PPD. Our results suggest that women who answer affirmatively to questions about past or current interpersonal violence or personal or partner substance use problems should be questioned about having postpartum depressive symptoms. Our results also suggest that women who experienced physical discipline as children and women who have a partner with a substance use problem may be at increased risk of PPD, even in the absence of a history of depression. As such, these

women can be followed closely for symptoms of depression in the postpartum period and/or referred for specialty mental health care. While the EPDS was specifically developed for assessing depressive symptoms in the postpartum period, it does not contain questions regarding a history of interpersonal violence or substance abuse. Routine use of the ALPHA to screen women for PPD above and beyond the EPDS may increase the detection of PPD. Early intervention in the course of PPD has been shown to improve treatment outcome and may lead to improved maternal–infant interactions, preventing known negative sequelae for children of mothers who suffer PPD. Future research could explore whether additional intervention focused on some of the potentially modifiable psychosocial risk factors (e.g., current interpersonal violence, personal and partner substance abuse) might actually decrease rates of PPD in this vulnerable population.

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