Intimate Partner Violence, Depression, and Posttraumatic Stress Disorder as Additional Predictors of Low Birth Weight Infants Among Low-Income Mothers

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Estimates of intimate partner violence (IPV) during pregnancy vary by population being studied, measures, and other methodological limitations, hindering the ability to gauge the relationship between IPV and negative birth outcomes. The authors report aggregated data from a subsample ($n = 148$) of the first three waves of the Women’s Employment Study. The authors compared groups of women who did and did not give birth to low birth weight infants on demographic, material deprivation, risk behavior, mental health, and IPV factors. The prevalence of domestic violence was more than twice as high for women with low birth weight infants as those women who had a normal weight infant. When considering additional risk factors, including food insufficiency, substance dependence, and depression and/or posttraumatic stress disorder, IPV remained a significant indicator, but it was most strongly associated with low birth weight among women also experiencing depression and/or posttraumatic stress disorder.

Keywords: intimate partner violence; birth outcomes; posttraumatic stress disorder
Intimate partner violence (IPV) has become increasingly recognized as a persistent social and public health problem, resulting in negative mental and physical health consequences for women (Dienemann et al., 2000; Petersen, Gazmararian & Clark, 2001; Plichta, 2004; Seng, 2002). IPV occurring around the time of pregnancy is a leading cause of maternal death in the United States (Horon, 2005; Krulewich, 2001). It also has been associated with low birth weight, a major source of infant mortality and long-term adverse health outcomes for children (Cokkindes, Coker, Sanderson, Addy, & Bethea, 1999). Findings about risk for low birth weight in relation to IPV have been mixed, but a recent systematic review (Boy & Salihu, 2004) revealed an association between IPV with low birth weight. Murphy, Schei, Myhr, & DuMont (2001) concluded from their meta-analysis reviewing the association between abuse during pregnancy and low birth weight that, overall, women reporting physical, emotional, or sexual violence had 1.4 times greater odds of giving birth to a low birth weight infant than nonabused women (95% confidence interval 1.1–1.8).

Low-income women are particularly vulnerable to IPV (Cokkindes & Coker, 1998; Martin, Mackie, Kupper, Buescher, & Moracco, 2001; Tolman & Rosen, 2001) and to the depression, posttraumatic stress disorder (PTSD), and substance abuse sequelae of abuse. Although studies have shown pregnant abused women to have higher rates of substance abuse (e.g., Amaro, Fried, Cabral, & Zuckerman, 1990; Kearney, Haggerty, Munro, & Hawkins, 2003), and more psychological distress and morbidity (e.g., Stewart & Cecutti, 1993), and have shown that psychological stress may mediate the effect of IPV on birth weight (Altarac & Strobino, 2002), studies modeling the combined effect of IPV and specific maternal mental health disorders on birth weight are still needed. The purpose of this analysis was to determine the impact of both IPV and mental health conditions known to be the result of abuse (depression, PTSD, and substance dependence) on risk for low birth weight among an economically vulnerable sample—single mothers who are Medicaid recipients.

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Method

Study Overview

We report data from the first three waves of the Women’s Employment Study (WES), a longitudinal survey of welfare recipients in an urban Michigan county. Michigan’s Family Independence Agency, which administers the state’s Temporary Assistance for Needy Families program, provided names and addresses of all single-parent cases in the selected county. The sample included single mothers who received welfare in February of 1997, had a racial identity of either White or Black, and were United States citizens. Because noncitizens and other ethnic/racial groups made up only a small proportion of the overall caseload, there was insufficient sample size to examine these groups in detail. With these exceptions, the WES sample can be characterized as a simple random sample, systematically selected with equal probability from an ordered list of eligible women.

In the fall of 1997, trained interviewers conducted face-to-face interviews with a random sample of 753 women. Waves 2 and 3 were conducted at approximately one-year intervals in the fall of 1998 and winter of 1999, respectively. The response rate for Wave 1 was 86.2% (753 of 874 women), and for Wave 2 the response rate was more than 90%. In the first two waves, we collected data on physical health, mental health, demographic characteristics, income, health insurance, current/most recent job, current welfare status, and work and welfare histories. Wave 3 had a 91% response rate and, in addition to the questions asked in the first two waves, respondents were also asked about their most recent pregnancy in the past 5 years and the birth weight of that baby.

The WES sample is representative of the population of single mother urban welfare recipients and has been verified on the basis of race, age, months on welfare, welfare caseload size, employment codes, and monthly reported income. There was no differential attrition within the sample between Wave 1 and Wave 3 on any of the key demographic, mental health, substance dependence, or IPV variables.

Study Participants

The sample for this analysis was limited to a subsample of the overall WES sample at Wave 3 (N = 632) who had a baby in the past 5 years (n = 148). More than half of this subsample was Black (54.1%) with a mean age of 25.9 years.
Nearly three quarters of the sample (73.0%) were living below the poverty line and more than a third (35.4%) had less than a high school degree or General Education Development (GED). Although respondents were originally identified as single-parent cases in administrative data, more than a third of the respondents (43.2%) were currently living with a spouse or partner. This discrepancy in living arrangements is primarily because of the time gap between when the sample was drawn and when the interview was conducted. For a further discussion of the sample, see Danziger et al. (2000).

Measures

**Low birth weight.** Respondents who gave birth in the last 5 years reported the birth weight of their infant, usually in pounds and ounces. These English weights were converted to grams. Infants that were less than 2500 grams were coded as having a low birth weight.

**IPV.** IPV was assessed with a modified version of the Conflict Tactics Scale (CTS; Straus, 1979). We augmented the CTS by adding items that asked about additional physical and nonphysical forms of abusive behavior. These IPV items were used to create a 12-month prevalence measure. For the current study, we use a subscale of the IPV measures that defines IPV as the presence of severe physical abuse. These items include respondents who had an intimate partner who hit them with a fist, hit them with an object that could hurt, beat them, choked them, threatened them with or actually used a weapon, or forced them into any sexual activity against their will in the past 12 months. A dichotomous variable for the presence of any severe physical abuse in the past 12 months was created for analyses.

**Material deprivation.** Material deprivation measures were self-reports of experiences of various forms of financial hardships—gas or electricity terminations, evictions, and food insufficiency. For utility terminations, evictions, and homelessness, respondents were asked whether they had experienced any of these over the past 12 months. The food insufficiency measure is a widely-used single item (Alaimo, Olson, & Frongillo, 1999)—“Which of the following statements describes the amount of food your household has to eat—enough to eat, sometimes not enough to eat or often not enough to eat?” A dummy variable is coded as 1 for respondents who answer sometimes or often do not have enough and a 0 for those with enough to eat.

**Mental health disorders and substance dependence.** Mental health disorders and substance dependence were measured using diagnostic screening
batteries developed from the University of Michigan Composite International Diagnostic Interview (UM-CIDI). The screening scales assess DSM-III-R disorders developed from data from the National Comorbidity Survey. We used short-form scales to assess major depression, and measured PTSD prevalence using the long form of the UM-CIDI. A dichotomous variable was created for having depression and/or PTSD in the 12 months prior to the interview.

We use the more restrictive “dependence” criteria for alcohol and drug problems in the past 12 months, rather than use or abuse. The short-form measures used in this study do not provide adequate measures for use and abuse criteria. A combined variable of either having drug dependence and/or alcohol dependence in the past 12 months was created and referred to as substance dependence.

Smoking cigarettes was defined by respondents who answered that they were current smokers during the period of their pregnancy. Smoking, drug dependence, and alcohol dependence overlap to some extent in the sample, and all are associated with adverse outcomes, including low birth weight. To keep this model parsimonious, any use of these substances was combined into a single dichotomous variable.

Analysis

Using t test (for age) and chi-square, we compared the groups of women who did and did not give birth to low birth weight infants on demographic, material deprivation, risk behavior, mental health, and IPV factors. The relatively small sample size and use of the nominal low birth weight outcome required a parsimonious logistic regression model. Deprivation and risk factors were included in the multivariate analysis based on preliminary analysis assessments of collinearity and based on existing theory on factors associated with low birth weight. Being Black American and substance use (smoking during pregnancy, alcohol dependent, or drug dependent) were included in the model, even though these variables were not associated with low birth weight in the chi-square tests, because they are such significant predictors of low birth weight in population data.

Deprivation factors covaried to a great extent, so we included food insufficiency alone in the model because it is the deprivation theoretically most likely to affect birth weight. In addition, IPV, depression, and PTSD also covaried. In numerous studies of lifetime violence exposure and PTSD, including cases comorbid with depression, both factors have been related to poor health outcomes, but with the mental health factor being the stronger predictor (Graham-Bermann & Seng, 2005; Kimerling et al., 1999). In the context of ongoing violence, we hypothesized that those women who were...
both battered and suffering PTSD and/or depression would have the worst outcomes. Therefore, we also created a combined risk variable to determine odds of low birth weight for those experiencing both IPV and a mental health disorder.

### Results

Slightly more than half (54.1%) of the 148 women who were pregnant in the past 5 years in the WES data set were Black. The rate of past-year IPV (20.9%) was high in this sample, as were 12-month rates of depression (23.6%), and PTSD (25.7%). Nearly a third (37.2%) of the respondents reported smoking cigarettes during the time period of their pregnancy. The number of women who met the criteria for either alcohol and/or drug dependence was relatively low (5.4%).

Food insufficiency was the most common form of economic deprivation, with more than half (59.5%) of the women identifying that they did not have enough food to eat in their household. Bivariate odds ratios (ORs) indicate significantly different risks for low birth weight among women experiencing food insufficiency (OR = 4.6, \( p = .035 \)), utility shut-off (OR = 6.2, \( p = .002 \)), and intimate partner physical abuse (OR = 3.3, \( p = .034 \)).

The multivariate model shown in Table 1 controls for the potential effects of racial identity and substance dependence, even though these were

#### Table 1

<table>
<thead>
<tr>
<th>Coefficient ((B))</th>
<th>SE</th>
<th>OR</th>
<th>95 CI for OR</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race (Black)</td>
<td>.997</td>
<td>.689</td>
<td>2.710</td>
<td>.0702–10.461</td>
</tr>
<tr>
<td>Food insufficiency</td>
<td>1.613</td>
<td>.812</td>
<td>5.017</td>
<td>1.021–24.659</td>
</tr>
<tr>
<td>Substance use</td>
<td>-1.013</td>
<td>.679</td>
<td>.363</td>
<td>0.096–1.373</td>
</tr>
<tr>
<td>Intimate partner violence</td>
<td>2.325</td>
<td>1.009</td>
<td>10.222</td>
<td>1.414–73.900</td>
</tr>
<tr>
<td>Mental health disorder</td>
<td>2.106</td>
<td>.873</td>
<td>8.215</td>
<td>01.483–45.507</td>
</tr>
<tr>
<td>Both intimate partner violence and a mental health disorder</td>
<td>2.505</td>
<td>1.030</td>
<td>12.238</td>
<td>01.625–92.136</td>
</tr>
</tbody>
</table>

Note: OR = odds ratio; CI = confidence interval. Overall model chi-square was significant \( (p = .004) \) with Nagelkerke \( R^2 = .264 \) and 90.5% predicted correctly.
not significantly associated with low birth weight in the chi-square bivariate test, because in other studies these two factors usually do account for some proportion of increased risk. Food insufficiency significantly increased the risk of having a low birth weight baby. Respondents with only a mental health disorder and those who only experienced IPV were also significantly more likely to have a low birth weight baby. Those respondents who were experiencing both a mental health condition and IPV had the highest odds of having a low birth weight infant.

**Discussion**

The prevalence of IPV was more than twice as high for women with low birth weight infants than those women who had a normal weight infant. IPV was most strongly associated with low birth weight among women also experiencing depression or PTSD. Food insufficiency was also associated with low birth weight. In this sample, Black race and substance dependence, two factors usually associated with adverse birth outcomes, including low birth weight, were not significantly associated with low birth weight. This set of findings is consistent with other studies showing that low birth weight is most likely to occur in association with IPV among women who have other risk factors.

**Limitations**

A number of limitations of the data should be noted. The sample of women with low birth weight babies was quite low \( (n = 14) \) and women were asked to self-report the birth weight of their babies from as long as 5 years prior to the interview. Although prevalence rates of low birth weight babies \( (9.5\%) \) in this sample were in the range of previous studies \( (\text{Coker, Sanderson, \\& Dong, 2004}) \), the small number of cases limited certain types of analyses. In addition, only women who participated in all three waves of the study were included in the present analyses.

Although data was collected at Wave 3 regarding respondent’s most recent birth in the past 5 years, there were a narrow range of questions about the pregnancy. For instance, no questions were asked about prenatal care. Although IPV information was collected at all three waves, such that we know which women experienced IPV around the time of pregnancy, there were no direct questions about violence during pregnancy or the physical location on the body of acts of IPV.
In addition, there were women in the WES study who experienced miscarriage who were not included in this analysis. In previous studies, miscarriage has been identified as being associated with IPV and with PTSD in Medicaid data from the same state (Seng et al., 2001). Thus, the negative impact on pregnancy outcomes may be very underestimated if we look only at pregnancies that result in live birth.

Implications for Addressing IPV During Pregnancy

The results presented in this study indicate that IPV is a significant and prevalent risk factor for low birth weight infants among poor women. Health care and social work practitioners need to be aware of the issue of IPV during pregnancy, generally, because violence against women occurs in every socioeconomic level. However, results from this analysis combine with those from prior studies to show that it is the most socioeconomically vulnerable women, and those suffering mental health problems at the same time, that are most at risk for this very adverse outcome. Medicaid recipients often are in contact with social service professionals in the process of enrolling for perinatal coverage, providing an opportunity for social workers to assist perinatal professionals in case finding and intervention.

Although routine screening and safety planning are standards of care for perinatal professionals (American Medical Association, 2003) and valid, reliable screening measures are available for use with pregnant women (e.g., Abuse Assessment Screen; McFarlane, Parker, Soeken, & Bullock, 1992), enhanced education and training for case finding and intervening may be necessary for perinatal and social work practitioners who work with pregnant women. The finding here that depression and PTSD increased risk underscores the need to routinely assess mental health among perinatal clients, by clinical interview or use of brief self-report screening tools. The extent of overlapping incidence of victimization and mental health morbidity warrants linking these two elements of assessment. The sustained relationship that can occur between health professionals and women during their pregnancy offers an unusual opportunity for service providers to be more successful at their efforts to help a woman experiencing IPV (Rosen, 2004). The high cost of perinatal care of low birth weight infants and their health and educational disadvantages across the lifespan (Roth et al., 2004) indicate that it would be a cost-effective use of resources for health professionals to address the interrelated issues of IPV and mental health conditions during pregnancy.
References


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