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# Effects of Intimate Partner Violence on Pregnancy Trauma and Placental Abruption

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## Abstract

**Aims:** Intimate partner violence (IPV) during pregnancy increases women's risk of pregnancy complications and adverse birth outcomes. The goal of this study was to examine the association between IPV and prenatal trauma and placental abruption during pregnancy.

**Methods:** Prenatal and hospital obstetrical charts were reviewed for 2873 women who gave birth between January 2000 and March 2002 in a Northeastern city. We examined associations among sociodemographic characteristics, health-related variables, IPV, and pregnancy trauma and placental abruption using univariate and multivariate logistic regression.

**Results:** Of the 2873 women in the analyses, 105 (3.7%) reported IPV during prenatal care. After controlling for sociodemographic variables; tobacco, alcohol, and drug use; preeclampsia; and gestational diabetes during pregnancy, women who reported IPV also had higher odds of pregnancy trauma and placental abruption (adjusted odds ratio [OR] 32.08, 95% confidence interval [CI] 14.33-71.80,  $p < 0.01$ , and OR 5.17, 95% CI 1.37-19.51,  $p < 0.05$ , respectively).

**Conclusions:** This study found that IPV is a significant and independent risk factor for pregnancy trauma and placental abruption after controlling for factors typically associated with these outcomes. This study has implications for partner violence screening and intervention policies among pregnant women and highlights the importance of making distinctions about the type of IPV that women experience.

## Introduction

IT IS ESTIMATED THAT between 1.2% and 9% of pregnant women experience physical or sexual intimate partner violence (IPV) by a male partner.<sup>1-3</sup> Between 40% and 59% of female victims of IPV continue to experience violence once they become pregnant,<sup>4,5</sup> and >80% of women victimized during pregnancy have also experienced violence prior to pregnancy.<sup>6</sup> Other research has shown a significant increase in sexual coercion and psychological abuse during pregnancy among women who experience prior physical violence.<sup>7</sup>

Physical and sexual violence during pregnancy increases women's risk of psychological and physical health outcomes, including pregnancy complications and adverse birth outcomes. This unique type of violence threatens both maternal and child health because it is often chronic and ongoing

during and after the pregnancy. IPV affects the mortality and morbidity of both infant and mother and is associated with other health and economic risk factors.<sup>8</sup> For example, IPV during pregnancy is associated with perinatal health consequences, including low weight gain, anemia, kidney infections, and first and second trimester bleeding.<sup>9,10</sup> Reproductive health problems, such as sexually transmitted diseases (STD) including HIV infection, are also more common among pregnant women who experience coercively controlling, severe physical violence,<sup>11</sup> perhaps related to the fact that nearly 40%-50% of women in these relationships are forced to have sex.<sup>12</sup> Adverse pregnancy outcomes associated with IPV include low birth weight, preterm birth,<sup>5</sup> increased risk of cesarean delivery,<sup>9</sup> uterine rupture, hemorrhage,<sup>13</sup> and antenatal hospitalization.<sup>14</sup> IPV during pregnancy is also linked to intermediary risks for women, including unintended

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pregnancy, depression and other psychological problems,<sup>14,15</sup> and increased risk of femicide<sup>13,16</sup> and neonatal death.<sup>13,17</sup>

Placental abruption, the premature separation of the placenta from the uterus during pregnancy, is a significant contributor to both maternal and fetal mortality and accounts for approximately 12% of all perinatal deaths.<sup>18</sup> Placental abruption has been discussed as a potential consequence of IPV<sup>19</sup>; however, empirical evidence linking the two is sparse. Common risk factors for placental abruption include advanced maternal age, hypertension, trauma, and maternal substance use. Some of these risk factors are also either directly or indirectly associated with IPV. For example, violence and assault (e.g., blunt force to the abdomen) by a partner is the second leading cause of pregnancy trauma and represents 22% of all pregnancy trauma cases.<sup>20</sup> IPV victims also report higher tobacco, alcohol, and illicit drug use,<sup>10,14</sup> which may stem from increased levels of stress and fear associated with victimization.<sup>9</sup> El Kady et al.<sup>13</sup> reported a significant link between IPV and placental abruption among nearly 5 million women identified through maternal discharge records in California between 1990 and 1999. To date, however, no study has empirically linked IPV to placental abruption after statistically controlling for other known biological risk factors for placental abruption. The current study examines factors associated with reporting IPV during prenatal care and the extent to which IPV and other risk factors (i.e., tobacco, alcohol, and drug use; preeclampsia; and gestational diabetes) are associated with pregnancy trauma and placental abruption.

## Materials and Methods

### *Study design and sample*

The database for these analyses was developed for the evaluation of the Syracuse Healthy Start (SHS) program. SHS is an infant mortality reduction initiative funded by the Health Resources and Services Administration (HRSA), and the SHS evaluation was funded by the Centers for Disease Control and Prevention (CDC). IRB approval was obtained from State University of New York (SUNY) Upstate Medical University.

Current analyses used all births at a large urban hospital of residents in a 9-ZIP code high-risk area in the City of Syracuse, New York, from January 1, 2000, to March 31, 2002. Prenatal and hospital obstetrical charts were reviewed, and a data abstraction form was generated for each mother and infant. Prenatal charts were reviewed in outpatient settings, including publicly funded clinics, high-risk referral clinics, and private offices. If a private provider did not grant access to that office's prenatal charts, the review was performed on the prenatal summary transmitted to the hospital for delivery (30% of prenatal charts). The documentation of prenatal screening was comparable across different settings because all clinical sites use the same prenatal record form. This form was developed by one of the co-authors on this article (R.H.A.) and sent to the birth hospitals before the birth for inclusion in the hospital delivery chart. Items abstracted from the prenatal chart included screening tests performed, symptoms, conditions, treatments, pregnancy complications, and risk factors for prematurity. Inpatient charts were reviewed at the delivery hospital, and items abstracted included symptoms, conditions, and treatments during the delivery hospitalization, and perinatal, postnatal, and postpartum outcomes.

Chart reviewers, blind to the purpose of the review, were recruited from among the major delivery hospital's obstetrical nursing and paraprofessional clinical staff and attended two 3-hour training sessions. The first 10 charts a reviewer abstracted were rereviewed by one of the co-authors (K.D.M.), and 5% of all charts were rereviewed by the same co-author (K.D.M.). Prenatal chart reviewers were blind to birth outcomes, and inpatient chart reviewers were blind to prenatal conditions. All charts were abstracted onto a scannable form (Cardiff Teleform, Plymouth, MI) to facilitate data entry. Data from the chart reviews were merged with existing electronic databases: the Electronic Birth Certificate, the Regional Perinatal Data System, SHS enrollment, and the neonatal intensive care (NICU module). In addition to the quantitative data described, the data abstraction form included three open comment sections that allowed chart reviewers (i.e., nurses) to write in anecdotal information. These anecdotes are rich with information but were not recorded on each chart in a uniform manner. Many of these anecdotes record details about IPV. The total sample included 2873 women for whom IPV data were available. Data about placental abruption were available for all of the 2873 women, and data about pregnancy trauma were available for 2860 of these women.

### *Independent variables*

**Sociodemographic characteristics.** The current study included seven patient sociodemographic characteristics. These variables were collected in patient medical charts as part of the standard medical procedure. Maternal race, highest education level, and marital status were coded as categorical variables; maternal employment was measured as a dichotomous (Yes/No) variable; maternal socioeconomic status (SES) was measured as a dichotomous (Yes/No) variable based on whether or not the patient received Medicaid (indicating lower income); and maternal age was measured as a continuous variable in years for descriptive purposes and as a dichotomous variable based on a median split (<25 or ≥25 years) for inferential statistical analysis. Whether the pregnancy was unintended was coded as a dichotomous (Yes/No) variable. Women who reported they wanted to get pregnant later than they actually did, were unsure about getting pregnant, or did not want to be pregnant at all were coded as Yes for unintended pregnancy; women who reported they had intended to get pregnant sooner than they actually did or when they actually did were coded No.

**Health-related variables.** Five patient health-related variables were examined based on prenatal and hospital obstetrical chart information. These variables included tobacco, alcohol, and drug use during pregnancy, whether the pregnant woman had specifically been hospitalized for preeclampsia, and whether she had been diagnosed with gestational diabetes. Tobacco, alcohol, and drug use during pregnancy was measured as three separate dichotomous (Yes/No) variables. Data about tobacco and alcohol use were based on self-reports, and drug use data were based on urine testing done for clinical indications. With their consent, urine drug testing of pregnant women was routinely conducted in the 70% of the sample receiving prenatal care in clinic sites serving the majority of low-income women as part of overall efforts to encourage substance-using women to enter treat-

ment early in their pregnancy. The 30% of the sample seen by private providers were much less likely to be screened.

**IPV.** Information concerning IPV was obtained from two different sources, as not all women were enrolled in the SHS program. First, the SHS screening protocol asked about IPV among pregnant women in two ways: In the past year have you been hit, slapped, punched, or otherwise hurt by your partner? and Do you feel unsafe in your home right now? Second, prenatal charts included a place for the provider to record the patient's response about IPV. The prenatal protocol is for this IPV history to be recorded at the first prenatal visit. This history neither specifies the timing, extent of, or any injuries caused by IPV nor how the question about IPV was asked. Women who affirmed either of the questions on the SHS screening form or who reported IPV on the prenatal record were coded Yes for IPV ( $n = 105$ ). Otherwise women were coded No ( $n = 2768$ ).

#### Dependent variables

**Pregnancy trauma.** Whether or not the patient was diagnosed with trauma during the pregnancy (e.g., physical injury before the birth) was measured as a dichotomous (Yes/No) variable on the basis of hospital chart data. Women received a diagnosis of trauma if they came to a prenatal site or hospital with injury. There may be many cases of physical harm from IPV for which women did not request treatment from a healthcare provider, there may be cases of injury caused by IPV that women denied were caused by IPV, and there may be cases of other types of trauma, for example, automobile accidents, that were not caused by IPV.

**Placental abruption.** Whether or not the patient experienced placental abruption during the pregnancy was measured as a dichotomous (Yes/No) variable on the basis of hospital chart data.

#### Plan of analysis

This study has two main hypotheses. First, pregnant women who screen positive for IPV will be at greater risk of clinically diagnosed trauma. Second, pregnant women who screen positive for IPV will be at greater risk of placental abruption. Univariate logistic regression analyses were conducted to examine sociodemographic and health-related factors associated with reporting IPV during prenatal care. Sociodemographic characteristics include maternal age, race, highest education level, employment, relationship status, SES (i.e., whether or not the mother received Medicaid), and whether the pregnancy was unintended. Health-related variables include tobacco, alcohol, and drug use during pregnancy; preeclampsia; and gestational diabetes. Univariate associations were summarized with odds ratios (OR) and 95% confidence intervals (CI). These analyses allowed us to determine the statistical independence of reporting IPV during prenatal care. Next, multivariate analyses using backward stepwise multiple logistic regression were conducted to identify sociodemographic and health-related variables most strongly associated with reporting IPV during prenatal care. Backward stepwise regression is a preferred method of exploratory analyses, where the analysis begins with a full model and variables are eliminated from the model in an iterative process. After elimination of each

variable, the model's fit is tested to ensure that it still adequately fits the data. The analysis is complete when variables can no longer be eliminated from the model.

We then conducted separate univariate logistic regression analyses to examine the association between IPV and pregnancy trauma and IPV and placental abruption. Univariate associations were summarized with ORs and 95% CIs. Finally, separate multivariate logistic regression analyses using stepwise multiple logistic regression were used to model risk factors for pregnancy trauma or placental abruption.

TABLE 1. SOCIODEMOGRAPHIC VARIABLES, HEALTH-RELATED VARIABLES, AND STUDY OUTCOMES OF STUDY PARTICIPANTS ( $N = 2873$ )

Variable	Total number	%
Race		
White	1143	40.6
African American	1363	48.5
Other	308	10.9
Education		
Less than high school	1018	35.7
High school graduate	962	33.8
More than high school	869	30.5
Employed during pregnancy		
No	1404	49.2
Yes	1449	50.8
Relationship status		
Married	887	31.2
Single	1865	65.6
Divorced/widowed/other	89	3.2
Received Medicaid		
No	1178	47.1
Yes	1324	52.9
Unintended pregnancy		
No	2016	73.3
Yes	738	25.7
Tobacco use		
No	1919	66.9
Yes	950	33.1
Alcohol use		
No	2398	98.4
Yes	40	1.6
Drug use		
No	2358	95.0
Yes	125	5.0
Preeclampsia		
No	2733	95.1
Yes	140	4.9
Gestational diabetes		
No	2689	94.7
Yes	150	5.3
Pregnancy trauma		
No	2799	97.9
Yes	61	2.1
Placental abruption		
No	2834	98.6
Yes	39	1.4
Intimate partner violence		
No	2768	96.3
Yes	105	3.7
Age, mean $\pm$ SD (median), years	2856	25.52 $\pm$ 6.47 (24.0)

Totals may differ because of missing values. SD, standard deviation.

TABLE 2. EXAMPLES OF ANECDOTAL RECORDS FROM HOSPITAL CHARTS OF WOMEN WHO REPORTED INTIMATE PARTNER VIOLENCE

1. Domestic assault—kicked in abdomen, poor weight gain
2. Patient physically/sexually assaulted during pregnancy
3. Patient stabbed in abdomen during pregnancy
4. Patient depressed, attempted suicide, history of rape and abuse
5. Patient shot in right side of abdomen

These analyses allowed us to examine the association between reporting IPV during prenatal care and pregnancy trauma or placental abruption while controlling for sociodemographic characteristics and health-related variables that are generally associated with these outcomes. Multivariate analyses were conducted only on women for whom we had complete data on all study variables ( $n = 1714$ , 60% of the total sample). In these analyses, we report estimated adjusted ORs and associated 95% CIs. We also report examples of notes from the women's hospital charts to illustrate how IPV was assessed and recorded among this sample.

## Results

### Preliminary analyses

Descriptive statistics of study variables for all women are presented in Table 1. As shown, study participants were pri-

marily white and African American, most had completed at least high school, approximately half were employed during the pregnancy, about one third were married, approximately half were receiving Medicaid, and for most, the pregnancy was intended. The median age of the study participants was 24 years. Moreover, about one third of participants reported using tobacco during the pregnancy, <2% reported using alcohol during the pregnancy, and 5% tested positive for drugs during the pregnancy. About 5% of the women experienced preeclampsia or gestational diabetes or both. Further, 2.1% of women experienced pregnancy trauma, and 1.4% experienced placental abruption. Finally, 105 women (3.7%) reported IPV during prenatal care. Examples of anecdotal chart notations for women reporting IPV are provided in Table 2, and included "domestic assault—kicked in abdomen" and "patient was stabbed in abdomen during the pregnancy."

Univariate analyses of sociodemographic variables by IPV status were examined (Table 3). Women who reported IPV differed significantly from women who did not report IPV on four of the seven sociodemographic variables. Women with less than or equal to a high school education had approximately three times the odds of reporting IPV compared to women who completed more than a high school education ( $p < 0.01$ ); employment during pregnancy was associated with about half the odds of reporting IPV ( $p < 0.01$ ); not being married was associated with between three and five times the odds of reporting IPV compared to being married ( $p < 0.01$ ); and receiving Medicaid was associated with twice the risk of

TABLE 3. UNIVARIATE ANALYSES OF SOCIODEMOGRAPHIC VARIABLES BY INTIMATE PARTNER VIOLENCE ( $N = 2873$ )

Predictor variables	Reported IPV ( $n = 105$ ) n (%) <sup>a</sup>	Crude OR (95% CI)	p value
Age, years			
<25	59 (4.1)	1.00	
≥25	44 (3.1)	0.74 (0.50-1.11)	0.14
Race <sup>b</sup>			
White	41 (3.6)	1.00	
African American	55 (4.0)	1.13 (0.74-1.71)	0.56
Other	7 (2.3)	0.63 (0.28-1.41)	0.26
Education <sup>c</sup>			
More than high school	13 (1.5)	1.00	
Less than high school	49 (4.8)	3.33 (1.79-6.18)	<0.01
High school education	41 (4.3)	2.93 (1.56-5.51)	<0.01
Employed during pregnancy			
No	63 (4.5)	1.00	
Yes	39 (2.7)	0.59 (0.39-0.88)	<0.01
Relationship status <sup>d</sup>			
Married	13 (1.5)	1.00	
Single	86 (4.6)	3.25 (1.80-5.86)	<0.01
Divorced/widowed/other	6 (6.7)	4.86 (1.80-13.12)	<0.01
Received Medicaid			
No	28 (2.4)	1.00	
Yes	68 (5.1)	2.22 (1.42-3.48)	<0.01
Unintended pregnancy			
No	64 (3.2)	1.00	
Yes	35 (4.7)	1.52 (0.99-2.31)	0.05

<sup>a</sup>(%) refers to the percentage of participants in that specific group who reported IPV (e.g., 3.6% of all white women included in the analysis reported IPV).

<sup>b</sup>Reference category is White.

<sup>c</sup>Reference category is More than high school.

<sup>d</sup>Reference category is Married.

CI, confidence interval; IPV, intimate partner violence; OR, odds ratio.

TABLE 4. UNIVARIATE LOGISTIC REGRESSION ANALYSES OF PREGNANCY TRAUMA AND PLACENTAL ABRUPTION BY SOCIODEMOGRAPHIC VARIABLES, HEALTH-RELATED VARIABLES, AND INTIMATE PARTNER VIOLENCE STATUS

Predictor variables	Pregnancy trauma (n = 61) n (%) <sup>a</sup>	Crude OR (95% CI)	p value	Placental abruption (n = 39) n (%)	Crude OR (95% CI)	p value
Age, years						
<25	42 (2.9)	1.00		21 (1.5)	1.00	
≥25	19 (1.3)	0.45 (0.26-0.08)	0.01	18 (1.3)	0.86 (0.46-1.62)	0.65
Race <sup>b</sup>						
White	27 (2.4)	1.00		15 (1.3)	1.00	
African American	30 (2.2)	0.93 (0.55-1.58)	0.98	18 (1.3)	1.01 (0.51-2.01)	0.99
Other	4 (1.3)	0.55 (0.19-1.57)	0.55	6 (1.9)	1.49 (0.58-3.88)	0.41
Education <sup>c</sup>						
More than high school	6 (0.7)	1.00		10 (1.2)	1.00	
Less than high school	33 (3.3)	4.81 (2.01-11.53)	<0.01	10 (1.0)	0.85 (0.35-2.06)	0.72
High school education	22 (2.3)	3.35 (1.35-8.30)	<0.01	18 (1.9)	1.64 (0.75-3.57)	0.21
Employed						
No	29 (2.1)	1.00		18 (1.3)	1.00	
Yes	32 (2.2)	1.07 (0.65-1.78)	0.79	21 (1.4)	1.13 (0.60-2.13)	0.70
Relationship status <sup>d</sup>						
Married	18 (2.0)	1.00		9 (1.0)	1.00	
Single	43 (2.3)	1.14 (0.65-1.98)	0.65	29 (1.6)	1.54 (0.73-3.27)	0.26
Divorced/widowed/other	0 (0.0)	0.00 (0.00-0.00)	1.00	0 (0.0)	0.00 (0.00-0.00)	1.00
Received Medicaid						
No	15 (1.3)	1.00		13 (1.1)	1.00	
Yes	35 (2.6)	2.10 (1.14-3.86)	0.02	18 (1.4)	1.24 (0.61-2.53)	0.56
Unintended pregnancy						
No	42 (2.1)	1.00		22 (1.1)	1.00	
Yes	16 (2.2)	1.04 (0.58-1.86)	0.90	13 (1.8)	1.63 (0.81-3.24)	0.17
Alcohol use						
No	49 (2.1)	1.00		30 (1.3)	1.00	
Yes	1 (2.5)	1.22 (0.17-9.09)	0.84	2 (5.0)	4.15 (0.99-18.01)	0.05
Tobacco use						
No	43 (2.2)	1.00		26 (1.4)	1.00	
Yes	18 (1.9)	0.85 (0.49-1.47)	0.56	13 (1.4)	1.01 (0.52-1.98)	0.98
Drug use						
No	47 (2.0)	1.00		28 (1.2)	1.00	
Yes	5 (4.0)	2.06 (0.80-5.27)	0.13	2 (1.6)	1.35 (0.32-5.75)	0.68
Preeclampsia						
No	59 (2.2)	1.00		36 (1.3)	1.00	
Yes	2 (1.4)	0.66 (0.16-2.72)	0.56	3 (2.1)	1.64 (0.50-5.39)	0.42
Gestational diabetes						
No	58 (2.2)	1.00		37 (1.4)	1.00	
Yes	2 (1.3)	0.62 (0.15-2.54)	0.50	1 (0.7)	0.48 (0.07-3.53)	0.47
Reported IPV						
No	42 (1.5)	1.00		34 (1.2)	1.00	
Yes	19 (18.3)	14.44 (8.06-25.88)	<0.01	5 (4.8)	4.02 (1.54-10.50)	<0.01
Pregnancy trauma						
No				38 (1.4)	1.00	
Yes				1 (1.6)	1.21 (0.16-8.97)	0.85

<sup>a</sup>(%) refers to the percentage of participants in that specific group who experienced pregnancy trauma/placental abruption (e.g., 2.4% of all white women included in the analysis experienced pregnancy trauma).

<sup>b</sup>Reference category is White.

<sup>c</sup>Reference category is More than high school.

<sup>d</sup>Reference category is Married.

reporting IPV compared to not receiving Medicaid ( $p < 0.01$ ). Multivariate analyses (not shown) indicated that two of these three variables were independently associated with reporting IPV: having less than a high school education (OR 2.34, 95% CI 1.19-4.61,  $p < 0.05$ ) or a high school education (OR 2.04, 95% CI 1.03-4.04,  $p < 0.05$ ) compared with having more than a high school diploma, and being single (OR 2.43, 95% CI 1.24-4.74,  $p < 0.05$ ) compared with being married. Differences between women who reported IPV during prenatal care and

women who did not report IPV on the five health-related variables were also examined (data not shown). Compared with women who did not report IPV during prenatal care, women who reported IPV had more than four times the odds of reporting alcohol use (OR 4.58, 95% CI 1.87-11.19,  $p < 0.01$ ), nearly twice the odds of reporting tobacco use (OR 1.81, 95% CI 1.22-2.68,  $p < 0.01$ ), and about five times the odds of testing positive for drug use (OR 4.95, 95% CI 2.63-9.34,  $p < 0.01$ ).

### *IPV as a risk factor for pregnancy trauma and placental abruption*

Univariate analyses of the association between reporting IPV during prenatal care and a clinical diagnosis of pregnancy trauma indicate that risk of pregnancy trauma was associated with four variables (Table 4). Women  $\geq 25$  years old had nearly half the risk of experiencing pregnancy trauma as women  $< 25$  years old ( $p < 0.01$ ), having less than or equal to a high school education (compared with more than a high school diploma) was associated with 3–5 times the risk of pregnancy trauma ( $p < 0.01$ ), and receiving Medicaid was associated with about twice the risk of pregnancy trauma ( $p < 0.01$ ). Finally, women who reported IPV had  $> 14$  times the risk of pregnancy trauma compared with women who did not report IPV ( $p < 0.01$ ). Multivariate analyses (data not shown) indicate that two variables were significantly and independently associated with pregnancy trauma: women  $\geq 25$  years old had nearly half the risk of experiencing pregnancy trauma as women  $< 25$  years old (OR 0.39, 95% CI 0.16–0.92,  $p < 0.05$ ), and reporting IPV was associated with  $> 30$  times the risk of experiencing pregnancy trauma (OR 32.08, 95% CI 14.33–71.80,  $p < 0.01$ ).

Two variables significantly predicted placental abruption in the univariate analyses (Table 4). Both alcohol use during pregnancy ( $p = 0.05$ ) and IPV ( $p < 0.01$ ) were associated with four times the risk of placental abruption. Note that pregnancy trauma was included as a possible predictor of placental abruption because of the established, empirical link between these two variables; however, in these data, no empirical association existed. Multivariate analyses (data not shown) indicated that both alcohol use during pregnancy (OR 5.06, 95% CI 1.03–24.94,  $p < 0.05$ ) and reporting IPV during prenatal care (OR 5.17, 95% CI 1.37–19.51,  $p < 0.05$ ) significantly and independently predicted placental abruption.

### **Discussion**

The current analysis extends our knowledge of the health consequences of IPV during pregnancy by using a large sample of births in a largely urban, Northeastern city over a 2-year span. The prevalence rate of IPV within this hospital-based sample (3.7%) falls within previous estimates (1.2%–9%).<sup>1–3</sup> We examined pregnancy trauma and placental abruption, which, with few exceptions, have not been previously explored thoroughly in the literature on IPV. Our findings indicate that IPV is a large, significant, and independent predictor of pregnancy trauma and placental abruption. Indeed, controlling for both sociodemographic and health-related variables, women who reported IPV during prenatal care had more than 30 times the odds of a clinical diagnosis of pregnancy trauma and approximately 5 times the odds of experiencing placental abruption compared with women who did not report IPV. The current study supports previous research linking IPV to pregnancy trauma.<sup>20</sup> Previous work by El Kady et al.<sup>13</sup> found an association between IPV and placental abruption in a population-based study; our study substantiates these earlier findings in an in-depth empirical analysis that controls for other established risk factors for placental abruption.

To date, very little is known about the etiology of placental abruption.<sup>14</sup> Placental abruption is relatively infrequent, occurring in about 6.5/1000 births, but is a significant contrib-

utor to both fetal and maternal mortality.<sup>16,17</sup> For example, perinatal mortality occurs in about 119/1000 births with placental abruption vs. 8.2/1000 among all other births.<sup>21</sup> The high fetal mortality associated with placental abruption is due primarily to its strong association with preterm delivery. Maternal outcomes caused by placental abruption include significant blood loss, disseminated intravascular coagulopathy, and renal failure.<sup>22</sup> Similarly, pregnancy trauma increases the risk of both preterm labor and low birth weight<sup>23</sup> and is the leading nonobstetrical cause of maternal death.<sup>24</sup> Trauma is considered the primary health consequence of IPV against pregnant women,<sup>25</sup> and IPV is the second leading cause of pregnancy trauma, representing 22% of pregnancy trauma cases.<sup>20</sup> The current study empirically links IPV to both placental abruption and pregnancy trauma and provides a strong foundation for future endeavors in this area.

In this hospital-based sample, pregnant women who reported physical victimization by partners represent a lower-resource, highly vulnerable group who, because of their economic dependency, may have tremendous difficulty safely escaping a violent relationship. Compared with women who did not report IPV, those who did were less likely to be married, reported less education, were less likely to be employed, were more likely to receive Medicaid, and were somewhat more likely to report that the pregnancy was unintended—variables that can contribute to entrapment in an abusive relationship. Consistent with previous research, IPV victims were also more likely to use tobacco, alcohol, and drugs,<sup>3</sup> which may reflect self-medicating strategies to cope with the violence and abuse they experience.

Findings from the current study have implications for both prevention and intervention strategies used by healthcare professionals. First, general and prenatal healthcare professionals play a critical role in identifying women at risk for or experiencing IPV because they provide routine care at the entry point of contact and can provide abuse assessment and prolonged intervention. The American College of Obstetricians and Gynecologists (ACOG) recommends that physicians screen all patients for IPV and that pregnant women should be screened at the first prenatal visit, at least once per trimester, and at the postpartum checkup.<sup>26</sup> The American Medical Association (AMA) also specifies physician guidelines that address assessment, prevention, and reporting of interpersonal violence and abuse.<sup>27</sup> For example, the AMA states that “Physicians should routinely inquire about physical, sexual, and psychological abuse as part of the medical history . . . and should familiarize themselves with the detection of violence or abuse, the community and health care resources available to abused or vulnerable persons.”<sup>27</sup> Finally, the American Academy of Family Physicians (AAFP) recommends that “Family physicians should evaluate each patient for domestic violence issues, and offer referral to anyone involved in a violent relationship of any kind to appropriate community and mental health resources.”<sup>28</sup> These policies illustrate the medical field’s recognition of IPV as a substantial health risk and its role in screening for IPV and referring follow-up services for victims.

Based on current findings, we suggest that medical and other health professional schools reassess student education concerning IPV against women. Developing collaborative relationships with local domestic violence services, such as battered women’s shelters, police departments, and victim



advocacy programs, would (1) increase service providers' confidence and skill in talking with patients about IPV, (2) contribute to a more comprehensive understanding among service providers of factors surrounding IPV, such as fear, isolation, and danger, and (3) provide service providers with community resources to make referrals for IPV victims. In addition to encouraging more community-based collaboration, intake procedures for pregnant women should incorporate a short screening tool that efficiently and effectively assesses a woman's experiences of coercive control, her fear of her partner, her assessment of danger, and her psychological well-being in order to identify women most at risk for short-term and long-term health problems, including pregnancy-related complications. Simply asking a woman whether or not she is a victim of domestic violence is likely insufficient to properly assess pregnancy and health risk caused by IPV.

General and prenatal healthcare professionals can also be instrumental in intervening on behalf of pregnant women who screen positive for IPV by helping victims cope with short-term and long-term physical and psychological consequences associated with IPV and assisting them in safely seeking necessary services. Effective, evidence-based intervention and prevention protocols can undoubtedly decrease pregnancy complications for many women; however, little research has addressed the effectiveness of follow-up and referral procedures. Our research team is currently conducting a qualitative analysis of obstetrical providers' follow-up and referral procedures once a woman screens positive for IPV.

Despite study strengths, some questions remain unanswered. First, data were abstracted from hospital charts rather than through patient interviews. Although this method eliminates reporting biases common to research in this area, it makes the data dependent on clinician screening, which may vary with regard to how questions are asked and the interpretation of patient responses. Second, patient drug use was based on selected urine testing that was not uniform; it detects marijuana with greater precision than cocaine, and positive screens were recorded on the prenatal charts as "drug screen positive" without specific record of the type of drug. Marijuana metabolites persist in the urine of users for up to 7 days, whereas traces of cocaine in urine clear within 4 days.<sup>29</sup> Thus, it was impossible to examine the link between specific illicit drugs and study outcomes. Third, the current study is hospital-based and used prenatal charts from different sources. Therefore, it is an analysis of existing care, and the ways that care providers ask questions about IPV differ across settings. Nonetheless, the documentation of prenatal screening for IPV was comparable across different settings because all clinical sites use the same prenatal record form, which was then included in the hospital delivery chart. Fourth, there may be many cases of physical harm from IPV for which women did not request treatment from a healthcare provider. There may be cases of clinically diagnosed trauma caused by IPV that women denied were caused by IPV. There also may be cases of other types of trauma, for example, automobile accidents, that were not caused by IPV. Despite the potential imprecision of this variable, we retained it in the analysis because the association between a positive screen for IPV and a subsequent clinical diagnosis of pregnancy trauma is critical for clinicians to understand. Finally, it is not possible to assess incidence and prevalence rates of these conditions among the

general population based on the current sample, which is a hospital-based group of patients. Instead, the purpose of the current study was to describe and explore factors associated with IPV and clinically diagnosed trauma and placental abruption among patients receiving care at a large urban hospital. Results should be interpreted within this context.

This study establishes an empirical and robust link between IPV and pregnancy trauma and placental abruption. Future research is needed to better understand the complexities and experiences of IPV for pregnant women, specifically the context within which IPV exists and the mechanisms through which it can negatively affect pregnancy outcomes. For example, current research consistently shows that IPV is not a unitary phenomenon and that distinct forms of partner violence exist, with significantly different outcomes for victims. Johnson et al.<sup>30-33</sup> have argued that two major forms of male-perpetrated IPV exist: one is embedded in a general pattern of power and control, which they have called "intimate terrorism," and the other is a response to a situationally specific conflict, which they have called "situational couple violence." This typology defines IPV types on the basis of the underlying motivation to use physical violence, as demonstrated through the context of nonviolent, controlling behaviors (e.g., isolation, threats, emotional abuse, economic abuse) in which the physical violence exists. Intimate terrorists entrap victims in the relationship by creating tremendous fear of further physical and sexual violence, by diminishing their personal and financial resources, and by creating an environment in which victim support networks may be both geographically and socially inaccessible.<sup>32</sup> In contrast, situational couple violence is more episodic and does not exist within a context of control and can often be an isolated disagreement that escalates into one or both partners using physical violence.<sup>32</sup> Compared with situational couple violence victims, intimate terrorism victims report more frequent and severe physical violence, more violence-related injuries,<sup>33,34</sup> significantly poorer general health,<sup>35</sup> more symptoms of depression and posttraumatic stress disorder, and more pain killer and tranquilizer use,<sup>33</sup> likely reflecting strategies to cope with the physical and psychological devastation they endure. Intimate terrorism victims also report increased risk of suicidal behavior<sup>32</sup> and less perceived social support,<sup>36</sup> reflecting their increased isolation and feelings of hopelessness. Intimate terrorism victims likely require more intensive measures to help them recover from the psychological trauma of severe physical and psychological abuse and likely require more survivor-based services to help them safely escape from the violent relationship.<sup>36</sup>

Differences in pregnancy outcomes have not yet been examined as a function of IPV type. However, based on prior findings, we hypothesize that intimate terrorism has significantly higher risks for negative pregnancy outcomes, including pregnancy trauma and placental abruption, as examined here. For example, the specific violent acts noted in these data, such as being shot and stabbed in the abdomen and sexually assaulted by the partner, are more likely signs of intimate terrorism than situational couple violence. Blunt force to the abdomen is a common tactic used by intimate terrorists<sup>37</sup> and is a significant cause of pregnancy trauma.<sup>19</sup> Moreover, the tremendous psychological and physical distress that intimate terrorists impose on victims is well-documented<sup>32,33,37</sup> and may contribute to the link between partner violence victimization

and placental abruption. Although situational couple violence clearly can be harmful to pregnant victims—indeed, any violence can be injurious and even lethal—the severity and frequency of violence that are associated with intimate terrorism clearly place its victims at greater risk for pregnancy-related complications and negative outcomes stemming from physical and psychological distress. By lumping together all IPV without making clear distinctions, research most likely dilutes the devastating health problems that intimate terrorists can create for victims. Research that can adequately and reliably distinguish between violence types with regard to pregnancy-related outcomes might better inform current medical screening practices and intervention programs, as both researchers and practitioners now consider violence during pregnancy to be a “quintessential threat” to maternal and child health.<sup>8</sup>

### Conclusions

This study supports previous research by linking IPV to pregnancy-related complications and serious risk factors associated with maternal and fetal death. Using an adjusted analysis, the current study empirically demonstrates a significant association between IPV against pregnant women and a clinical diagnosis of pregnancy trauma and placental abruption among a hospital-based sample of women. Findings highlight the need for practitioner-oriented education about the complexities of IPV, knowledge of economic and social resources available to women subjected to IPV, and strategies that can efficiently and effectively increase screening for IPV and intervention on behalf of IPV victims.

### Disclosure Statement

The authors have no conflicts of interest to report.

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