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### Intimate Partner Violence during Pregnancy: Victim or Perpetrator? Does it make a difference?

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1 Intimate Partner Violence during Pregnancy: Victim or Perpetrator? Does it make a difference?

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15 Running Title: Women as Perpetrators

16

17 **Abstract**

18 **Objectives:** To differentiate between forms of intimate partner violence (IPV)(victim only,  
19 perpetrator only, or participating in reciprocal violence) and examine risk profiles and  
20 pregnancy outcomes.

21 **Design:** Prospective

22 **Setting:** Washington, DC, July 2001 to October 2003

23 **Sample:** 1044 high-risk African-American pregnant women who participated in a randomized  
24 controlled trial to address IPV, depression, smoking, and environmental tobacco smoke  
25 exposure.

26 **Methods:** Multivariable linear and logistic regression

27 **Main outcome measures:** Low and very low birth weight, preterm and very preterm birth

28 **Results:** 5% of women were victims only, 12% were perpetrators only, 27% participated in  
29 reciprocal violence, and 55% reported no IPV. Women reporting reciprocal violence in the past  
30 year were more likely to drink, use illicit drugs, and experience environmental tobacco smoke  
31 exposure and were less likely to be very happy about their pregnancies. Women reporting any  
32 type of IPV were more likely to be depressed than those reporting no IPV. Women experiencing  
33 reciprocal violence reported highest levels of depression. Women who were victims of IPV were  
34 more likely to give birth prior prematurely and deliver low and very low birth weight infants.

35 **Conclusions:** We conclude that women were at highest risk for pregnancy risk factors when  
36 they participated in reciprocal violence and thus might be at higher risk for long-term  
37 consequences, but women who were victims of intimate partner violence were more likely to

38 show proximal negative outcomes like preterm birth and low birth weight. Different types of  
39 interventions may be needed for these two forms of intimate partner violence.

40 **Keywords:** Intimate partner violence, pregnancy outcomes, risk factors

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42

43 **INTRODUCTION**

44           The Centers for Disease Control and Prevention defines intimate partner violence (IPV)  
45 as physical, sexual or psychological harm by a current or former spouse or partner,<sup>1</sup> with  
46 serious psychosocial and physical sequelae. The National Violence against Women Survey found  
47 that 22.1 percent of women and 7.4 percent of men report any violence by an intimate partner  
48 during their lifetimes. Annually, in the U.S approximately 1.3 million women and 835,000 men  
49 report physical assault by an intimate partner.<sup>2</sup> Using the Behavior Risk Factor Surveillance  
50 System, Breiding and colleagues<sup>3</sup> found a lifetime prevalence of IPV was 26.4 percent in women  
51 and 15.9 percent in men. They also found that the lifetime prevalence of IPV was similar for  
52 non-Hispanic African-American and non-Hispanic white women, whereas the rate for the 12-  
53 month period preceding the survey was almost twice as high among African-Americans.<sup>3</sup>

54           There are a myriad of factors associated with or causally linked to IPV. Women who  
55 were younger, had less education and lower income, and those who were single mothers  
56 reported more lifetime IPV than their counterparts.<sup>4,5</sup> A prevalence study from Canada used  
57 data from the Canadian Perinatal Surveillance System which questioned women on abuse  
58 before, during and after pregnancy. Overall, the prevalence was 10.9% of women reporting  
59 abuse during the two years preceding interviews. Women who were low income (21.2%  
60 abused), single, divorced, separated or widowed (35.3% abused), < 19 years old (40.7% abused)  
61 and Aboriginal mothers (30.6% abused) had a higher prevalence of abuse.<sup>6</sup> These findings  
62 reinforce those by Bhandari et al. who reported that family stressors such as financial issues,  
63 lack of social support, legal and transportation issues put women at increased risk for abuse.<sup>7</sup>

64 There are conflicting reports in the literature about whether pregnancy raises or lowers the risk  
65 of intimate partner violence.<sup>8,9</sup> Alcohol use has consistently been associated with IPV. A World  
66 Health Organization multi-country study found that when one or both partners abused alcohol,  
67 there were significantly higher rates of IPV experienced by women.<sup>5</sup> Kiely and colleagues<sup>10</sup>  
68 reported that women with continued IPV during pregnancy were significantly more likely to use  
69 alcohol. Breiding et al.<sup>11</sup> reported that IPV victimization in women was associated with heavy or  
70 binge drinking and cigarette smoking. Illicit drug use has been associated with physical partner  
71 violence.<sup>12,13</sup> Physical, sexual or psychological IPV have been associated with depressive  
72 symptoms.<sup>10,14,15</sup> Mistimed or unintended pregnancies were linked to higher rates of IPV in the  
73 year before conception or during pregnancy.<sup>16</sup> Alcohol,<sup>9</sup> tobacco and drug use,<sup>17</sup> depression<sup>18</sup>  
74 and unintended pregnancy<sup>9</sup> are not only associated with IPV but are also considered as known  
75 risk factors for IPV during pregnancy. Thus, it is important to note if these risk factors are  
76 present in women who experience IPV to ensure they receive proper care during pregnancy  
77 and post-partum.

78 IPV increases both pregnancy complications (e.g., inadequate weight gain, maternal  
79 infections and bleeding) as well as adverse pregnancy outcomes (low birth weight (LBW),  
80 preterm birth (PTB) and neonatal death).<sup>19-21</sup> Kiely et al. report that among women  
81 experiencing IPV victimization throughout pregnancy and postpartum, those randomized to the  
82 intervention compared to usual care had significantly fewer very preterm births (VPTB) (<33  
83 weeks gestation) and significantly longer mean gestational age at delivery.<sup>10</sup> A Pregnancy Risk  
84 Assessment Monitoring System study found that women reporting IPV in the year before  
85 pregnancy were more likely to deliver prematurely and to have LBW infants.<sup>22</sup> Other studies

86 have found similar associations between abuse during pregnancy and LBW, PTB, and maternal  
87 infections, low gestational weight gain, smoking, alcohol and illicit drug use.<sup>19,21,23</sup>

88 While the link between victimization and negative outcomes is established, there may  
89 also be an association between women's aggression and physical and psychological sequelae.  
90 Girls who are aggressive in adolescence have higher rates of early pregnancy, have higher rates  
91 of obstetric and delivery complications, and score higher for depression and anxiety than their  
92 non-aggressive counterparts.<sup>24</sup>

93 Partners experience perpetration and victimization differently. The types of violence  
94 reported tend to differ, with men reporting more verbal or psychological abuse and women  
95 reporting more physical or sexual abuse.<sup>25</sup> It has been posited that women react to violence in  
96 their relationships, while men initiate it.<sup>26</sup> Women are injured more<sup>27-29</sup> and have more  
97 psychological consequences.<sup>3, 15</sup>

98 Few, if any, studies have examined the different ways that pregnant women experience  
99 IPV and the risk profiles of each form of IPV (victim, perpetrator or reciprocal). The purpose of  
100 this study is to examine the different forms of IPV present in a sample of high-risk pregnant  
101 women. We examine risk profiles (alcohol, illicit drug and tobacco use, pregnancy wantedness,  
102 and depression) by the form of IPV and pregnancy outcome.

## 103 **METHODS**

104 This study uses data from the National Institutes of Health - District of Columbia  
105 Initiative to Reduce Infant Mortality in Minority Populations, a congressionally mandated  
106 project to improve maternal and child health outcomes in African-Americans living in the  
107 District. The data presented here are from the Healthy Outcomes of Pregnancy Education

108 study, or DC-HOPE, a randomized controlled trial (RCT) designed to address smoking, exposure  
109 to environmental tobacco smoke (ETSE), IPV and depression, by providing an integrated  
110 behavioral intervention and following the women throughout pregnancy and postpartum. The  
111 methods and intervention have been previously described.<sup>30</sup>

## 112 Participants

113 Women were recruited from six prenatal care clinics in DC from July 2001 to October  
114 2003. Women were screened for eligibility in two stages, first based on demographic  
115 characteristics (self-identifying as black, African-American or Latina, 18 years old or older,  $\leq 28$   
116 weeks gestation, DC resident and English speaking). Those who were demographically eligible  
117 were consented and screened by audio-computer assisted self-interview for one of the  
118 following risks: smoking, ETSE, IPV, and/or depression. An average of 9 days after screening,  
119 they completed the baseline interview and were then consented to participate in the  
120 randomized controlled trial. A total of 2,913 women were screened for eligibility. Of those,  
121 1,191 women consented to participate in the study and 1,070 (90%) completed baseline phone  
122 interviews and were further randomized into intervention and usual care groups by using site-  
123 and risk-specific block randomization. Follow-up data collection by telephone, conducted by  
124 interviewers blinded to care group, occurred during the second and third trimesters of  
125 pregnancy (22-26 and 34-38 weeks gestation, respectively) and 8-10 weeks postpartum. Data  
126 on maternal and infant outcomes were abstracted from medical records. Figure 1 displays the  
127 eligibility, consent and randomization process of DC-HOPE. The current analysis includes the  
128 1,044 African-American women who were still pregnant at the time of the baseline



129 questionnaire. These analyses include the data on women in the intervention and control  
130 groups.

### 131 Measures

132 *Intimate Partner Violence.* IPV was measured by the Revised Conflict Tactics Scale.<sup>31</sup> During the  
133 baseline interview, women reported IPV they experienced or perpetrated during the previous  
134 year. During the follow-up interviews, the period of IPV was since the previous interview. For  
135 each item on the Revised Conflict Tactics Scale, the women rated the frequency that a  
136 particular event happened to them and the frequency with which the women used violence on  
137 their partner. Women who reported only being the victim were classified as victims only;  
138 women who reported that they used violence on their partner, but their partner did not, were  
139 considered perpetrators; and women who were both victims and perpetrators were classified  
140 as participating in reciprocal violence. This study used the physical assault and sexual coercion  
141 subscales. The minor items on the physical assault subscale include twisting a partner's arm or  
142 hair, pushing or shoving, or grabbing, while the severe items include punching, choking, kicking,  
143 or using a knife or a gun with a partner. The sexual coercion scale includes asking about minor  
144 items such as insisting on oral, anal or vaginal sex, and more severe items include using force  
145 and threats to make a partner have oral, anal or vaginal sex. We report on severe and minor  
146 physical IPV, severe and minor sexual IPV, and three different forms of IPV: perpetration,  
147 victimization, reciprocal.

148 *Pregnancy Risk Factors.* The pregnancy risk factors assessed at baseline and analyzed  
149 include alcohol and illicit drug use during pregnancy, depression, smoking, ETSE, pregnancy  
150 wantedness, and pregnancy happiness. These were chosen because previous studies found

151 associations between these factors and negative pregnancy and infant outcomes, such as LBW  
152 and PTB.

153 Alcohol use questions asked about frequency of use during pregnancy of different  
154 alcoholic beverages (beer, wine, wine coolers, and liquor). For this analysis, if women reported  
155 any type or quantity of drinking during pregnancy, alcohol use was considered to have  
156 occurred. Women were coded as using illicit drugs if they reported using marijuana, cocaine,  
157 heroin, LSD, amphetamines, sedatives or tranquilizers, or any other drugs since learning they  
158 were pregnant (yes/no).

159 Depression was assessed using the Hopkins Symptom Check List.<sup>32</sup> This scale consists of  
160 20 questions asking participants about how they have felt in the past month and whether they  
161 were distressed by these symptoms. The symptoms include feeling hopeless about the future,  
162 poor appetite, trouble falling asleep, thoughts of death, feeling worthless, and difficulty making  
163 decisions. The responses were on a five-point Likert scale ranging from “Not at all” to  
164 “Extremely.” Depression was defined as a mean Hopkins score  $>0.75$ .

165 Smoking at baseline was considered to be present if the participant reported smoking  
166 currently or within the last 6 months and verified by salivary cotinine, and had smoked a total  
167 of more than 100 cigarettes in her lifetime. ETSE was marked as present if the participants  
168 reported being exposed to one or more cigarettes smoked by someone else inside the home or  
169 in other places in the past 7 days.

170 Pregnancy wantedness was determined by participants reporting having an intended  
171 pregnancy or one that was not intended currently but wanted eventually. All other women  
172 were considered to have an unwanted pregnancy. Finally, happiness about pregnancy was

173 measured by one question that queried participants about the level of their happiness on a  
174 scale of 1 to 10. Those who reported happiness levels of 1 to 3 were categorized as unhappy,  
175 those who reported happiness of 4 to 7 were categorized as moderately happy, and a report of  
176 greater than 7 was considered very happy.

177 *Pregnancy and Birth Outcomes.* We measured pregnancy and birth outcomes in the  
178 current study. PTB was defined as gestation less than 37 weeks and very preterm birth (VPTB)  
179 was defined as gestation less than 34 weeks. Birth weight was measured in grams. LBW was  
180 defined as less than 2,500 grams and very low birth weight (VLBW) as less than 1,500 grams at  
181 delivery. Finally, small for gestational age (SGA) was based on sex of the infant, birth weight and  
182 gestation at delivery. Infants who weighed less than the 10<sup>th</sup> percentile of weight for  
183 gestational age were considered as small for gestational age. These variables were coded as  
184 dichotomous for statistical analysis.

185 *Demographic Variables.* We used demographic variables previously associated with both  
186 IPV and pregnancy outcomes to control the relationships that were tested in the analyses.  
187 Maternal education was used as a proxy of socio-economic status and trichotomized as less  
188 than high school, high school diploma or GED, and some college. A woman's relationship status  
189 was dichotomized into single (which included divorced, separated, and widowed) or partnered  
190 (which included married or having a significant other). We also used maternal age as a  
191 continuous control variable in the analyses.

## 192 Statistical Analysis

193 We performed analyses using SAS version 9.1 (SAS Institute, Cary, NC). In order to  
194 examine the associations between different forms of IPV and pregnancy risk factors, we used

195 linear and logistic regression procedures, depending on the type of variable. Adjusted odds  
196 ratios were estimated in multivariable logistic regressions for the relationship of interest while  
197 controlling for the effects of maternal age, maternal education, and relationship status.  
198 Similarly, multivariable linear regressions were estimated with demographic variables and the  
199 IPV indicator variables. Finally, happiness to be pregnant is an ordinal variable; therefore, we  
200 used multinomial logistic regression.

201 Similar testing was performed with the pregnancy-related outcomes – all of the  
202 outcome variables were dichotomous. Because pregnancy outcomes were determined  
203 postpartum and some women were lost to follow-up, only data for the women (n=832) who  
204 remained in the study were used in these analyses. We analyzed the baseline data collected for  
205 women who did and did not have complete data at follow-up to determine if there were any  
206 differences, using ANOVA and Mantel-Haenszel chi-square. Furthermore, since some women  
207 received the intervention meant to reduce risky behaviors and exposures, we controlled for  
208 care group in the analysis. Finally, we controlled for other risk factors in the fully adjusted  
209 models of pregnancy outcomes (preterm birth (PTB), LBW, VLBW, and SGA) if those risk factors  
210 showed an association with the outcome at the  $p \leq 0.10$  level of significance. Therefore, some  
211 fully adjusted models include smoking, depression, and alcohol or illicit drug use.

## 212 **RESULTS**

213 The women ranged in age from 17 to 51, with a mean age of 24.57 years. All of the  
214 participants included in these analyses were African-American. At the time of the baseline  
215 interview, women were on average 19 weeks pregnant. A large majority of the women were  
216 single. Table 1 presents the sociodemographic characteristics and psycho-behavioral risks at

217 baseline between women who reported any IPV perpetration (n=127), IPV victimization (n=51),  
218 reciprocal IPV (n=285) and those who reported no IPV (n=577). Women who reported any IPV  
219 at baseline had significantly higher rates of alcohol and illicit drug use, higher depression, and  
220 reported more ETSE. Women who dropped out of the study reported higher depression at  
221 baseline (mean = 16.48±13.42 for those who remained vs. 19.28±16.18 for those who dropped  
222 out,  $p<0.01$ ) and were more likely to be single ( $p<0.05$ ) (data not shown).

223 Table 2 displays the adjusted odds ratios for the associations between different IPV  
224 forms and other pregnancy risk factors. The no IPV category is the referent group in the  
225 analyses. The most consistent finding is that regardless of type of violence (any, minor, severe,  
226 physical or sexual) these women are depressed. There is a clear linear trend for increasingly  
227 higher levels of depression going from perpetrator only to victim only to reciprocal violence. For  
228 women with minor IPV, those participating in reciprocal violence were significantly more likely  
229 to use alcohol (OR=2.76, 95% CI=1.95-3.90) and illicit drugs (OR=2.01, 95% CI=1.31-3.07).  
230 Women experiencing severe IPV (all forms) were significantly more likely to use alcohol.  
231 Women who perpetrate only were significantly more likely to use illicit drugs (OR=1.89, 95%  
232 CI=1.02-3.50) as were women who participated in reciprocal violence (OR=3.05, 95% CI=1.83-  
233 5.06). For physical IPV, there is a clear linear trend for increasingly significant odds of alcohol  
234 use going from perpetrator only (OR=1.63, 95% CI=1.02-2.60) to victim only (OR=2.04, 95%  
235 CI=1.00-4.13) to reciprocal (OR=2.89, 95% CI=2.03-4.11). For women reporting sexual IPV,  
236 alcohol use was significant for victims (OR=2.17, 95% CI=1.33-3.53) and women participating in  
237 reciprocal violence (OR=3.06, 95% CI=1.79-5.23). The women who participate in reciprocal  
238 violence were significantly more likely to use illicit drugs (OR=2.11, 95% CI=1.11-4.01).

239 Table 3 presents the adjusted odds ratios from the models associating baseline reports  
240 of IPV types and forms with pregnancy and infant outcomes (PTB, VPTB, LBW, VLBW, SGA),  
241 while controlling for demographic and risk factors. Women who were perpetrators only, were  
242 not at significantly increased risk of any of the adverse infant outcomes. Women who reported  
243 physical IPV and participated in reciprocal violence were more likely to have a PTB (OR=1.60,  
244 95% CI=1.00-2.57). Women who were victims only were the ones with significantly worse birth  
245 outcomes. Victims reporting any type of IPV were more likely to have a LBW infant (OR=2.21,  
246 95% CI=1.04-4.72) or VLBW infant (OR=4.54, 95% CI=1.06-19.44). Victims were more likely to  
247 have a VPTB if they reported minor IPV (OR=3.66, 95% CI=1.22-10.97), severe IPV (OR=2.78,  
248 95% CI=1.10-7.06) or physical IPV (OR=3.52, 95% CI=1.06-11.65). Victims reporting physical IPV  
249 had significantly more LBW (OR=2.49, 95% CI=1.13-5.52) and VLBW (OR=5.67, 95% CI=1.29-  
250 25.02) infants. Victims reporting sexual IPV had significantly more VLBW infants (OR=3.74, 95%  
251 CI=1.09-12.85).

## 252 **DISCUSSION**

### 253 **Main Findings**

254 The current study was novel in that we analyzed different forms of IPV – perpetrators,  
255 victims, and women participating in reciprocal violence – in a sample targeted specifically at  
256 high-risk African-American pregnant women. IPV affects millions of women regardless of  
257 economic status, race or ethnicity. The results point to different risk profiles for different kinds  
258 of violence. Women who reported reciprocal violence in the past year had higher odds of  
259 consuming alcohol and illicit drugs during pregnancy, ETSE exposure, and were the most  
260 depressed, which supports and extends findings linked to reciprocal violence in couples.<sup>33</sup>

261 Women who reported only victimization in the past year were more likely to smoke and had  
262 elevated levels of depression. To our knowledge, few studies have linked various forms of IPV  
263 with different types of pregnancy risk.<sup>34,35</sup> Although women who reported reciprocal violence  
264 had the worst risk profiles, their birth outcomes were similar to women not experiencing IPV.  
265 Previous research reported that reciprocal violence being associated with higher injury rates,<sup>36</sup>  
266 but no one has studied IPV forms as predictors of pregnancy outcomes.

267         There has been controversy in the literature regarding perpetration, with one side  
268 asserting that female perpetration has been ignored<sup>37</sup> and the other emphasizing male  
269 perpetrators.<sup>38</sup> The current study accounts for female perpetration and finds clearly delineated  
270 risk profiles for different forms of IPV, especially for victims and reciprocal violence. Women  
271 were willing to and did report reciprocal violence, more than victimization only. Previous  
272 studies have found that women engaging in violence often do so in the context of responding  
273 to partner violence. Swan and Snow<sup>39</sup> reported that 75% of women studied stated that their  
274 violence was in self-defense. Women also acknowledged fear,<sup>40, 41</sup> defense of their  
275 children,<sup>42,43</sup> relationship control,<sup>39,40</sup> and retribution, often for being emotionally hurt<sup>39, 44</sup> as  
276 their motivations for violence. Women experience coercive control, including sexual coercion,  
277 while rarely being coercively controlling themselves.<sup>40</sup> Future studies should endeavor to gain  
278 more insight into the context of IPV during pregnancy.

279         Studies of IPV generally do not report reciprocal violence because most scales do not  
280 ask about perpetration. This may be a reflection that it is not asked simultaneously and  
281 researcher's own biases about the likelihood that women would perpetrate violence. A  
282 compendium by the CDC<sup>45</sup> reveals that only two scales ask about both victimization and

283 perpetration: the Revised Conflicts Tactics Scale,<sup>31</sup> and the Multidimensional Measure of  
284 Emotional Abuse.<sup>46,47</sup>

285         Alcohol and drug use are often studied in association with IPV, as risk factors or coping  
286 mechanisms. Alcohol use has been linked to victimization and perpetration of IPV. Some studies  
287 report drinking as a coping mechanism for dealing with IPV,<sup>48,49</sup> while others posit drinking as a  
288 risk factor for victimization,<sup>34</sup> and some find that alcohol use was directly related to  
289 perpetration.<sup>35</sup> Causality is unclear in our study, but the results point to alcohol use as a  
290 particular problem for women who participate in reciprocal violence. It is possible that alcohol  
291 use could be linked to more aggressive behavior in this group of women; however, there is no  
292 way to determine if drinking led to aggressive behavior or if it were used as a coping  
293 mechanism. Contrary to current literature, we found that women who were perpetrators only  
294 were less likely to acknowledge either alcohol or illicit drug use.<sup>50-52</sup> This may be partially  
295 explained by the fact that most researchers do not refine perpetration as we did. Our findings  
296 suggest providers of services should question women on both perpetration and victimization.

297         The literature supports our findings that women who experience IPV as victims are more  
298 likely to have negative birth outcomes.<sup>19,20</sup> However, our study is the first, to our knowledge, to  
299 separate the forms of violence and point to victimized women as particularly at risk for LWB  
300 and PTB. . Previous studies have found that psychosocial stress and stressful life events are  
301 linked with LBW specifically in African-Americans.<sup>53,54</sup> If IPV increases stress, these episodes  
302 may exacerbate the risk of poor pregnancy outcomes. Victims may have been unable to  
303 marshal the resourcefulness needed to fight back when abused and may have internalized the



304 stress caused by the abuse. Future studies should include the necessary measures to  
305 understand this phenomenon.

306 Our results emphasize the need to understand how these risk factors interact and act as  
307 mediating mechanisms between IPV and pregnancy outcomes.<sup>55</sup> during Addressing health  
308 behaviors may require a deeper understanding of the temporality and reasons (i.e. coping  
309 mechanisms). Likewise, we found that depression during pregnancy was elevated for all forms  
310 of IPV and should be addressed in the context of abusive relationships.

### 311 Strengths and Limitations

312 These results should be interpreted in light of study limitations. The sample population  
313 is high-risk African-American pregnant women residing in Washington, DC, and thus are not  
314 necessarily generalizable a wider population. However, the results inform the kind of elevated  
315 risk that affects pregnant women who are already vulnerable. These analyses are longitudinal,  
316 involving data collected during pregnancy and including birth outcomes. While there were few  
317 differences between women retained and lost to follow-up, the higher depression levels in  
318 women who were lost suggest that this group was at higher risk and that our results would  
319 have been stronger with complete follow-up. The data on risk factors and IPV were self-  
320 reported, which may have led to under-reporting due to social desirability. However, the data  
321 on pregnancy outcomes were collected through record abstraction, and thus should be  
322 considered reliable. The RCT was not originally powered to detect differences in birth  
323 outcomes, but rather risk resolution. The original study randomization did not account for  
324 different IPV. Future research should include a broader population of pregnant women.

325 Following women longer would facilitate understanding the detrimental effects of different  
326 forms of IPV on long-term maternal and child health outcomes.

### 327 Interpretation

328 Despite the limitations, the results provide important insight into differences in the risk  
329 profiles of pregnant women experiencing various forms of IPV. We confirm that women who  
330 participate in reciprocal violence tend to suffer many negative consequences<sup>40</sup> and have serious  
331 pregnancy risk profiles. We also add to the literature describing the relationship between IPV  
332 and negative birth outcomes, specifically in women who report victimization only. We found  
333 clear delineations between forms of violence experienced and risk profiles and outcomes,  
334 which may have implications for future research on IPV and clinicians' practice.

335 Previous studies reported the benefits of screening for IPV in clinical settings.<sup>56,57</sup> Expanding the  
336 identification of IPV to include the type and form(s) should be possible within the clinical setting  
337 with a similar time investment. This would allow beneficial interventions to alleviate a  
338 woman's behavioral and mental health issues. This knowledge can help providers guide the  
339 patient's pregnancy and birth care decisions. Our results support the recent American Congress  
340 of Obstetricians and Gynecologists opinion that screening for IPV should be a routine part of

341 preventive care for women.<sup>58</sup> **Conclusions:** We conclude that women have the most pregnancy  
342 risk factors when they are participating in reciprocal violence and thus might be at higher risk  
343 for long-term consequences, but women who are victims of IPV are more likely to show  
344 proximal negative outcomes like PTB and LBW. When women present for care, their provider  
345 should consider perpetration as well as victimization. Different types of interventions may be  
346 needed for these two forms of IPV.

347

348

349 **DISCLOSURE OF INTERESTS**

350 Neither of the authors has any competing interests to declare.

351 **CONTRIBUTION TO AUTHORSHIP**

352 YS performed the statistical analyses, participated in the interpretation of the results and the writing of  
353 the manuscript. YS has given final approval of the manuscript.

354 MK, as the NICHD Project Officer, oversaw all the activities of the study while it was in the field. She  
355 participated in the analysis and interpretation of the results. MK did a significant amount of the original  
356 writing of the manuscript, as well as revising it critically for important intellectual content. MK has given  
357 final approval of the manuscript.

358 **DETAILS OF ETHICS APPROVAL**

359 This study was approved by the Human Subjects Committees at Howard University (for the clinical sites),  
360 RTI International (the data coordinating center) and the *Eunice Kennedy Shriver* National Institute of  
361 Child Health and Human Development. Copies of the Institutional Review Board approval have been  
362 archived and I no longer have access to them. The data were collected as part of a clinical trial,  
363 registered at ClinicalTrials.gov, [www.clinicaltrials.gov](http://www.clinicaltrials.gov), NCT00381823

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370

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602 **TABLE CAPTIONS**

603 Table 1. Select descriptive characteristics of sample at baseline.

604 Table 2. Adjusted odds ratios (95% confidence intervals) associating risk factors of pregnancy  
605 and IPV forms

606 Table 3. Adjusted odds ratios (95% confidence intervals) in the model associating pregnancy-  
607 related outcomes and IPV forms (any IPV)

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Table 1. Select descriptive characteristics of sample at baseline.

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Table 1. Select descriptive characteristics of sample at baseline.

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Variables	Women who reported perpetrating IPV (n = 127) Mean ± SD/ Percent (n)	Women who reported being victims of IPV (n = 51) Mean ± SD/ Percent (n)	Women who reported reciprocal IPV (n = 285) Mean ± SD/ Percent (n)	Women who reported no IPV (n = 577) Mean ± SD/ Percent (n)	Difference tests p-value
Maternal age (years)	<b>23.94±5.10</b>	<b>26.31±6.67</b>	<b>24.17±5.27</b>	<b>24.74±5.40</b>	<b>0.03</b>
Gestational age (weeks)	20.25±6.98	18.24±8.80	18.92±6.90	18.72 ±6.80	0.13
Education:					
Less than high school	33.86 (43)	19.61 (10)	34.04 (97)	28.60 (165)	0.16
High school or GED	51.97 (66)	43.14 (22)	42.81 (122)	47.49 (274)	
Some college	14.17 (18)	37.25 (19)	23.16 (66)	23.92 (138)	
Relationship status:					
Married/significant other	28.35 (36)	23.53 (12)	24.56 (70)	22.18 (128)	0.14
Single/divorced/widowed/separated	71.65 (91)	76.47 (29)	75.44 (215)	77.82 (449)	
Medicaid	<b>86.51 (109)</b>	<b>66.00 (33)</b>	<b>80.99 (230)</b>	<b>75.83 (436)</b>	<b>0.04</b>
WIC	49.21 (62)	41.18 (21)	45.26 (129)	41.59 (240)	0.13
Currently employed	31.50 (40)	35.29 (18)	37.68 (107)	37.09 (214)	0.29
Risk factors:					
Alcohol use during pregnancy	<b>18.90 (24)</b>	<b>25.49 (13)</b>	<b>32.98 (94)</b>	<b>15.80 (91)</b>	<b>&lt;0.001</b>
Illicit drug use during pregnancy	<b>12.60 (16)</b>	<b>11.76 (6)</b>	<b>17.54 (50)</b>	<b>8.84 (51)</b>	<b>&lt;0.01</b>
Active smoking	18.11 (23)	29.41 (15)	20.70 (59)	17.33 (100)	0.15
ETSE	<b>76.86 (93)</b>	<b>66.67 (34)</b>	<b>80.00 (224)</b>	<b>68.37 (389)</b>	<b>&lt;0.01</b>
Depression	<b>17.34 ±13.36</b>	<b>19.37±14.19</b>	<b>23.16±14.68</b>	<b>13.76 ±12.81</b>	<b>&lt;0.001</b>
In intervention group	13.68 (71)	4.82 (25)	27.75 (144)	48.35 (279)	0.15
Wanted pregnancy	76.98 (97)	71.43 (35)	74.11 (209)	77.60 (447)	0.58
Happiness about pregnancy:					
Unhappy	<b>14.17 (18)</b>	<b>31.37 (16)</b>	<b>22.81 (65)</b>	<b>18.20 (105)</b>	<b>0.03</b>
Moderately happy	<b>44.09 (56)</b>	<b>33.33 (17)</b>	<b>42.81 (122)</b>	<b>38.30 (221)</b>	
Very happy	<b>41.73 (53)</b>	<b>35.29 (18)</b>	<b>34.39 (98)</b>	<b>43.50 (251)</b>	

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Note: Differences in means or proportions are denoted by bolded text.





617 Table 2. Adjusted odds ratios (95% confidence intervals) associating risk factors of pregnancy  
618 and IPV forms  
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Risk factors	Perpetrator only	Victim only	Reciprocal
<b>Any IPV</b>			
Maternal Age - B (SE) <sup>a</sup>	-0.80 (0.53)	<b>1.58 (0.79)</b>	-0.57 (0.39)
Relationship status <sup>a</sup>	0.72 (0.47, 1.11)	0.93 (0.47, 1.82)	0.88 (0.63, 1.22)
Maternal Education: <sup>a</sup>			
Less than high school	<b>2.00 (1.10, 3.62)</b>	<b>0.44 (0.20, 0.98)</b>	1.23 (0.84, 1.81)
High school graduate	<b>1.85 (1.06, 3.23)</b>	0.58 (0.31, 1.11)	0.93 (0.65, 1.34)
Alcohol use	1.36 (0.82, 2.26)	1.63 (0.82, 3.25)	<b>2.80 (1.99, 3.95)</b>
Illicit drug use	1.43 (0.78, 2.62)	1.56 (0.63, 3.88)	<b>2.12 (1.39, 3.25)</b>
Smoking	1.05 (0.62, 1.78)	<b>2.08 (1.04, 4.15)</b>	1.27 (0.87, 1.85)
ETSE	1.44 (0.91, 2.29)	1.02 (0.55, 1.90)	<b>1.83 (1.30, 2.59)</b>
Depression <sup>b</sup> – B (SE)	<b>3.93 (1.31)</b>	<b>5.06 (1.96)</b>	<b>9.40 (0.97)</b>
Pregnancy wantedness	0.96 (0.60, 1.53)	0.72 (0.37, 1.40)	0.80 (0.57, 1.12)
Pregnancy happiness <sup>c</sup> :			
Unhappy	0.72 (0.40, 1.30)	1.85 (0.89, 3.85)	1.17 (0.79, 1.71)
Very happy	0.81 (0.53, 1.23)	0.92 (0.46, 1.8.)	<b>0.71 (0.51, 0.96)</b>
<b>Minor IPV</b>			
Maternal Age - B (SE) <sup>a</sup>	-0.68 (0.53)	<b>2.42 (0.79)</b>	-0.63 (0.39)
Relationship status <sup>a</sup>	0.76 (0.50, 1.17)	0.93 (0.48, 1.84)	0.86 (0.62, 1.20)
Maternal Education: <sup>a</sup>			
Less than high school	1.69 (0.95, 3.01)	<b>0.43 (0.19, 0.96)</b>	1.26 (0.85, 1.86)
High school graduate	1.67 (0.97, 2.86)	0.58 (0.31, 1.12)	0.97 (0.67, 1.40)
Alcohol use	1.41 (0.85, 2.33)	1.68 (0.85, 3.31)	<b>2.76 (1.95, 3.90)</b>
Illicit drug use	1.39 (0.76, 2.55)	1.23 (0.46, 3.28)	<b>2.01 (1.31, 3.07)</b>
Smoking	1.06 (0.63, 1.79)	<b>2.13 (1.07, 4.22)</b>	1.27 (0.87, 1.85)
ETSE	1.36 (0.86, 2.15)	1.01 (0.54, 1.87)	<b>1.75 (1.23, 2.47)</b>
Depression <sup>b</sup> – B (SE)	<b>3.84 (1.31)</b>	<b>4.61 (1.96)</b>	<b>9.57 (0.97)</b>
Pregnancy wantedness	1.02 (0.64, 1.64)	0.77 (0.39, 1.50)	0.82 (0.59, 1.15)
Pregnancy happiness <sup>c</sup> :			
Unhappy	0.81 (0.46, 1.45)	<b>2.34 (1.12, 4.88)</b>	1.14 (0.78, 1.69)
Very happy	0.91 (0.60, 1.39)	1.04 (0.51, 2.13)	<b>0.71 (0.51, 0.98)</b>
<b>Severe IPV</b>			
Maternal Age - B (SE) <sup>a</sup>	-0.97 (0.60)	0.22 (0.65)	-0.58 (0.56)
Relationship status <sup>a</sup>	0.88 (0.53, 1.45)	1.00 (0.58, 1.74)	1.02 (0.63, 1.64)
Maternal Education: <sup>a</sup>			
Less than high school	<b>2.00 (1.02, 3.94)</b>	0.92 (0.49, 1.72)	1.47 (0.86, 2.52)
High school graduate	1.74 (0.92, 3.31)	0.79 (0.45, 1.40)	0.88 (0.52, 1.50)
Alcohol use	<b>3.05 (1.85, 5.01)</b>	<b>2.53 (1.49, 4.29)</b>	<b>4.03 (2.59, 6.27)</b>



Illicit drug use	<b>1.89 (1.02, 3.50)</b>	1.47 (0.72, 3.01)	<b>3.05 (1.83, 5.06)</b>
Smoking	1.38 (0.79, 2.43)	1.05 (0.56, 1.98)	<b>1.78 (1.10, 2.91)</b>
ETSE	<b>1.99 (1.11, 3.57)</b>	<b>2.43 (1.28, 4.64)</b>	1.39 (0.85, 2.27)
Depression <sup>b</sup> – B (SE)	<b>6.79 (1.51)</b>	<b>7.87 (1.61)</b>	<b>9.59 (1.39)</b>
Pregnancy wantedness	0.89 (0.53, 1.50)	0.98 (0.55, 1.74)	0.71 (0.45, 1.12)
Pregnancy happiness <sup>c</sup> :			
Unhappy	0.82 (0.43, 1.57)	1.76 (0.99, 3.16)	1.21 (0.72, 2.05)
Very happy	0.85 (0.52, 1.38)	0.76 (0.43, 1.34)	0.69 (0.43, 1.11)
<b>Physical IPV</b>			
Maternal Age - B (SE) <sup>a</sup>	<b>-1.05 (0.50)</b>	1.63 (0.84)	-0.69 (0.40)
Relationship status <sup>a</sup>	0.67 (0.44, 1.00)	0.84 (0.42, 1.71)	0.89 (0.63, 1.27)
Maternal Education: <sup>a</sup>			
Less than high school	1.68 (0.98, 2.88)	<b>0.35 (0.14, 0.86)</b>	1.34 (0.90, 2.00)
High school graduate	1.53 (0.92, 2.52)	0.59 (0.30, 1.16)	0.95 (0.65, 1.39)
Alcohol use	<b>1.63 (1.02, 2.60)</b>	<b>2.04 (1.00, 4.13)</b>	<b>2.89 (2.03, 4.11)</b>
Illicit drug use	1.24 (0.69, 2.23)	1.15 (0.39, 3.37)	<b>2.08 (1.35, 3.19)</b>
Smoking	0.98 (0.59, 1.61)	1.16 (0.51, 2.63)	1.26 (0.86, 1.85)
ETSE	<b>1.57 (1.01, 2.45)</b>	1.81 (0.86, 3.81)	<b>1.74 (1.21, 2.48)</b>
Depression <sup>b</sup> – B (SE)	<b>5.18 (1.25)</b>	<b>7.51 (2.10)</b>	<b>9.16 (1.01)</b>
Pregnancy wantedness	0.82 (0.53, 1.27)	1.09 (0.50, 2.36)	0.76 (0.54, 1.08)
Pregnancy happiness <sup>c</sup> :			
Unhappy	0.81 (0.48, 1.39)	1.39 (0.59, 3.25)	1.23 (0.83, 1.81)
Very happy	0.78 (0.52, 1.16)	1.25 (0.61, 2.55)	<b>0.67 (0.48, 0.94)</b>
<b>Sexual IPV</b>			
Maternal Age - B (SE) <sup>a</sup>	-1.38 (0.88)	1.15 (0.61)	-0.99 (0.69)
Relationship status <sup>a</sup>	0.92 (0.44, 1.92)	0.87 (0.53, 1.44)	2.05 (1.00, 4.21)
Maternal Education: <sup>a</sup>			
Less than high school	2.42 (0.87, 6.73)	0.57 (0.33, 1.00)	1.29 (0.65, 2.58)
High school graduate	1.67 (0.61, 4.57)	<b>0.39 (0.23, 0.67)</b>	0.96 (0.50, 1.86)
Alcohol use	1.69 (0.79, 3.60)	<b>2.17 (1.33, 3.53)</b>	<b>3.06 (1.79, 5.23)</b>
Illicit drug use	1.99 (0.87, 4.54)	1.42 (0.73, 2.76)	<b>2.11 (1.11, 4.01)</b>
Smoking	1.97 (0.92, 4.24)	<b>1.80 (1.04, 3.10)</b>	<b>1.94 (1.07, 3.53)</b>
ETSE	1.31 (0.58, 2.93)	1.25 (0.74, 2.11)	<b>2.42 (1.16, 5.02)</b>
Depression <sup>b</sup> – B (SE)	<b>6.91 (2.23)</b>	<b>7.18 (1.55)</b>	<b>8.83 (1.73)</b>
Pregnancy wantedness	2.70 (0.94, 7.76)	0.69 (0.42, 1.16)	1.19 (0.64, 2.21)
Pregnancy happiness <sup>c</sup> :			
Unhappy	0.31 (0.07, 1.36)	1.65 (0.95, 2.86)	1.14 (0.58, 2.25)
Very happy	1.49 (0.76, 2.94)	0.77 (0.45, 1.32)	1.11 (0.63, 1.95)

621 Note. The odds ratios are adjusted for maternal age, maternal education, and relationships status

622 <sup>a</sup> These relationships are bivariate between age, relationship status and maternal education and the different  
623 forms of IPV

624

625 <sup>b</sup> Depression is a continuous variable; therefore, the coefficients presented are from a linear regression

626   <sup>c</sup> Moderately happy category is the reference group  
627  
628

629 Table 3. Adjusted odds ratios (95% confidence intervals) in the model associating pregnancy-  
 630 related outcomes and IPV forms (any IPV)  
 631

Pregnancy outcomes	Perpetrator only	Victim only	Reciprocal
<b>Any IPV</b>			
PTB (< 37 weeks)	0.74 (0.36, 1.53)	1.52 (0.68, 3.36)	1.40 (0.87, 2.23)
VPTB (< 34 weeks)	0.61 (0.13, 2.76)	2.93 (0.90, 9.54)	2.06 (0.92, 4.58)
LBW (< 2,500 grams)	0.89 (0.44, 1.72)	<b>2.21 (1.04, 4.72)</b>	1.07 (0.49, 1.48)
VLBW (< 1,500 grams)	NE <sup>a</sup>	<b>4.54 (1.06, 19.44)</b>	1.72 (0.51, 5.81)
SGA	0.87 (0.49, 1.56)	1.85 (0.92, 3.72)	0.62 (0.38, 1.00)
<b>Minor IPV</b>			
PTB (< 37 weeks)	0.89 (0.46, 1.75)	1.64 (0.76, 3.55)	1.33 (0.82, 2.15)
VPTB (< 34 weeks)	0.61 (0.13, 2.76)	<b>3.66 (1.22, 10.97)</b>	2.01 (0.89, 4.56)
LBW (< 2,500 grams)	1.02 (0.53, 1.94)	1.83 (0.84, 3.98)	0.96 (0.57, 1.61)
VLBW (< 1,500 grams)	NE <sup>a</sup>	4.24 (0.98, 18.30)	1.87 (0.55, 6.32)
SGA	0.87 (0.49, 1.55)	1.81 (0.90, 3.63)	<b>0.59 (0.36, 0.96)</b>
<b>Severe IPV</b>			
PTB (< 37 weeks)	0.75 (0.63, 2.62)	1.28 (0.75, 2.57)	1.39 (0.57, 1.26)
VPTB (< 34 weeks)	0.31 (0.04, 2.39)	<b>2.78 (1.10, 7.06)</b>	1.13 (0.37, 3.46)
LBW (< 2,500 grams)	0.51 (0.21, 1.25)	1.66 (0.84, 3.28)	1.06 (0.54, 2.07)
VLBW (< 1,500 grams)	1.07 (0.13, 8.74)	3.28 (0.85, 12.65)	0.81 (0.10, 6.59)
SGA	<b>0.40 (0.17, 0.95)</b>	0.92 (0.45, 1.89)	0.88 (0.47, 1.65)
<b>Physical IPV</b>			
PTB (< 37 weeks)	0.74 (0.37, 1.47)	1.41 (0.58, 3.41)	<b>1.60 (1.00, 2.57)</b>
VPTB (< 34 weeks)	0.54 (0.12, 2.43)	<b>3.52 (1.06, 11.65)</b>	2.15 (0.96, 4.79)
LBW (< 2,500 grams)	0.72 (0.36, 1.45)	<b>2.49 (1.13, 5.52)</b>	1.28 (0.77, 2.13)
VLBW (< 1,500 grams)	NE <sup>a</sup>	<b>5.67 (1.29, 25.02)</b>	2.06 (0.61, 6.98)
SGA	0.75 (0.43, 1.34)	1.62 (0.75, 3.48)	0.65 (0.39, 1.05)
<b>Sexual IPV</b>			
PTB (< 37 weeks)	1.30 (0.52, 3.28)	1.08 (0.55, 2.13)	0.98 (0.44, 2.21)
VPTB (< 34 weeks)	0.67 (0.09, 5.25)	1.57 (0.56, 4.36)	1.30 (0.36, 4.67)
LBW (< 2,500 grams)	1.21 (0.47, 3.06)	1.12 (0.55, 2.26)	0.61 (0.23, 1.62)
VLBW (< 1,500 grams)	2.43 (0.29, 20.54)	<b>3.74 (1.09, 12.85)</b>	NE <sup>a</sup>
SGA	0.62 (0.21, 1.81)	1.32 (0.71, 2.45)	0.77 (0.33, 1.77)

632 Note: The odds ratios are adjusted for maternal age, maternal education, relationship status, care group and  
 633 baseline risk factors (the latter only if they attained a significant association with the outcome at the p ≤ .01  
 634 level)

635 <sup>a</sup> NE – Not estimated because no women participating in reciprocal violence delivered a VLBW infant..