Intimate Partner Violence, Substance Use, and Adverse Neonatal Outcomes among Urban Women

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Objective To assess the prevalence of intimate partner violence, substance use, and their co-occurrence during pregnancy and to examine their associations with adverse neonatal outcomes.

Study design Between February 2009-February 2010, pregnant women receiving obstetrical care at 3 urban clinics were screened for intimate partner violence and substance use between 24-28 weeks gestation. A chart review was conducted upon delivery to assess for adverse neonatal outcomes of low birth weight, preterm birth, and small for gestational age (SGA).

Results Maternal and neonatal data were collected on 166 mothers and their neonates. Overall, 19% of the sample reported intimate partner violence during their pregnancies. Of the study's neonates, 41% had at least 1 adverse neonatal outcome. Nearly one-half of the mothers reported using at least 1 substance during pregnancy. Women experiencing intimate partner violence had a higher prevalence of marijuana use than their nonabused counterparts ($P < .01$). Experiencing intimate partner violence was associated with a 4-fold increase in having a SGA neonate (aOR = 4.00; 95% CI 1.58-9.97). Women who reported marijuana use had 5 times the odds of having a neonate classified as SGA (aOR = 5.16, 95% CI 2.24-11.89) or low birth weight (aOR 5.00; 95% CI 1.98-12.65).

Conclusions The prevalence of intimate partner violence during pregnancy and substance use is high in urban mothers, the risks of which extend to their neonates. Pediatric providers are urged to routinely screen for both issues and recognize the impact of co-occurrence of these risk factors on poor neonatal and childhood outcomes. *(J Pediatr 2013;163:471-6)*.

Intimate partner violence is a public health issue existing in most countries, occurring across all demographic, ethnic, cultural, and socioeconomic strata. Women of child-bearing age are at the highest risk for intimate partner violence, and pregnancy may represent a period of unique vulnerability to intimate partner violence because of changes in women's physical, social, emotional, and financial needs. Previous research has reported a wide range of prevalence of abuse during pregnancy (0.9%-20.1%),[1] though the majority of studies have found prevalence ranging from 3.9% to 8.3%.[2,3] Variations in the prevalence of abuse during pregnancy are in part due to differences in the definition and measurement of intimate partner violence, study sample characteristics, and potential causal pathways.

Intimate partner violence during pregnancy confers considerable risk to the health of the woman and her unborn child. Low pregnancy weight gain, anemia, infections, bleeding in the first and second trimester, preterm labor, high blood pressure, edema, severe nausea, vomiting or dehydration, urinary tract infection, as well as hospital visits related to such morbidity are positively correlated with intimate partner violence.[4] Preterm birth, uterine rupture, hemorrhage, an infant requiring intensive care unit care, and maternal or fetal death are also associated with exposure to intimate partner violence during pregnancy.[5] There is a significant relationship between intimate partner violence during pregnancy and delivering a low birth weight (LBW) neonate.[4,6] Meta-analyses of intimate partner violence-pregnancy studies found women experiencing intimate partner violence during pregnancy were at increased risk for preterm birth and delivering a LBW neonate.[7,8]

There is a substantial impact of intimate partner violence on women's health behaviors during pregnancy, which, in turn, impact maternal and birth outcomes. Smoking is more common among abused pregnant women than their nonabused counterparts.[9,10] Increased use of other illicit substances in pregnant women experiencing intimate partner violence also has been demonstrated.[11-13]

Research has examined a link between tobacco use and illicit drug use and adverse pregnancy outcomes, with divergent results. Tobacco use during pregnancy is associated with an increased risk of LBW, preterm birth, and neonates who are small for gestational age (SGA).[14-16] Studies of an association between marijuana use during pregnancy and adverse neonatal outcomes were inconclusive, with

HPA	Hypothalamic-pituitary-adrenal
LBW	Low birth weight
SGA	Small for gestational age

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some studies reporting adverse effects including LBW, preterm birth and SGA,[17] and other studies found no association.[18] The divergent findings may be in part due to a wide variation in reported prevalence of marijuana use as well as varied consideration of potential confounding variables across studies making comparisons difficult. The preponderance of evidence supports associations between the use of cocaine, crack cocaine, heroin, methamphetamine, and LBW, preterm birth, and SGA.[19-22]

Little is known regarding the manner in which the co-occurrence of intimate partner violence and substance use during pregnancy influences the growth rate of the fetus. SGA neonates are at increased risk of preterm delivery and childhood developmental and behavorial problems. Furthermore SGA is associated with increased rates of coronary heart disease, stroke, noninsulin dependent diabetes mellitus, adiposity, and metabolic syndrome in later life.[23-25]

Although limited, extant research has provided support for a relationship between intimate partner violence and risk of giving birth to a SGA neonate in developing countries.[26] Urquia et al[27] examined intimate partner violence during pregnancy and SGA in a Canadian population-based survey and did not find a relationship, perhaps due in part to the low reported prevalence of intimate partner violence during pregnancy (3.3%). Yet, experiencing intimate partner violence was associated with an increased risk of delivering a SGA neonate after adjusting for income and race/ethnicity in a sample of pregnant women in Vancouver, British Columbia (aOR 3.06, 95% CI 1.02-9.14), but the relationship did not hold after additional adjustment for alcohol, drug, or tobacco use.[28]

The purpose of this study was to examine the influence of intimate partner violence during pregnancy, tobacco use, and illicit substance use on adverse neonatal outcomes (eg, LBW, SGA, preterm birth). By focusing on a group of women who are already at risk for health disparities in neonatal outcomes, we sought to provide further insight into possible avenues to address and mitigate any added risk for poor infant outcomes.

Methods

This prospective longitudinal study used a convenience sample of pregnant women recruited from 3 obstetrical clinics in Baltimore, Maryland. The 3 clinics were all affiliated with a major university health care system and served a predominantly low-socioeconomic, minority, urban population. Eligible participants were at least 16 years of age, spoke English as their primary language, and were between 24-28 weeks gestation at the time of data collection. Exclusion criteria included a history of fetal or infant death, use of tocolytic therapy prior to 28 weeks gestation, or a known chronic medical condition (eg, chronic hypertension, preeclampsia diagnosed before 28 weeks, diabetes mellitus, clotting disorder). These exclusion criteria were assigned given their known contribution to adverse neonatal outcomes.[29,30]

The study protocol and informed consent received institutional review board approval from the Johns Hopkins Medical Institutions. Eligible participants were approached about study participation during their prenatal care appointments. After a complete description of the study, informed consent was obtained and participants were interviewed in a private space with only the researcher and the participant present. The survey generally took 30-45 minutes to complete, and all women completed it during the wait-time for their appointments. Participants were compensated $15 for their participation.

Outcome measures related to neonatal outcomes were extracted from electronic chart review within 48 hours after delivery. Measures specific to maternal physical health risk factors (eg, preeclampsia) were also extracted at this time, in case these developed after the initial time point of data collection (ie, between 24-28 weeks gestation).

Of the 174 eligible pregnant women approached to participate, 167 (96%) completed the survey composed of field-tested instruments. One participant delivered at an outside hospital, which precluded the ability to obtain accurate birth outcomes. Thus, the final sample consisted of 166 low-income women and their neonates.

Outcome Variables

Outcomes of interest for this analysis pertained directly to neonatal outcomes, which were obtained through an electronic chart review within 48 hours of delivery. Birth weight (g) and gestational age (weeks) were taken directly from the chart. LBW was assigned if the neonate weighed <2500 g, and preterm birth was assigned if the neonate was born at <37 completed weeks of gestation. Intrauterine growth was then calculated by relating neonatal birth weight to the gestational age at birth against reference curves. We used comprehensive reference values of birth weight based on a national sample of over 6 million infants.[31] Gestational age was determined by ultrasound dating, which was performed on every participant in the first trimester. An infant was considered SGA if intrauterine growth was less than 10% of the normal curve for his/her gestational age. The classifications of LBW, preterm birth, or SGA were not mutually exclusive, but each was analyzed as an adverse neonatal outcome.

Possible Correlates of Adverse Neonatal Outcomes

Data on sociodemographic variables including age, race, marital status, education, and income were gathered. Total household annual income was dichotomized using the median of <$10 000 and >$10 000. Additional predictors for adverse neonatal outcomes included maternal data specific to the current pregnancy as well as previous pregnancies. These included parity, number of term births, number of therapeutic and/or spontaneous abortions, number of live children, and presence of preeclampsia.

Another potentially predictive factor included substance use. Self-reported data was collected on: (1) cigarette smoking (or tobacco use); (2) marijuana use; and (3) crack cocaine, cocaine, methamphetamine, and/or heroin use since learning of the current pregnancy. Responses for each type (tobacco, marijuana, cocaine/methamphetamine/heroin) were dichotomized as "no use" or "use" during this pregnancy.