

Intimate-Partner Homicide Among Pregnant and Postpartum Women

Diana Cheng, MD, and Isabelle L. Horon, DrPH

OBJECTIVE: To identify pregnancy-associated homicide cases and to estimate the proportion that were perpetrated by a current or former intimate partner.

METHODS: This was an analysis of pregnancy-associated homicides occurring from 1993 to 2008 among Maryland residents using linked birth and death certificates, medical examiner charts, police records, and news publications.

RESULTS: Homicides (n=110) were the leading cause of death during pregnancy and the first postpartum year. Women who were African American, younger than 25 years, and unmarried were at the highest risk for homicide. Firearms were the most common (61.8%) method of death. A current or former intimate partner was the perpetrator in 54.5% (n=60) of homicide deaths and a nonpartner in 31.8% (n=35). If the cases (n=15) in which the victim-offender relationship could not be identified are excluded, 63.2% of homicides were committed by an intimate partner. Compared with homicides in which the perpetrator was not an intimate partner, a significantly higher percentage ($P<.05$) of intimate-partner homicides occurred at home (66.7% compared with 28.6%), among women who had completed more than 12 years of education (23.3% compared with 5.7%), and who were married (28.3% compared with 8.6%). Intimate-partner homicides were most prevalent (25.0%) during the first 3 months of pregnancy and least prevalent during the first 3 months postpartum (5.0%).

CONCLUSION: The majority of pregnancy-associated homicides were committed by current or former intimate partners, most commonly during the first 3 months of

pregnancy. Efforts to protect women from partners optimally should begin before conception or very early in pregnancy.

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LEVEL OF EVIDENCE: III

Studies within the past two decades have shown that homicide is a leading cause of pregnancy-associated death,¹⁻⁷ defined by the American College of Obstetricians and Gynecologists (the College)/Centers for Disease Control and Prevention Maternal Mortality Study Group as a death from any cause occurring during pregnancy or within 1 year of pregnancy delivery or pregnancy termination regardless of the site or duration of the pregnancy.⁸ Unlike the medical causes of maternal mortality, such as hemorrhage and thromboembolism, homicides do not have a physiologic relationship to pregnancy. Nevertheless, some homicides, especially those due to intimate-partner violence, may not have occurred if the victim had not been pregnant. The prevention of intimate-partner homicide therefore could have a major effect on reducing the overall rate of pregnancy-associated mortality.

Unfortunately, population-based data on the proportion of pregnancy-associated homicides that are due to intimate-partner violence are nearly nonexistent. Studies done among pregnant and postpartum women in North Carolina⁹ and postpartum women in Georgia¹⁰ conclude that intimate-partner homicide was responsible for 36% to 38% of female homicides, respectively, although the total number of homicides studied in both states was small (n<30). Intimate-partner homicide made up at least 17% of 72 pregnancy-associated homicide cases in New York City, but perpetrator information was missing for the majority of cases.⁵ A common barrier inherent in the study of pregnancy-associated intimate-partner homicide is the need for supplemental data sources from multiple disciplines to establish both pregnancy status

From the Center for Maternal and Child Health and the Vital Statistics Administration, Maryland Department of Health and Mental Hygiene, Baltimore, Maryland.

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Corresponding author: Diana Cheng, MD, Maryland Department of Health and Mental Hygiene, 201 W. Preston Street, Baltimore, MD 21201; e-mail: chengd@dhmh.state.md.us.

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and perpetrator relationship to a homicide victim. Reliance on death certificate information alone to identify these deaths is problematic because these records are unlikely to indicate that a decedent was pregnant or had delivered recently and because domestic violence is not reported as a contributing cause of death.

Our objective in the current study was to use multiple surveillance methods to identify pregnancy-associated homicide cases among Maryland residents and to estimate the proportion that were perpetrated by a current or former intimate partner. Associated risk factors for these deaths also were examined.

MATERIALS AND METHODS

Data on pregnancy-associated deaths occurring among Maryland residents during the years 1993 through 2008 were collected from three main sources: 1) review of death certificates to identify those records in which a current or recent pregnancy could be identified through either cause-of-death information or a completed pregnancy checkbox, 2) linkage of death certificates of reproductive-aged women with corresponding live birth and fetal death records to identify a pregnancy within the year preceding death, and 3) review of medical examiner records for evidence of a current or recent pregnancy on the autopsy report or in the accompanying police record because all homicide victims in Maryland are examined routinely. Maternal race, ethnicity, age, level of education, marital status, and cause of death were obtained from death certificates. Birth and fetal death certificates for women who died during the postpartum period provided information on the date of the most recent delivery. Medical examiner autopsy records included information to estimate gestational age at the time of death. Information pertaining to the victim-perpetrator relationship was obtained primarily through local police records.

A death was categorized as a pregnancy-associated intimate-partner homicide if: 1) the perpetrator was a married person living with or estranged from his spouse or a current/former cohabiting intimate partner (including intimate partners of the same sex), in keeping with the definition of an intimate partner used by the Maryland Uniform Crime Reporting Program; and 2) the victim was a Maryland resident during pregnancy or within 1 year of delivery or pregnancy termination. This included pregnancies ending in live birth and fetal death, spontaneous or therapeutic abortion, ectopic pregnancy, and other nonviable outcomes. All homicide victims were Maryland residents at the time of death. However, the

pregnancy within the year before death and the death itself need not have occurred in Maryland.

Although not collected specifically for this study, we accumulated articles and documents from newspapers, obituaries, circuit court proceedings, and local police and sheriff's offices that were of interest to our work on pregnancy-associated mortality. These documents were available to us for 38.2% of our homicide cases, and we used them to confirm information about the crime, perpetrator relationship, and pregnancy status. In three out-of-state deaths or deliveries, we relied on the newspaper or court documents as the sole source of pregnancy or perpetrator status.

The Maryland Department of Health and Mental Hygiene's institutional review board qualified this project as exempt research. Analyses were performed using SAS 9.2 (SAS Institute Inc., Cary, NC). The Fisher exact test was used to compare categorical variables. Statistical significance was set at $P < .05$.

RESULTS

Homicide ($n=110$) was the leading cause of pregnancy-associated death and accounted for 17% of deaths among Maryland residents occurring between 1993 and 2008, followed by cardiac disorders (16%) and accidents (11%). The perpetrator was identified in 95 of the 110 pregnancy-associated homicides and was found to be an intimate partner in 54.5% (95% confidence interval [CI] 42.5–63.9%, $n=60$) of total homicide deaths and a nonpartner in 31.8% (95% CI 23.1–40.5%, $n=35$). The remaining 15 cases (13.6%) were either unsolved or unavailable for review (Table 1). Therefore, for homicides in which the victim-to-offender relationship could be identified, 63.2% (95% CI 53.5–72.9%) were intimate-partner homicide cases. Firearms were the most common method of injury (61.8%), accounting for more deaths than all other methods combined in both intimate-partner and non-intimate-partner homicide cases. None of the fetuses survived the deaths of their mothers during pregnancy. Records from the local police were used to determine perpetrator status for all but two cases. An official court document was used to identify the perpetrator in one of these homicides, and a newspaper obituary was used to identify the perpetrator in the other.

The 66 cases of homicide in nonpregnant women (Table 2) included 64 women who had delivered liveborn neonates and two women whose fetuses were stillborn in the year before death. One woman was both 19 weeks pregnant and less than a year postpartum at the time of her death. She was categorized as pregnant at the time of death so as not to be



Table 1. Demographic Characteristics of Women Dying as a Result of Pregnancy-Associated Homicide by Perpetrator, 1993–2008, and Demographic Characteristics of All Women Delivering Live Born Neonates, 2000, Maryland

	Pregnancy-Associated Homicide				P
	Maryland Live Births, 2000 (N=74,226)	Total* (n=110)	Known Perpetrator		
			Intimate Partner (n=60)	Nonpartner (n=35)	
Race					.33
White [†]	61.0	27.3	31.7	22.9	
African American	33.1	71.8	68.3	74.3	
Asian	4.9	0.9	0	2.9	
Other	1.0	0	0	0	
Age (y)					.34
Younger than 20	9.9	24.5	23.3	28.6	
20–24	19.5	38.2	38.3	37.1	
25–29	25.2	17.3	15.0	22.9	
30–34	27.4	13.6	13.3	11.4	
35 or older	17.9	6.4	10.0	0	
Education (y)					.02
12 or fewer	43.1	81.8	73.3	94.3	
More than 12	55.3	16.4	23.3	5.7	
Not stated	1.7	1.8	3.3	0	
Marital status					.02
Married	65.3	20.0	28.3	8.6	
Unmarried	34.6	79.1	70.0	91.4	
Not stated	<1.0	0.9	1.7	0	

Data are % unless otherwise specified.

* Includes 15 cases with unknown perpetrator.

† Includes two Hispanic intimate-partner cases and one Hispanic non-intimate-partner case.

counted twice. Medical examiner records were used to identify deaths occurring during pregnancy. A matched birth certificate was available for 63 of the 64 deaths that occurred after a live birth. The missing certificate was most likely from a birth that occurred outside of Maryland. A published newspaper article was the sole method used to identify the postpartum status of one woman who was a Maryland resident at the time of death but was not a resident of Maryland when she delivered. Although information on initiation of prenatal care was missing in 15.6% of cases of postpartum live-birth intimate-partner homicide, all remaining women had had prenatal care during their most recent pregnancies; 70.4% initiated care during the first trimester and 25.9% during the second trimester.

Victims of both intimate-partner homicide and nonpartner homicides were more likely to be African American, younger than 25 years, and unmarried. Women in the intimate-partner-homicide group were significantly more likely ($P<.05$) to have completed more than 12 years of education than were those in the non-intimate-partner-homicide group (23.3% compared with 5.7%), be married (28.3% compared with 8.6%), and be murdered in their homes (66.7% compared with 28.6%). Although the

differences were not significant, women in the intimate-partner-homicide group were more likely to be 30 years of age or older at the time of death (23.3% compared with 11.4%) than were those in the non-intimate-partner-homicide group (Table 1) and more likely to have died during the first 3 months of pregnancy (25% compared with 11.4%) (Table 2). None of the intimate-partner homicides during early pregnancy occurred before the second month.

The pregnancy-associated homicide ratio, defined as the number of homicides during pregnancy or within the first postpartum year per 100,000 births, was 9.3 per 100,000 births for total homicides and 5.1 per 100,000 births for intimate-partner homicide cases. The ratio for intimate-partner homicide cases was approximately four times higher among African-American women than white women (10.4 compared with 2.7). African-American women younger than 25 years were at highest risk, with a ratio of 16.7 per 100,000 births (Table 3).

DISCUSSION

More than half of all Maryland pregnancy-associated homicides were committed by a current or former husband or intimate partner. This proportion is



Table 2. Circumstances of Death for Women Dying as a Result of Pregnancy-Associated Homicide by Perpetrator, Maryland, 1993–2008

	Pregnancy-Associated Homicide			P
	Total* (n=110)	Known Perpetrator		
		Intimate Partner (n=60)	Nonpartner (n=35)	
Method of injury				.87
Firearm	61.8	61.7	60.0	
Sharp object/stabbing	18.2	18.3	17.1	
Strangulation	10.0	11.7	8.6	
Blunt object/beatings	6.4	5.0	11.4	
Other	3.6	3.3	2.9	
Place of fatal injury				<.001
Residence, victim	50.0	66.7	28.6	
Residence, family/friend	3.6	6.7	0	
Other	35.5	23.3	57.1	
Not stated	10.9	3.3	14.3	
Timing of death				.15
During pregnancy (mo)	39.1	46.7	31.4	
1st to 3rd	19.1	25.0	11.4	
4th to 6th	14.5	13.3	17.1	
7th to 9th	5.5	8.3	2.9	
Postpartum (mo)	60.9	53.3	68.6	
1st to 3rd	10.9	5.0	20.0	
4th to 6th	9.1	6.7	14.3	
7th to 9th	20.0	20.0	17.1	
10th to 12th	20.9	21.7	17.1	

Data are % unless otherwise specified.

* Includes 15 cases with unknown perpetrator.

higher than the 16% to 38% reported in previously published studies that assessed pregnancy-associated intimate-partner homicides.^{5,9,10} National estimates of intimate-partner homicide in the general female population from the Federal Bureau of Investigation's "Supplementary Homicide Reports" indicate that current spouses, ex-spouses, or current intimate partners were responsible for approximately 30% of all homicides among American women (pregnant and non-pregnant) between 1993 and 2005.¹¹ However, the exclusion of ex-intimate partners likely underestimates the number of intimate-partner homicide cases.

Table 3. Race-Specific Pregnancy-Associated Intimate-Partner-Homicide Ratios* by Age, Maryland, 1993–2008

	Total	White [†]	African American	P
Total	60 (5.1)	19 (2.7)	41 (10.4)	<.001
Age (y)				<.001
Younger than 25	37 (7.8)	10 (5.7)	27 (16.7)	
25 or older	23 (2.8)	9 (1.7)	14 (6.0)	

Data are n (ratio) unless otherwise specified.

* Number of homicides per 100,000 live births.

[†] Includes two Hispanic women.

Recent data from the Maryland State Police's Uniform Crime Report includes ex-partners but gave similar results, showing that current or former intimate partners were responsible for 27.7% of female homicides in Maryland from 2007 to 2008.¹² Data for these government reports often are submitted by law-enforcement agencies before investigations are complete, leading to potential misclassifications and missing information about the perpetrator. Campbell's review of intimate-partner-homicide research shows that, when misclassifications are accounted for, most femicide studies estimate that 40% to 50% of homicides are due to intimate-partner violence.¹³ Morocco reports that 50% of homicides in North Carolina among women 15 years of age or older were due to intimate-partner violence.¹⁴ These higher proportions of intimate-partner homicide approximate the rate we found in our study of pregnancy-associated homicide cases.

Our current study shows a greater than fivefold higher pregnancy-associated homicide ratio than that reported by the only national study published¹ of pregnancy-associated homicides (9.3 in Maryland compared with 1.7 in the national study) and a nearly twofold higher proportion of homicide deaths occur-



ring during pregnancy (40% in Maryland compared with 21% in the national study). We attribute these differences to our use of multiple data systems, especially medical examiner records, which identified a large proportion of deaths during pregnancy. As Chang and colleagues acknowledge, the data set used for the national study is based on reports from states, few of which do enhanced surveillance of pregnancy-associated deaths. The higher Maryland figures also may be due in part to the high homicide rates in Baltimore City and the Washington, DC, area. In 2007, Maryland ranked 16th highest among states for homicide rates involving one female victim and one offender.¹⁵

Previous studies on pregnancy-associated homicide have not analyzed the occurrence of homicide by time interval during pregnancy or after delivery. If there were no association of homicide with pregnancy, we would expect approximately 14.3% of homicides to occur during each of the roughly seven equal time intervals we studied (three 3-month periods of pregnancy and four 3-month periods after delivery). The prevalence of intimate-partner homicide cases varied greatly with each 3-month time period, peaking at 25.0% during the first 3 months of pregnancy and decreasing to 5.0% during the first 3 months postpartum. When intimate-partner homicide during pregnancy is viewed as a whole, the high prevalence of intimate-partner homicide during the first trimester is offset by the low rates during the third trimester (8.3%). This may lead to an erroneous assumption that pregnancy offers protection against violence and obscures the possibility that the first trimester may be a high risk time for intimate-partner homicide, potentially triggering violence by the partner after the discovery of the pregnancy. Although the differences did not reach statistical significance, non-partner homicides did not peak during the first trimester but were more evenly distributed (11.4–20.0%) over each of the seven 3-month intervals during pregnancy and the postpartum year, except the third trimester of pregnancy (2.9%).

Our finding that intimate-partner homicide most commonly occurs during the first 3 months of pregnancy makes screening for violence especially important before conception and early in pregnancy. Campbell and colleagues report that 79% of female intimate-partner homicide victims ages 18–50 had been physically abused by the same perpetrator on one or more occasions before death.¹⁶ Moreover, the prenatal period may be an especially vulnerable time for women. In a case-controlled study, McFarlane and colleagues report that women who were abused dur-

ing pregnancy had three times the risk of homicide as did women who were not abused.¹⁷ All postpartum victims in our study with known prenatal care status had received prenatal care. This provides obstetricians an opportune time to assess routinely all prenatal patients for domestic violence during the initial visit, at each trimester of pregnancy, and at the postpartum visit as recommended by the College.¹⁸ Incorporation of the abuse assessment into the medical-history record helps to standardize the screen so that it has a better chance of being completed routinely.¹⁹ There are many screens for intimate-partner violence. One three-question assessment is presented below²⁰ and also is available from the College's Web site²¹:

1. "Within the past year (or since you have been pregnant) have you been hit, slapped, kicked or otherwise physically hurt by someone?"
2. Are you in a relationship with a person who threatens or physically hurts you?"
3. Has anyone forced you to have sexual activities that made you feel uncomfortable?"

If a patient discloses violence, the trauma should be acknowledged, safety assessed, and assurance made that she is not responsible for the abuse. Educational materials and referral sources such as local shelters, hotline numbers, safety plans, and advocacy agencies, should be handed to the patient or made available in restrooms where they can be retrieved privately.

Women at risk of pregnancy-associated intimate-partner homicide may need safety planning. Firearms caused the deaths of nearly two thirds of intimate-partner homicide victims in our study, and gun ownership by an intimate partner is associated with a greater risk of danger or fatal outcome to women.²² Also, two out of every three intimate-partner homicide deaths in this study occurred at home. Safety planning that includes alternate living arrangements may be necessary for many women.

Limitations of this retrospective study include possible coding and reporting errors on birth and death certificates, which were the primary sources of our demographic and delivery data. In a study assessing concordance between data on HealthStart prenatal records and the birth certificate, Reichman reports accurate sociodemographic data.²³ As with all maternal mortality surveillance, our numbers very likely still reflect an undercount of deaths during pregnancy and postpartum. Deaths that occurred among Maryland residents who were residents of other states when they delivered but moved to Maryland before they died would not be identified with our linked death



and birth certificate surveillance because we would not routinely have access to a birth certificate from an out-of-state resident. Most early pregnancies also are undercounted because they are not commonly identified on routine autopsy records before 6 weeks of gestation. Deaths after a spontaneous or therapeutic abortion, ectopic pregnancy, or other nonviable pregnancy also are underestimated owing to the lack of accessible information about these events.

During the past century, the United States has had remarkable success in the dramatic reduction of maternal mortality from deaths due to hemorrhage, embolism, infection, and hypertension. As we continue our important work on reducing deaths from these causes, we must also recognize that pregnant and postpartum women are dying not only from physiologic causes but also from social causes such as intimate-partner violence. Informing women about the potentially fatal outcome of violence during pregnancy, especially during the first trimester, may motivate some women to obtain help before pregnancy. More importantly, women in an already tumultuous or abusive relationship should not become pregnant in the hopes that having a baby will stop the perpetuation of violence. For some women, this can be a fatal mistake. The obstetric field is uniquely positioned to play an important role in keeping women safe by screening for domestic violence before, during, and after pregnancy.

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