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Abstract

To describe the epidemiology of intimate partner violence (IPV) homicide in Massachusetts, an IPV mortality data set developed by the Massachusetts Department of Public Health was analyzed. The rates of death were estimated by dividing the number of decedents over the aged-matched population and Poisson regression was used to estimate the contribution of race, ethnicity, and foreign-born status to the risk of dying from IPV. Out of the total 270 women whose deaths were associated with IPV, 239 (89%) were killed by a male partner. Black women had a risk of dying from IPV of 16.2 per 1,000,000 person-years. Hispanic women also had a higher risk of dying from IPV than non-Hispanic women; incidence risk ratio of 9.7 (Poisson regression 95% confidence interval 6.8-13.8). IPV femicide disproportionately affected Black and Hispanic women. Agencies must consider the importance of providing culturally appropriate services to IPV survivors and their community.

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sexual assault and domestic violence, domestic violence and cultural contexts, predicting domestic violence

Introduction

Intimate partner violence (IPV) is defined as physical, sexual, psychological, or emotional violence, or threat of violence, perpetrated by a current or former partner. It can occur along a continuum ranging from one violent event to ongoing abuse (Saltzman, Fanslow, McMahon, & Shelley, 2002). IPV often occurs concurrently with child abuse and is a common and serious public health problem (McCloskey, Figueredo, & Koss, 1995). The National Violence Against Women Survey estimates that 1.5 million women are raped or physically assaulted annually in the United States by an intimate partner. Thirty-nine percent of assaulted women are injured, and one third of these require medical attention (Tjaden & Thoennes, 1998). Women who survive IPV report poor health status, poor quality of life, and higher rates of health care system use and treatment cost than do other women (J. C. Campbell, 2002; Wisner, Gilmer, Saltzman, & Zink, 1999). Similar to national data (Rennison, 2003), women who do not survive IPV accounted for 43% of all female homicide victims in Massachusetts during 2003-2007 (Massachusetts Department of Public Health, 2009).

Certain races, ethnicities, and nationalities seem to experience higher rates of IPV than others. Sorenson, Upchurch, and Shen (1996) and Field and Caetano (2003) reported a higher prevalence of IPV among Black and Hispanic couples. American Indian women were more likely than other women to report physical assault (Malcoe, Duran, & Montgomery, 2004). Raj and Silverman (2002a, 2002b) found that foreign-born women with less acculturation and social isolation reported IPV injuries more often than did less-isolated women. The New York City Department of Health's Injury Prevention Research Program indicated that the percentage of African American, Latina, and foreign-born homicide victims was higher than in the general population (Wilt, 2000). These disparities have important implications for minority communities.

Few studies have quantified the association of race, ethnicity, and place of origin with the risk for death from IPV because often the relationship between the perpetrator and the decedent is undocumented in mortality databases. A study on national surveillance data using the Federal Bureau of Investigation's supplemental homicide reports suggest that deaths from IPV vary by race (e.g., higher among Black females) and geographic location

(e.g., higher in southern and western states; Paulozzi, Saltzman, Thopson, & Holmgreen, 2001). This study, which is now more than a decade old, does not account for homicides perpetrated by ex-boyfriends or ex-girlfriends (a narrower definition than what is defined as an intimate partner by the Centers for Disease Control and Prevention [CDC]) and is limited to files voluntarily reported by police agencies. In addition, this study and the National Family Violence Surveys suggest a steady decline in the incidence of IPV (Strauss & Gelles, 1986).

The current epidemiology and rate of IPV homicide in Massachusetts remains unknown. To guide allocation of resources in Massachusetts, the Governor's Commission on Domestic Violence (reestablished during 2007 as the Governor's Council to Address Sexual Assault and Domestic Violence) and the Commonwealth Fund/Harvard University Fellowship in Minority Health Policy conducted a study to describe the epidemiology of IPV femicide, estimate current rates of IPV femicide in the state, and determine whether racial and ethnic minority women and foreign-born women were at higher risk of dying from IPV than other women. As a secondary objective investigators also explored the association to the perpetrator and the mechanism of deaths attributed to IPV homicides among women.

Method

Risk for Death

To describe the epidemiology of IPV homicides among women in Massachusetts, we analyzed an IPV mortality data set developed by the Injury Surveillance Program (ISP) at the Massachusetts Department of Public Health. ISP identified cases of IPV deaths from *The Boston Globe* "In Memoriam" articles from 1993 to 2007 published on the last day of each year. *The Boston Globe* compiles this annual list from data provided by three Boston organizations: Jane Doe Inc., a nongovernment organization which focuses on sexual assault and domestic violence and provided data during 1993-2007; Peace at Home, a human rights organization which provided data during 1993-2005; and the Massachusetts Office for Victim Assistance which provided data during 2007. These agencies identified cases of IPV from multiple data sources including domestic violence advocacy agencies, news articles, the Federal Bureau of Investigation's supplemental homicide reports and district attorney reports. These annual lists describe publicly reported intimate partner homicides (excluding the perpetrators involved in murder-suicides) where criminal charges were filed during the same calendar year as the IPV deaths.

Intimate partner was defined as spouse, ex-spouse, boyfriend/girlfriend, ex-girlfriend/boyfriend, partner, ex-partner, and dating partner. Although Jane Doe Inc. has broadened its definition of IPV during the past 15 years, *The Boston Globe* has continued to publish deaths using the conventional definition of IPV as described here. ISP then validated IPV identified cases with death certificates collected by the Massachusetts Registry of Vital Records and Statistics to verify mortality and to obtain racial, ethnic, and country of birth information on victims. The mechanisms of death were determined by medical doctors responsible for completing the death certificates. Funeral directors completed the demographic portion of the death certificate by obtaining information from a family member or friend of the decedent.

To describe the epidemiology of IPV homicides among women, we assumed the percentage of women born outside the United States and its territories living in Massachusetts increased linearly from 7.65% in the 1990 Census to 12.2% in the 2000 Census among all sex, age, racial, and ethnic groups. We used the equation $0.12 = 0.0765 + b(2000-1990)$ to estimate the percentage of foreign women living in Massachusetts each year (i.e., coefficient b ; U.S. Census Bureau, 2000). We estimated the risk of death associated with IPV by dividing the number of all decedents by the cumulative population in Massachusetts during 1993-2007 as calculated by the National Center for Health Statistics (i.e., 94,719,683; CDC, 2009). We estimated rate of IPV female homicides by dividing the number of female decedents by the cumulative number of women aged greater than 14 years in Massachusetts during 1993-2007 (i.e., 40,621,535 person-years). We explored potential trends in the annual rate of IPV female homicides using robust linear regression.

We calculated the associations of race, ethnicity, and country of birth with the probability of dying from IPV by using Poisson regression models (e.g., $\ln \lambda_i = \ln(\text{Pop}_i) + \beta_0 + \beta_1 A$ where λ_i = frequency of deaths in each risk group i , Pop_i = population within each risk group i , A is 1 if decedent is Black or 0 otherwise) because we assumed deaths from IPV were rare events that approximated a Poisson distribution (λ ; Frome, 1983). For each woman who died from IPV, we estimated the population at risk by determining the number of women of the same age category, race, and ethnic group who lived in Massachusetts during the year of the homicide (U.S. Census data). Foreign-born women included those women born outside of the United States and its territories.

As a secondary objective, we described the epidemiologic characteristics of alleged perpetrators and the mechanism of death. We explored associations between race, ethnicity, and foreign-born status and mechanism of death.

Table 1. Race, Ethnicity, and Foreign-Born Status of Women Killed by an Intimate Partner in Massachusetts, 1993-2007

	Deaths	Person-Years	Rate per 1,000,000 Person-Years
Race^a			
Asian	4	1,577,215	2.5
Black	40	2,466,918	16.2
Native American	1	115,555	8.7
White	171	36,461,847	4.7
Ethnicity			
Hispanic	36	2,340,891	15.4
Non-Hispanic	203	38,280,644	5.3
Place of birth			
Foreign-born	36	4,955,827	7.3
American	203	35,665,708	5.7

Sources: Jane Doe, Inc., Peace at Home, and the Massachusetts Office for Victim Assistance as reported by *The Boston Globe*; Massachusetts Registry of Vital Records and Statistics, Massachusetts Department of Public Health.

a. 23 with unknown race (i.e., race coded in data as ethnicity).

Results

Demographics

Analysis on the IPV database created by the Massachusetts Department of Public Health show that Massachusetts females died more frequently because of IPV than males. Three hundred and sixty-five people died as a result of IPV among Massachusetts residents during 1993-2007 (rate 3.9 per 1,000,000 person-years). Two-hundred and seventy females, 90 males, and 5 uncategorized individuals were killed as a result of IPV. Out of the total 270 females who died because of IPV, 239 (89%) were killed by a male intimate partner. These were selected for further analyses.

Women who died as a result of IPV had a median age of 36 [interquartile range 27 to 43 years] and were of diverse age, race, ethnicity, and place of birth. One hundred and seventy-one women with known race (72%) of the 239 women killed by a male intimate partner were classified as White, 40 (17%) as Black, 4 (2%) as Asian, and 1 as Native American (Table 1). None were categorized as Native Hawaiian or other Pacific Islander. Thirty-six (15%) of 239 women who died as a result of IPV were Hispanic. Thirty-six (15%) of 239 women were born outside the United States and its territories (i.e., 13 from the Western hemisphere countries and 23 from the remainder

of the world). Fourteen (39%) of the 36 foreign-born women were White, whereas 157 (77%) of the 203 U.S.-born women were White (chi-square < 0.0001). Conversely, 11 (31%) of 36 foreign-born women were Black, whereas 29 (14%) of 203 U.S.-born women were Black (chi-square = 0.02). Foreign-born women were not significantly more likely to be Hispanic than U.S.-born women. The median age of White women was higher (37 years) than other women, namely, Black, Asian, and Native American women (29 years; Wilcoxon Rank-Sum test $p < .002$). Similarly, the mean age of Hispanic women was lower (32 years) than the age of non-Hispanic U.S.- and non-U.S.-born women (36 years; Wilcoxon Rank-Sum test $p = .02$). Foreign-born women did not differ significantly in age from U.S.-born women.

Risk for Death

Young adult women had the highest rates of death as a result of IPV. The annual risk of women dying as a result of IPV during 1993-2007 was 5.8 per 1,000,000 persons-years for women aged 14 years or older. The annual death rate ranged from 1.1 to 5.8 per 1,000,000 women (Figure 1). We identify a downward trend in the incidence of IPV female homicides (robust linear regression $p = .03$). Rates of IPV homicide among women were highest for women aged 25 to 29 years (Figure 2).

Black and Hispanic women had a higher risk of dying from IPV than White, non-Hispanic women. White women of any ethnicity and birth place had a risk of dying from IPV of 4.7 per 1,000,000 person-years (Table 1). Black women of any ethnicity and birth place had a risk of dying from IPV of 16.2 per 1,000,000 person-years. The incidence rate ratio between Black and White women was 12.0 (Poisson regression 95% confidence interval 8.4-17.2; Figure 3). Hispanic women also had a higher risk of dying from IPV than non-Hispanic women; incidence risk ratio of 9.7 (Poisson regression 95% confidence interval 6.8-13.8). Foreign-born women's risk of dying from IPV was higher than that of women born in the United States and its territories (7.3 vs. 5.7 per 1,000,000 person-years), but this difference was not statistically significant.

Perpetrator and Mechanisms of Death

Most commonly, a current male partner was the perpetrator of the female homicide. Eighty-six (36%) of deaths were attributed to the decedent's boyfriend, 85 (36%) to the husband, 33 (14%) to an ex-boyfriend, 21 (9%) to an ex-husband, 5 (2%) to the father of the decedent's children, and 4 (2%) to

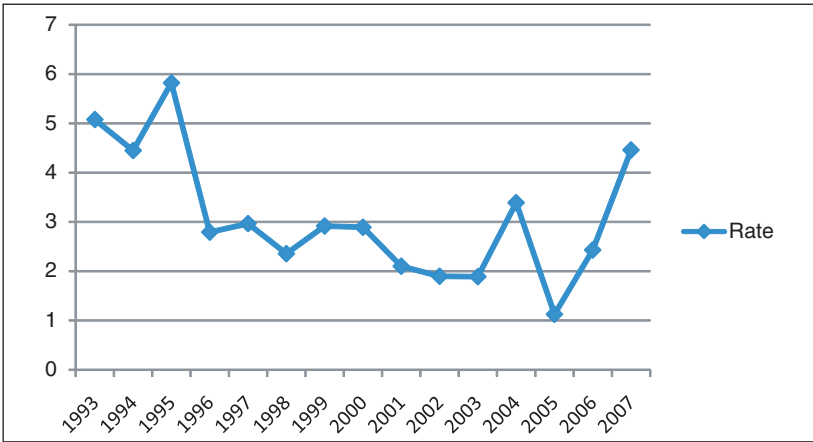


Figure 1. Annual rates of intimate partner femicide per 1,000,000 women—Massachusetts, 1993-2007

Sources: Jane Doe, Inc., Peace at Home, and the Massachusetts Office for Victim Assistance as reported by *The Boston Globe*; Massachusetts Registry of Vital Records and Statistics, Massachusetts Department of Public Health.

Note: Investigators estimated the denominator for the rates using U.S. Census data of all women aged 14 years or older of any race, ethnicity, or place of birth.

other unspecified intimate partners or their proxies (i.e., persons paid to kill the decedent). Eighty-three women died from firearm injuries (35%), 74 (31%) cut/piercing wounds, 32 (13%) suffocation, 16 (7%) from unspecified causes, 13 (5%) from blunt trauma, 3 (1%) from fire, and 12 (6%) from other causes. White women frequently (34%) died from firearm injuries, whereas 19 (47%) of 40 Black women died from cut/piercing wounds compared to 55 (27%) of 199 women of other races (chi-square $p = .01$).

Discussion

Although more White women in Massachusetts died of IPV during 1993-2007, Black and Hispanic women were at higher risk of dying from IPV than other women. Similarly, foreign-born women had higher risk of dying from IPV than other women, but this difference was not statistically significant. These data are compatible with data from New York City during 1990-1999, where young, Black or foreign-born women were more likely to be killed by an intimate partner (Frye, 2005). Similarly, Tjaden and Thoennes (1998) and a study of national homicide surveillance found Black women had higher rates

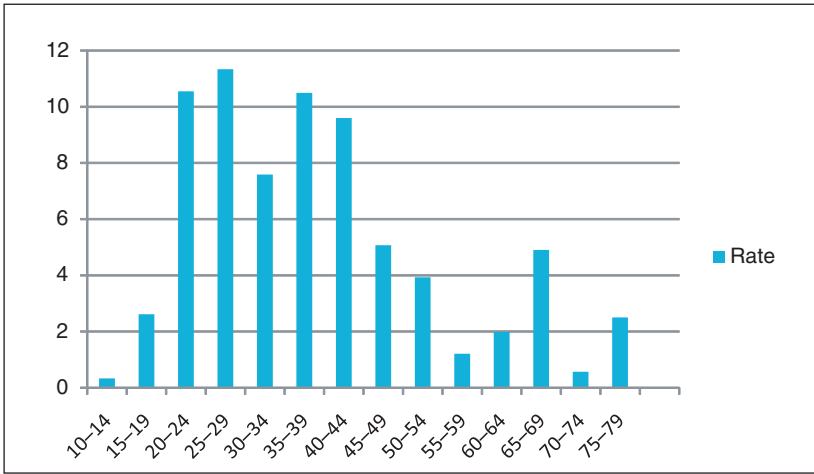


Figure 2. Rates of females killed by a male intimate partner per 1,000,000 women of specified age category—Massachusetts, 1993-2007

Sources: Jane Doe, Inc., Peace at Home, and the Massachusetts Office for Victim Assistance as reported by *The Boston Globe*; Massachusetts Registry of Vital Records and Statistics, Massachusetts Department of Public Health.

Note: Investigators estimated the denominator for the rates using U.S. Census data for women within each age category regardless of race, ethnicity, or place of birth.

of death from IPV than other women (Paulozzi et al., 2001). As in Paulozzi et al. (2001), we found a downward trend in the rates of IPV female homicide during 1993-2005. This downward trend may be caused by a variety of factors including an increased availability of emergency medical services but may be reversing since 2005.

Study findings are compatible with national and state data regarding race, ethnicity, and foreign-born status and nonlethal IPV. Death from IPV represents the most extreme manifestation of the highly prevalent problem of IPV. Between 5.21% and 13.61% of 1,599 couples sampled from the contiguous United States annually experienced IPV (Field & Caetano, 2005; Schafer, Caetano, & Clark, 1998). Similarly, 6.7% of 2,418 women sampled from a New Mexico managed-care organization annually experienced IPV (Tollestrup et al., 1999). CDC reported that Black women were assaulted physically by an intimate partner at a rate of 5.1 per 1,000, whereas White women were assaulted at a rate of 4.3 per 1,000 (CDC, 2004). Rennison and Welchans (2000) found that Black women were more likely than other women to be victimized by an intimate partner.

It is possible that minority women may be at higher risk of potentially deadly IPV because of functional social isolation (Groves, 2002). In addition,

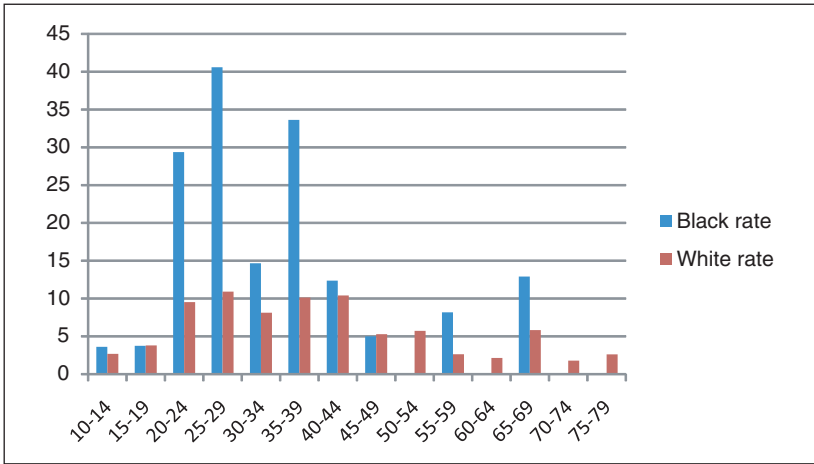


Figure 3. Rates of females killed by a male intimate partner by race and age group per 1,000,000 person-years—Massachusetts, 1993-2007

Sources: Jane Doe, Inc., Peace at Home, and the Massachusetts Office for Victim Assistance as reported by *The Boston Globe*; Massachusetts Registry of Vital Records and Statistics, Massachusetts Department of Public Health.

victim-blaming in that community may have perpetuated cycles of violence. As found in the analyses of 1981-1998 national homicide data, the most frequent perpetrator were male partners or ex-partners and the most common mechanism of IPV homicide was firearms (Paulozzi et al., 2001). Although racial, ethnic, and foreign-born minority women often died from lacerations and stab wounds, it is uncertain what impact Massachusetts’ gun control laws have on the epidemiology of IPV female homicides.

Our study had several important limitations. It is not possible to use death certificates to identify deaths from IPV in Massachusetts, and our data are limited to public reports of intimate partner homicides for which criminal charges were filed. Our inability to quantify the number of women in a relationship and who are experiencing IPV are likely to underestimate the rates of female IPV homicide. In addition, we did not assess whether race, ethnicity, and nationality were proxies for other identified IPV risk factors (e.g., unemployment, economic stress, and partner history of substance abuse; D. W. Campbell, Sharps, Gary, Campbell, & Lopez, 2002, J. C. Campbell et al., 2003). Future IPV studies in Massachusetts could rectify these limitations by collecting prospective incidence data through active surveillance of police records and medical examiners during 1 or more years coupled with verbal autopsy data from the victims’ next of kin. Massachusetts is one of 17 states currently

participating in the National Violent Death Reporting System (NVDRS) which may be used during future studies to address some of the aforementioned limitations. NVDRS is an incident-based system which allows for the collection and analysis of both the perpetrator and victim of the violent death. The database contains information from a variety of data sources including the medical examiner and police reports to gain a better understanding of the circumstances surrounding all violent deaths including those that are IPV related.

Conclusion

IPV female homicides are infrequent but devastating occurrences. IPV female homicides are part of the spectrum of the more pervasive public health and law enforcement problem of IPV that represents 20% of violent crimes against women (Gunderson, 2002). Like IPV homicides among women, nonlethal IPV disproportionately affects minority women. The CDC estimates that IPV costs US\$5.8 billion a year and is associated with serious health problems such as increased risk for unhealthy weight gain, substance abuse, sleep problems, anxiety, chronic pain, depression, suicidality, unwanted pregnancies, lower infant birth weights, and disabilities (CDC, 2003; Hathaway et al., 2000; McCauley et al., 1995; McFarlane, Parker, & Soeken, 1996; Silverman, Raj, Mucci, & Hathaway, 2001). Our analyses suggest Black, Hispanic, and foreign-born women were more likely than other women to die from IPV during 1993-2007. Health care, public health, advocacy groups, and law enforcement must consider the importance of providing culturally appropriate services to IPV survivors in the most affected communities (Yoshioka, Golbert, El-Bassel, & Baig-Amin, 2003).

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article.

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Bios

Eduardo Azziz-Baumgartner conducted this investigation during his fellowship at the Commonwealth Fund/Harvard University Fellowship Program in Minority Health Policy. He now works as a medical epidemiologist at the U.S. Centers for Disease Control and Prevention.

Loreta McKeown provided her demographic and statistical expertise to compile, analyze, and interpret data as part of this collaborative work between the Injury Surveillance Program at the Massachusetts Department of Public Health, Harvard University, Jane Doe Inc and Peace at Home.

Patrice Melvin provided her demographic and statistical expertise to compile, analyze, and interpret data as part of this collaborative work between the Injury Surveillance Program at the Massachusetts Department of Public Health, Harvard University, Jane Doe Inc and Peace at Home.

Quynh Dang has led the Massachusetts Department of Public Health Asian Task Force Against Domestic Violence and provided a liaison between the community and the research team during the investigation.

Joan Reed, MD, MPH, MBA is the first dean for Diversity and Community Partnership at the Harvard School of Public Health and the director of the Program for Faculty Development and Diversity. Her continued mentorship has been critical in the success of this and similar projects.