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Making the news: Victim characteristics associated with media reporting on firearm injury

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A B S T R A C T

Firearm injury is a public health crisis in the United States. Selective media coverage may contribute to incomplete public understanding of firearm injury. To better understand how firearm injury is communicated to the public, we analyzed media coverage of intentional, interpersonal shootings in 3 U.S. cities. We hypothesized that multiple shootings and fatal shootings would be more likely to make the news, as would shootings affecting children, women, and white individuals. We compared police department data on shootings to media reports drawn from the Gun Violence Archive (GVA) for 2017 in Philadelphia, PA, Rochester, NY, and Cincinnati, OH. GVA reports were matched to police data by shooting date, location, victim age, and gender. Matched victims were compared to unmatched using chi^2 tests for categorical variables and Kruskal Wallis tests for continuous variables. Philadelphia police reported 1216 firearm assault victims; Cincinnati police reported 407; and Rochester police reported 178. News reports covered 562 (46.2%), 222 (54.6%), and 116 (65.2%) victims, respectively. Fatal shootings were more often reported as were shootings involving multiple victims or women. Half of shooting victims did not make the news. Selective reporting likely limits awareness of the public health impact of firearm injury. Researchers and policy makers should work with journalists and editors to improve the quantity and content of reporting on firearm injury.

1. Introduction

Firearm injury is increasingly seen as a public health crisis in the United States (Bulger et al., 2019; Board on Population Health and Public Health Practice, Health and Medicine Division, and National Academies of Sciences, Engineering, and Medicine, 2019) with nearly 40,000 deaths (U.S. Centers for Disease Control and Prevention, 2016) and 90,000 nonfatal injuries per year (Gani et al., 2017). A variety of interventions, including public policy (Crifasi et al., 2018; Wintemute et al., 2010), community and environmental programming (Branas et al., 2018; Whitehill et al., 2014) and individual prevention (Juillard et al., 2015) efforts have demonstrated potential to reduce firearm injury (Prevention of Firearm Injuries Among Children and Adolescents: Consensus-driven Research Agenda from the Firearm Safety Among Children and Teens (FACTS) Consortium, 2019). However, expanding effective firearm injury prevention policy and programming would require similarly large-scale public support. This support may lag in part because many members of the U.S. public do not have a comprehensive understanding of firearm injury, including its epidemiology, root causes, and evidence-based solutions.

For example, in a 2019 national survey, 1 in 4 respondents believed that mass shootings were the leading cause of death from firearm injury, although these shootings account for < 1% of deaths. Another 14% believed that accidental shootings were the most common cause of firearm deaths, when in truth these only account for 2% of deaths (Gun Survey Part Two: What Americans know about gun-related deaths, 2019). Likewise, a 2017 Pew Research Center study found that while 50% Americans considered gun violence to be a “very big” problem nationally, only 19% believed it was a “big” problem in their own communities. Among Black respondents, 73% called gun violence a “very big” problem in the United States and 49% reporting the same about their own communities. When respondents were asked about contributors to gun violence, they ranked ease of obtaining guns illegally first (86%) followed by family instability (74%) and lack of

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economic opportunity (65%) (Views of Guns and Gun Violence in the U.S. Pew Research Center's Social and Demographic Trends Project, 2017).

Many factors may influence these varying public perceptions of firearm injury, and media reporting is a likely contributor, particularly for individuals who do not perceive themselves or their communities to be directly affected. Evidence suggests that reporting on firearm injury is incomplete at best. For example, over a 10-year period, Beard et al. identified 46 events with 212 victims meeting the definition of a multiple-causality "neighborhood mass shooting" in Philadelphia (defined as a shooting with at least 4 victims). Of these, 15% had no media coverage at all. Another 80% were only covered only in local and regional news media, and just one incident was described as a mass shooting in any associated headline (Beard et al., 2019). Reporting on firearm injury is also often limited in scope and depth. Researchers from the Berkeley Media Studies Group identified 3815 articles on firearm injury over one year in California. They found that media coverage was generally episodic and provided minimal context regarding the causes or solutions for firearm injury. Only 8% of articles included speakers who expressed optimism about firearm injury (Issue 25: More than mass shootings: Gun violence narratives in California news, 2019).

In this study, we focused on intentional, interpersonal firearm violence, which we refer to as "shootings" throughout this manuscript. To further investigate the nature of news reporting on firearm injury, we used publicly available data on shootings from police departments and the media in 3 US cities to calculate the proportion of injured victims that are reported in the media and to identify victim and shooting characteristics associated with media reporting. We hypothesized that multiple shootings and fatal shootings would be more likely to make the news, as would shootings affecting children, women, and white individuals.

2. Methods

2.1. Data sources and population

We analyzed victims of fatal and non-fatal shootings for the year 2017 in three cities: Philadelphia, Pennsylvania, Cincinnati, Ohio, and Rochester, New York. Media reports were derived from the Gun Violence Archive (GVA) (Gun Violence Archive, 2019). This online repository draws from more than 6000 local, regional and national media sources using a combination of automated queries and manual research. Each entry includes source documentation of original reporting used to generate the entry. The goal of the GVA is to catalog all incidents of firearm violence in the United States. GVA entries include victim and perpetrator characteristics along with circumstances and weapons used. To our knowledge, this is the most thoroughly researched source for media reporting on firearm injury that is currently available (Jetter and Walker, 2018).

There is no comprehensive national data source for non-fatal shootings. Police data may be the closest available substitute for victims of firearm violence, and is more comprehensive than trauma registry data, as it does not depend on the severity of injury or location of care (Kaufman et al., 2019). Therefore, we used police department data to approximate a complete count of civilian shooting victims. Police shootings were not consistently included or demarcated in these data. We selected Philadelphia, Cincinnati, and Rochester because these three cities have all made detailed data on shooting victims available via the Police Data Initiative (Datasets, 2019).

Shooting victims were included if they were injured as the result of intentional, interpersonal violence (assault). Non-shooting incidents such as pistol whippings were excluded, as were self-harm and unintentional injuries.

2.2. Analysis

Both data sources were analyzed at the victim level. Victims reported in GVA were matched to victims reported in police department data by date, location, victim age, and victim gender. Matching was performed by direct inspection of both data sources. GVA source materials were revisited as necessary to confirm details or clarify inclusion criteria. Victims were characterized as matched if they were present in both data sources. The primary analysis compared matched patients to those identified only in police department data.

Victim characteristics included age, gender, and race/ethnicity. Race/ethnicity was categorized as Hispanic, non-Hispanic Black, non-Hispanic White, and Asian. Cincinnati data did not specify Hispanic ethnicity. The population of Cincinnati is 2.7% Hispanic (Census.gov, 2016). Shooting characteristics included the number of victims per event and whether the outcome for each victim was fatal or nonfatal. We also compared the number of shooting victims per day and day of week of shooting using the nonparametric test of trend and day of week of shooting. These analyses were repeated excluding a single shooting from Cincinnati with 17 victims.

Matched victims were compared to unmatched victims using chi (Board on Population Health and Public Health Practice, Health and Medicine Division, and National Academies of Sciences, Engineering, and Medicine, 2019) tests for categorical variables and Kruskal Wallis tests for nonparametric continuous variables. Multivariable logistic regression incorporating victim characteristics, shooting characteristics, and city was used to identify independent predictors of reporting. Standard errors adjusted for clustering in multiple shootings. Victims reported only in GVA data were counted and excluded. This study used only publicly available data and was granted exemption from review by the Institutional Review Board of the University of Pennsylvania.

3. Results

Of 1801 firearm assault victims included in police department data for 2017 in Philadelphia, Cincinnati, and Rochester, 900 (50.0%) were reported in the news. This varied by city. Of 1216 firearm assault victims in Philadelphia, 562 victims (46.2%) were included in media reports. In Cincinnati, 222 of 407 total firearm assault victims (54.6%) were included in media reports. Rochester had only 178 firearm assault victims, and 116 (65.2%) were reported. The p value for the difference among cities was < 0.001. Characteristics of victims who were and were not reported in the media are shown in Table 1. For all cities, 5% or fewer shootings that represented in media reports were not included in police data.

Fig. 1 shows the relationship between media reporting and shooting characteristics. Just 16% of shootings were fatal, and these were much more likely to be reported, with 83% of victims making the news, compared to 43% of victims of nonfatal shootings ($p < 0.001$). Likewise, 22% of victims were injured as part of a multiple shooting, and 76.3% of these victims made the news compared to 42.5% of single shootings ($p < 0.001$). Of shootings involving multiple victims, 252 had just 2 victims, and of these 70.6% were reported. A single shooting event in Cincinnati involved 17 victims, all of whom were reported in the media. To assess for bias associated with this single-high profile event, we repeated the analysis excluding this shooting, and achieved very similar results.

In all 3 cities, non-Hispanic Black people comprise approximately 40% of the resident population (Census.gov, 2016), but were overrepresented among shooting victims. 83% of victims were Black, and only about half (48.7%) were reported in the news. Differences in reporting by victim race and ethnicity were not statistically significant. In multivariable logistic regression (Table 2), the strongest, independent predictor of reporting was fatality (odds ratio [OR] 8.3, 95% confidence interval [CI] 5.18, 12.0), followed by multiple shooting (OR 4.9, 95% CI 3.4, 7.1). Male victims had lower odds of reporting (OR 0.6, 95% CI 0.4,

Table 1
Victim and shooting characteristics of Firearm Assaults Reported vs. Not Reported in the Media.

	Not reported	Reported	p value
City			< 0.001
Philadelphia	654 (53.8)	562 (46.2)	
Cincinnati	185 (45.5)	222 (54.6)	
Rochester	62 (34.8)	116 (65.2)	
Outcome			< 0.001
Nonfatal	851 (56.7)	649 (43.3)	
Fatal	48 (16.6)	241 (83.4)	
Number of victims			< 0.001
Single victim	807 (57.5)	597 (42.5)	
Multiple victims	94 (23.7)	303 (76.3)	
Victim gender			0.002
Male	842 (51.3)	800 (48.7)	
Female	59 (37.3)	99 (62.7)	
Victim race/ethnicity			0.31
Hispanic	84 (45.9)	99 (54.1)	
Black (non-Hispanic)	760 (51.3)	722 (48.7)	
White (non-Hispanic)	52 (46.9)	59 (53.2)	
Asian	3 (33.3)	6 (66.7)	
Victim age			0.08
Child	55 (42.6)	74 (57.4)	
Adult	846 (50.6)	826 (49.4)	

0.9). There were 129 victims under age 18 (7.2%), and 57.4% made the news, compared to 49.4% of adults.

Victims shot on the weekend were no more or less likely to make the news. Among shootings involving a single victim, the total number of victims shot on the same day in the same city was inversely associated with likelihood of reporting (p for trend < 0.001). However, the larger the number of victims in a city on any given day, the more likely it was that the news would report at least one of those victims (p for trend < 0.001), as shown in Fig. 2. In Philadelphia, 4.4% of victims were the only shooting of the day, compared to 26.0% in Cincinnati and 53.9% in Rochester.

Table 2
Multivariable logistic regression results showing predictors of media reporting for firearm assault victims.

	Odds ratio	95% CI
City		
Philadelphia	Reference	
Cincinnati	1.7	1.3, 2.3
Rochester	2.9	2.0, 4.2
Shooting characteristics		
Fatal shooting	8.3	5.8, 12.0
Multiple shooting	4.9	3.4, 7.1
Victim characteristics		
Male gender	0.6	0.4, 0.9
Race		
White	Reference	
Black	0.8	0.5, 1.2
Latinx	1.0	0.5, 1.7
Asian	1.1	0.1, 14.8
Age < 18	1.5	1.0, 2.3

4. Discussion

Half of all firearm assault victims were not reported in the news media. Victim characteristics that were less common were more likely to be reported, including fatalities, multiple shootings, and female victims. Further, we found that individual victims were less likely to make the news when more people were shot on the same day, but when there were more shootings, it was more likely that at least one would make the news. This may explain the disparity in reporting between cities, as Philadelphia, which had the most shootings and the most days with multiple shootings, had the lowest percent reported. This is the first study of its kind to evaluate media reporting on firearm injury across multiple cities, but our findings align with the results of a study focusing on homicide reporting in Los Angeles (Sorenson et al., 1998), and suggest that firearm injury may be reported selectively, resulting in incomplete public understanding of this epidemic.

In the absence of a comprehensive, national data source for firearm injury, researchers, policy makers, and the public have resorted to creative use of healthcare, media, and police data. The GVA is widely

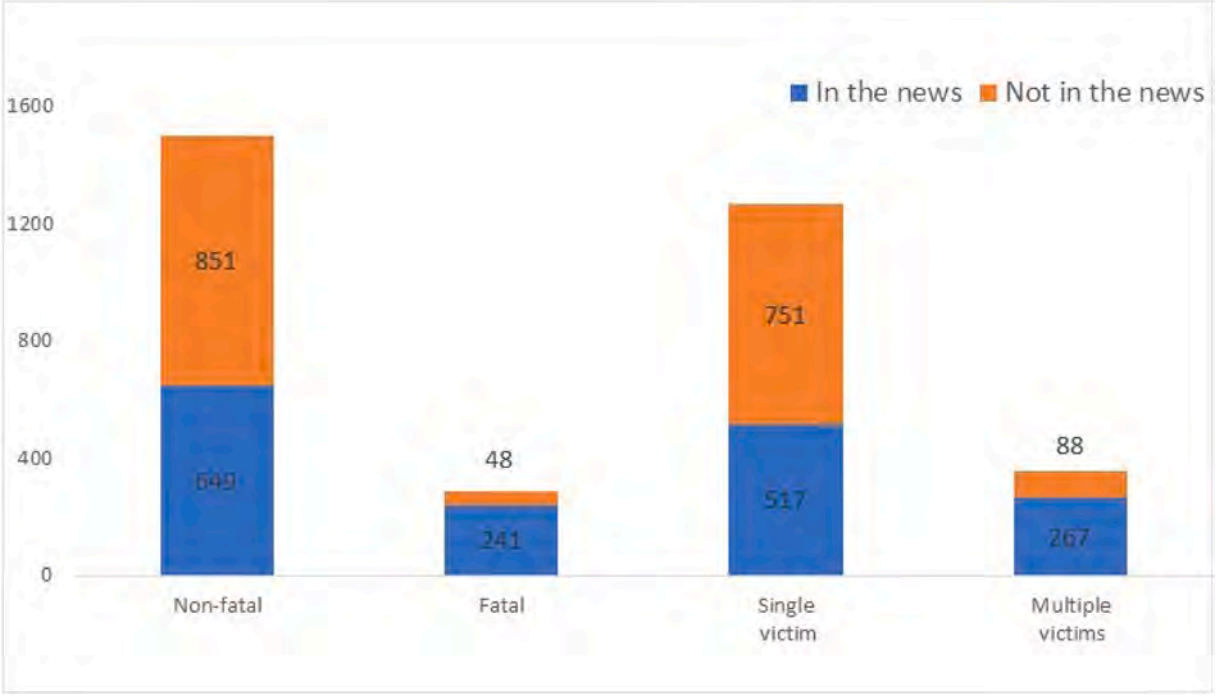

Fig. 1. Shooting characteristics associated with media reporting.

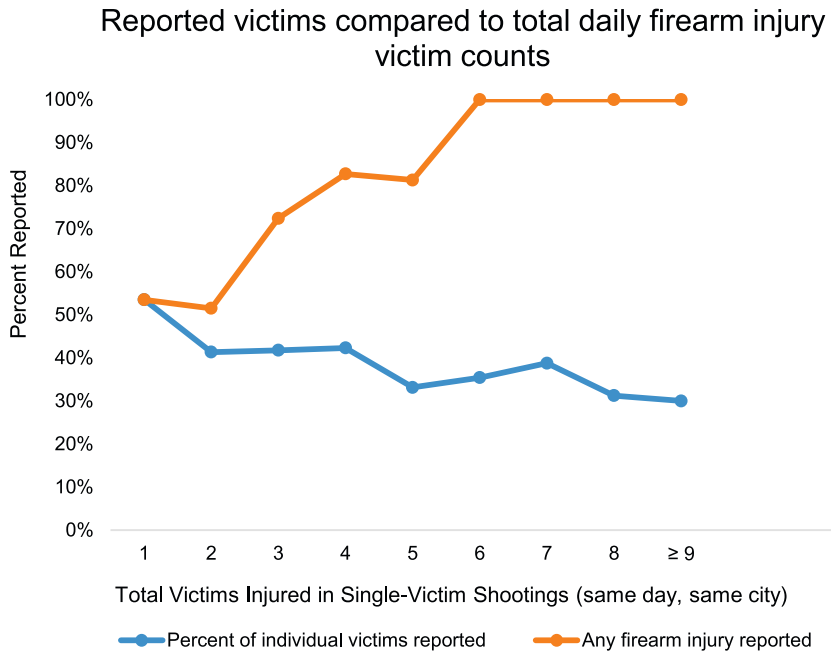

Fig. 2. Reporting of shooting victims compared to total victims shot on the same day.

utilized to characterize and study in the lay press (Payne and Moody, 2020) and increasingly in scientific research on firearm injury (Schleimer et al., 2020; Klassen et al., 2019; Conner et al., 2019; Kim, 2019; Booty et al., 2019). In the cities we studied, however, GVA data were incomplete, with cases missing in a non-random fashion. Media reports as complied by GVA over represented less common victims and circumstances. Researchers and journalists must be aware of these limitations and take caution in drawing conclusions from these data. Police data offers a useful counterpoint, as shown here and in prior work (Beard et al., 2019; Jacoby et al., 2018). However, not all police departments collect such comprehensive data and make these data publicly available. Furthermore, the relevant category of intentional, interpersonal shootings is not standard in larger law enforcement data sources such as the FBI's Uniform Crime Reporting system (Webster, 2019; United States Department of Justice. Federal Bureau of Investigation, 2014). A unified source of all-cause firearm injuries, including both fatal and nonfatal injuries would bring crucial clarity to our understanding of the epidemiology of firearm injury and of effective prevention strategies.

Effective firearm injury prevention policy and programming requires public support to reduce morbidity and mortality related to firearms. Media reporting can contribute to public support by broadening public awareness and understanding of this key health issue. Conceptually, public support for injury prevention likely relates to public perceptions of firearm injury and the victims of firearm injury. Support may be higher if the public believes that firearm injury is a major challenge than if the situation appears hopeless. Support may be higher if the public sees the victims as familiar, rather than solely as criminals or risk takers. Likewise, an appreciation of the multifaceted contributors to the epidemiology of firearm injury may encourage support for effective policy and programming more than if the public understands firearm injury as a law enforcement problem. Media reporting is one key factor in shaping public perceptions of this or any issue.

Three key models in media studies outline the impact of news outlets: agenda setting, priming, and framing public health issues. As summarized by Scheufele and Tewksbury, agenda setting refers to the concept that topics covered more frequently and prominently will gain more importance in the audience's thinking. Priming extends agenda-setting when news content serves to suggest standards that audiences should use to evaluate issues, institutions, or individuals. Framing indicates that the way the news media approaches a topic can influence the audience's understanding of a topic. This dynamic draws on psychological research showing that individuals' capacity to understand the world is necessarily limited, making frameworks essential for processing information on complex topics (Scheufele and Tewksbury, 2007). Variation in media reporting has been found to direct and reflect public opinion of numerous key public health issues, from substance abuse (Fan, 1996; Dasgupta et al., 2009) to childhood obesity (Barry et al., 2011), to AIDS (Colby and Cook, 1991), to vaccine uptake (Bodemer et al., 2012).

If reporting on firearm injury shapes the public narrative in similar ways, then more reporting alone may not be the answer. In some cases, the intensity of reporting surrounding a shooting event can contribute to future injuries. Intensive reporting on mass shootings, for example, has been shown to be associated with more mass shootings (Jetter and Walker, 2018). Likewise, reporting of suicides has been found to lead to copycat suicides. This dynamic has led to journalists widely adopting guidelines that limit reporting on suicide in the effort to prevent more deaths (Home, 2019). Paradoxically, these well-intentioned restrictions may have contributed to a general underestimation of the incidence of suicide and its preventability (Views of Guns and Gun Violence in the U.S. Pew Research Center's Social and Demographic Trends Project, 2017).

It is likely that the content is as important as the quantity of media reporting in shaping public perceptions of firearm injury, its victims, and opportunities for firearm injury prevention. Future research will examine the content of reporting on firearm injury in more detail and will aim to test the impact of reporting content on public perceptions of firearm injury and injury prevention policy. Ongoing work through the Initiative for Better Gun Violence Reporting (IBGVR, 2019) will seek to establish best practices for reporting of firearm injury. Preliminary recommendations include improving precision in language relating to weapons; avoiding stigmatizing descriptions; providing resource references for injured individuals and their families; and ensuring follow-up after early reporting. Reporters are also encouraged to identify and discuss relevant potential solutions (This New Tool Can Help You Understand Philly's Gun Violence Crisis, 2019).

This study has several limitations. For the purposes of this study, we assumed that the GVA represented a comprehensive catalog of shootings as reported in the media. This may not be the case: there is no gold standard count of reporting on firearm violence, and reports may have been excluded inadvertently. Likewise, there is no gold standard for the true incidence of shootings, and police department data may have been incomplete or inaccurate. We did not have any way of verifying the context or circumstance of shootings, even if these were reported in the media, and so did not analyze additional detail here. Our data sources do not provide a comprehensive understanding of police-involved shootings. In Cincinnati, police-involved shootings are listed separately, and were not included in this analysis. Of the 10 media reports of shootings not included in Cincinnati police data, 1 was a police shooting. For Rochester, police department data sources did not clearly demarcate shootings by police officers. In Philadelphia, officer involved shootings were included in the main data source.

A small proportion of GVA reports had no police department counterpart, although many of these articles mentioned police involvement. The reasons for this mismatch are unclear and may have introduced bias. It is possible that these represent intentional or unintentional omissions from the police data. The news reports may have been spurious, may have ultimately turned out not to be shootings, or were accidental or self-inflicted. It is possible that shootings made the news without ever coming to police attention. There were 82 such reports, 7 in Rochester, 65 in Philadelphia, and 10 in Cincinnati. Many of these incidents contained minimal information, but 75 (91%) mentioned police involvement, indicating that the explanation is not that the victims never came to police attention. In Philadelphia, 18 of the unmatched victims came from incidents that were included in both data sets, but with different total numbers of victims reported. This may indicate error in either data source. This also corresponds with our finding that multiple shootings were more likely to be reported. Another 13 were characterized as defensive gun use, which may have been categorized differently by police.

Finally, we chose three cities based on data availability. Although we found generally similar results in these cities, results may well differ in important ways in other cities and in suburban and rural areas across the country. Likewise, we included only a single year of data. We are unable to assess change in reporting over time and may have missed significant differences due to limited data.

5. Public health implications

A large proportion of shootings never make the news, which may limit public understanding of the true burden of firearm injury in the United States. Lack of awareness in turn may hinder support for and implementation of evidence-based approaches to reducing firearm injury. The study and prevention of firearm injury is an interdisciplinary endeavor that requires the participation of many sectors of our society. Researchers and policy makers seeking to prevent firearm injury should work with journalists and editors to improve reporting on its causes and consequences.

Meetings

Eastern Association for the Surgery of Trauma Annual Scientific Assembly, Quickshot Presentation, J28anuary 14, 2020.

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Declaration of Competing Interest

The authors have no conflicts of interest to report.

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