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ORIGINAL PAPER

A Study of Households with Children and Firearms in Baltimore, Maryland

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Abstract

Firearm injuries are the leading cause of death among children and adolescents in the US. Safe storage of firearms in the home is one of the most effective ways of preventing firearm injuries in children. This feasibility study was conducted in both the pediatric and general Emergency Departments of a large urban academic medical center in a community with high rates of firearm injuries in children. The objective was to pilot a survey seeking to describe sociodemographic characteristics, firearm specific risk factors, and firearm storage practices of households with children in the community. One hundred participants completed a survey containing items regarding participant demographics, household features, firearm ownership, firearm characteristics, and storage practices. Descriptive statistics were used to define sociodemographic characteristics of the enrolled population, comparing those with firearms to those without, and to describe firearms and storage practices of firearm owners in households with children. Of 100 participants, 30 lived in households with firearms and children. Most firearms in homes with children were stored locked and unloaded most of the time; however, 30% of participants with firearms and children in the home reported not consistently storing a firearm locked and unloaded. The most common reason given for not storing a firearm in the safest manner possible was that storing a firearm locked and unloaded would make it difficult to access quickly. Engaging families with children in discussions around firearm prevention during Emergency Department visits is feasible and may have implications for future efforts to promote safe firearm storage practices.

Keywords Firearms · Children · Safe Storage · Urban Health

Introduction

Firearm injuries are the leading cause of death among children and adolescents in the US [1] Most youth suicides, unintentional shooting deaths among children, and school shootings perpetrated by children involve the use of firearms stored in the home [2–4]. According to the American Academy of Pediatrics (AAP) the most effective way to prevent pediatric firearm-related injuries is through the absence of guns in homes and communities [5]. If firearms are present in the home, the AAP recommends that firearms be stored unloaded, in a locked box or with a locking device, and separate from ammunition [5]. While the risks of suicide and unintentional shootings among youth increase in homes where guns are kept loaded and/or unlocked, [6] less than half of gun owners report safely storing all firearms in the home [7]. Although having a child in the home is associated with higher odds of reported safe storage, [7] 20% of gun owners living with children store at least one gun both loaded and unlocked, the least safe storage method [8].

Like other urban areas with large racial and socioeconomic disparity, Baltimore has one of the highest firearm injury incident rates [9]. US population-based studies may miss opportunities to identify individual- and

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community-level nuances that can guide local level interventions to reduce firearm injuries in children. Enrolling patients in the emergency department (ED), where many patients have experienced or been exposed to violence or injury, can help identify risk factors and develop evidence-based strategies to mitigate violence and injury. This feasibility study was conducted to determine the receptiveness of ED patients with children to discuss firearm storage. We surveyed pediatric ED patients' guardians and adult ED patients with children living in the home to describe the sociodemographic characteristics of a population of firearm owners in households with children, and the firearm specific factors and firearm storage practices of those households in Baltimore.

Methods

Participants were recruited from both the pediatric and adult EDs at a large academic medical center in Baltimore, MD, which cares for approximately 100,000 patients annually. Patients were eligible if they were at least 18 years of age and used English as their preferred language for health communications. A convenience sample of 100 participants were enrolled between July 1st and August 20th, 2023. After verbal consent, study participants completed a survey administered on a tablet by a trained research assistant. The survey included items capturing participant and household demographics (age, gender, race, ethnicity, education level, household income, marital status, number of children in the home, ages of children in the home), firearm characteristics (number of firearms in the home, type of firearms in the home, use of firearm in the home), and firearm storage practices for each firearm in the home (locked, unloaded, and reasons why). Items included five-point Likert-scale questions assessing how often and to what degree each type of firearm in the home is stored safely. Immediately following the survey, participants were offered educational material on safe storage in the form of a pamphlet and were given an opportunity to discuss options for safe storage. Descriptive statistics were used to report socioeconomic features of the sample and compare participants with and without firearms in the home. Descriptive statistics were also used to describe firearm ownership and safe firearm storage practices of the sample. This study was approved by the hospital's institutional review board.

Results

One hundred adult participants were included in the study, 70 without firearms in the home and 30 with firearms in the home. Most of the sample was female (70%) and Non-Hispanic Black (45%) or Non-Hispanic White (38%). Most participants had completed high school (79%) and at least some college (57%). A majority of the sample had an annual household income of at least $50,000 per year (59%) and had children living in the home (94%). There were no significant demographic differences between participants who had firearms in the home and those who did not. See Table 1.

Twenty nine of the 30 respondents who reported having firearms in the home also reported having children in the home. Of those 29 households with firearms and children, 27 reported the number and ages of those children. In total, there were 78 children living in those 27 households with firearms with available age data. Children living in homes with firearms had a mean age of 10.2 years (SD ± 5.2 yrs.). See Figs. 1 and 2.

Most firearm owners reported having one (35.5%) or two (22.6%) firearms in the home, with one outlier reporting 10 or more firearms in the home, the maximum number allowable in the survey. Most firearms kept in homes with children were handguns (88.5%), but owners also reported having rifles (38.5%) and shotguns (26.9%) in the home. The most common reason for owning handguns and shotguns was personal protection (87% and 71.4% respectively) followed by recreation or sport (34.8% and 42.9% respectively), whereas the reason for rifle ownership was most often recreation and sport (70%).

Most firearms in homes with children were stored locked, with 91.3% of handguns, 90% of rifles, and 85.7% of shotguns stored in a lockbox or safe. Additionally, 30.4% handgun owners, 30% of rifle owners, and 28.6% of shotgun owners reported the use of a cable lock at least some of the time. Participants with firearms and children in the home reported storing most handguns (87%) and most shotguns (85.7%) unloaded, and participants with rifles reported storing them unloaded all the time. Most participants felt that storing firearms in the home locked and unloaded was very important (96%); however, 30% of participants reported not consistently storing a firearm in a home with children locked and unloaded. The most common reason given for not storing a firearm in the safest manner possible was that storing a firearm locked and unloaded would make it difficult to access quickly (55.5%). Other reasons for less safe storage methods included having no way to lock the firearm, not being able to afford a storage or locking device, and not thinking it was important or effective to store firearms unloaded or locked.

Table 1 Demographics

	Total Participants ($N=100$)	Participants without Firearms in the Home (N-70)	Participants with Firearms in the Home ($N=30$)	Chi Squared (p value)
Sex				
Female	70 (70%)	50 (71%)	20 (67%)	0.2 (0.64)
Marital Status				
Married	49 (49%)	31 (44%)	18 (60%)	2.1 (0.15)
Race/Ethnicity				9.3 (0.05)
Non-Hispanic Black	45 (45%)	36 (51%)	9 (30%)	3.9 (0.05)
Non-Hispanic White	38 (38%)	25 (36%)	13 (43%)	0.5 (0.48)
Hispanic	10 (10%)	7 (10%)	3 (10%)	0.3 (0.59)
Asian	5 (5%)	2 (3%)	3 (10%)	2.3 (0.13)
Other/Unknown/Prefer not to answer	2 (2%)	0 (0%)	2 (7%)	4.7 (0.03)
Highest Education Completed				0.9 (0.82)
No High School (HS) or Some HS	6 (6%)	4 (6%)	2 (7%)	0.1 (0.83)
HS or Equivalent	37 (37%)	28 (40%)	9 (30%)	0.9 (0.34)
Associate or Bachelor's Degree	42 (42%)	28 (40%)	14 (47%)	0.4 (0.53)
Graduate Degree	15 (15%)	10 (14%)	5 (17%)	0.1 (0.76)
Total Annual Household Income				3.6 (0.46)
Less than $20,000	11 (11%)	9 (13%)	2 (7%)	0.8 (0.36)
$20,000-$50,000	18 (18%)	15 (21%)	3 (10%)	1.6 (0.17)
$50,000-140,000	39 (39%)	24 (34%)	15 (50%)	1.2 (0.14)
Greater than $140,000	20 (20%)	14 (20%)	6 (20%)	0 (1.0)
Prefer not to answer	12 (12%)	8 (11.4%)	4 (13%)	0.1 (0.81)
Children Living in the Home				0 (0.98)
Always	77 (77%)	54 (77%)	23 (77%)	0 (0.96)
Sometimes	17 (17%)	12 (17%)	5 (17%)	0 (0.95)
Never	6 (6%)	4 (6%)	2 (7%)	0 (0.85)

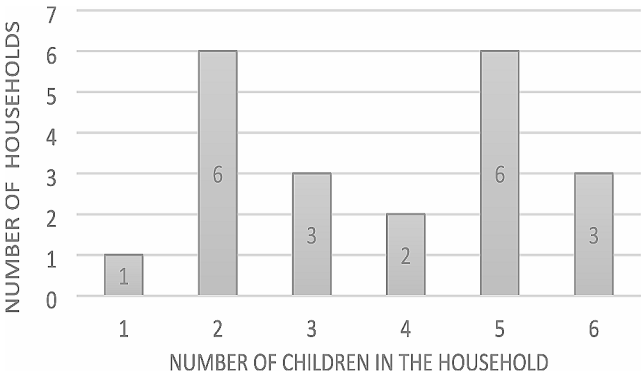

Fig. 1 Number of Children in Households with Firearms ($N=78$)

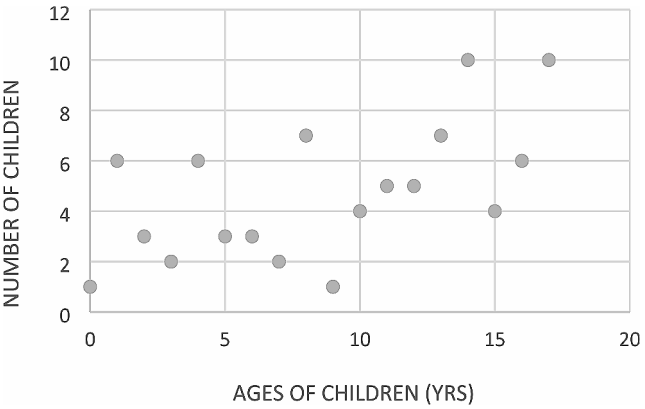

Fig. 2 Ages of Children Living in Households with Firearms

Discussion

With 46 firearm deaths per every 100,000 people, Baltimore has one of the highest rates of gun death in the US [10]. Social determinants of health including economic instability, lack of educational opportunity, and certain neighborhood characteristics are associated with unintentional and intentional injury, and particularly peer violence. In this small sample of ED patients, most firearm owners with children in the home stored firearms safely and, consistent with prior research, enrollees identified personal protection as the main reason for firearm ownership and quick access to a weapon as a barrier to safe storage [11, 12].

In comparison to their white peers, who are more likely to die from or be hospitalized with firearm injuries due to suicide attempts, Black youth in urban areas, have the highest overall proportion of hospitalizations for firearm injuries [13]. Higher firearm related crime rates in urban areas contribute to feelings of insecurity around safety, which acts as a barrier to improving safe storage, as evidenced in our sample by the concern of not being able to access a locked

and unloaded firearm quickly enough. While safe firearm storage reduces the risk of firearm suicide, homicide, and unintentional injuries among youth, it also prevents firearm theft, which is an important portal of entry for firearms used in crimes. Safe storage is a critical means of reducing the disparate impact of firearm violence in Black communities as Black youth are increasingly at risk for firearm suicide and already suffer an inequitable burden of firearm homicides.

Reducing gun violence requires multifaceted solutions. While improving safe storage is a piece of the puzzle, addressing the disproportionate impact of firearm injuries, and particularly firearm-related assaults, on urban communities requires a focus on safe communities. Local solutions such as violence prevention programs and non-violent conflict resolution management, such as Safe Streets, Baltimore's gun violence reduction program that engages community members to interrupt the transmission of violence, are likely to have a significant impact.

This study supports the feasibility of recruiting patients and families seen in both the pediatric and general ED to participate in violence and injury prevention interventions. Future directions may take the form of promoting injury prevention more broadly in the ED setting, distributing safety supplies, including supplies for safe firearm storage, in the ED, and engaging families in discussions and solution generation around community safety.

Limitations

Several limitations may limit the generalizability and validity of our findings. The small sample size may undermine the study's ability to draw reliable conclusions and the reliance on a convenience sample introduces selection bias, as participants were not randomly selected and may not be representative of the broader ED population. Additionally, the study's exclusion of patients who were not proficient in English raises concerns about the lack of diversity and inclusivity in the sample. Furthermore, the research is susceptible to social desirability bias, as participants may provide inaccurate or incomplete information due to the perceived social desirability of certain health behaviors such as safe firearm storage or not having firearms in the home.

Conclusion

In this sample of ED patients and their families living in Baltimore, MD, most adults did not keep firearms in the home and among those that did, the majority stored their firearms safely. Those participants who did not store firearms locked and unloaded were primarily inhibited from doing so due to perceived concerns around quick firearm access. This study has implications for future efforts to promote safe storage practices in the context of the ED.

Declarations

Conflict of interest The authors have no financial or non-financial interests that are directly or indirectly related to the work submitted for publication.

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