

Addressing Firearm Safety Counseling: Integration of a Multidisciplinary Workshop in a Pediatric Residency Program

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ABSTRACT

Background Firearm-related injuries are the second leading cause of death among US children. Given this, firearm injury prevention should be a key aspect of pediatric anticipatory guidance.

Objective We assessed the impact of a firearm safety counseling workshop on pediatric resident knowledge, self-efficacy, and self-reported practice patterns.

Methods Sixty of 80 residents (75%) participated in a 2-hour multimodal workshop, including video, didactics with experts, and role-play scenarios. Participants were invited to complete pre-workshop, immediate post-workshop, and 3- and 6-month post-workshop self-reported questionnaires evaluating knowledge, comfort, perceived barriers, and reported practice patterns. Data comparing pre- and 6-month post-workshop practice patterns were analyzed via Fischer's exact test. Remaining statistical analysis utilized a one-sided, unpaired Mann-Whitney U test. A binomial exact proportions test was used for open-ended responses.

Results After the workshop, the percentage of participants with perceived concern regarding parental barriers decreased significantly (24% to 7%, $P = .001$). Participants 6 months post-workshop were 5.14 times more likely to counsel their patients on firearms during more than 75% of their well visits than prior to the intervention ($P = .010$). Participants reported greater comfort asking patients about firearms, with mean Likert scores increasing from 3.81 pre to 4.33 post ($P = .022$), which was similar to 3-month (4.39, $P = .06$) and 6-month evaluations (4.54, $P = .003$).

Conclusions Education on firearm safety counseling improved pediatric resident comfort level in discussing the topic. This impact persisted 6 months after the workshop, implying a sustained change in attitudes and behaviors.

Introduction

Firearm-related injuries are the second leading cause of death among children in the United States.^{1,2} Given this, firearm injury prevention should be a key aspect of pediatric anticipatory guidance. Currently, an estimated 256 to 390 million firearms are present in 35% to 39% of US households,^{3,4} and an estimated 4.6 million children live in a home with a firearm that is stored unlocked and loaded.⁵ The unsafe storage of firearms puts the children living in these homes at risk of becoming one of nearly 6000 children treated in the emergency department because of firearm injury⁶ or the more than 3000 pediatric firearm deaths per year,^{1,2} underlining the need for the pediatrician to be engaged in firearm injury prevention.

The American Academy of Pediatrics (AAP) provides guidelines regarding responsible firearm storage, recognizing the safest home is one without a gun, but if a gun is kept in a home, it should be locked, unloaded, and ammunition should be locked separately.⁷ The AAP calls for pediatricians to routinely ask about the

presence of firearms in the home and provide firearm safety counseling.⁸ This pairs well with the Accreditation Council for Graduate Medical Education (ACGME) requirements for pediatric residency programs, which mandate a minimum of 5 educational units in ambulatory pediatrics that must contain elements of community pediatrics and child advocacy.⁹

Studies have reported 74% of pediatricians surveyed felt firearm safety counseling is important and a key responsibility, yet 30% to 50% reported routine counseling about firearm injury or safe storage.^{10,11} Coupled with reports that a majority of parents (75%) believe pediatricians should counsel about safe firearm storage,¹¹⁻¹³ the gap in counseling is telling. Firearm owners report being receptive to firearm safety counseling, especially when risk factors are present, such as young children in the home or an individual with suicidal ideation.¹⁴ A majority of surveyed residents (63%) reported never or rarely attending counseling.¹⁵ This is confirmed with 12.8% of parents reporting discussing firearms with their pediatrician.¹² Commonly cited barriers to counseling across multiple studies included lack of time and inadequate training on firearms and safe storage

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devices.^{11,15,16} Pediatric residents must develop skills in effective counseling and have knowledge of firearms and safe storage devices to promote firearm injury prevention strategies with confidence.

As of 2016, only 4 programs existed to teach medical professionals about developing firearm safety education.¹⁷ Other specialties like internal medicine, family medicine, surgery, psychiatry, and emergency medicine may encounter opportunities for firearm safety counseling. To address this gap, the University of Texas Health Science System at Houston developed an educational workshop for pediatric residents to improve their knowledge base and comfort level on firearm safety and safe storage counseling.

Methods

Setting and Participants

The workshop was hosted in June 2019 during the previously established dedicated academic time for the pediatric training program, which encompassed pediatric residents at all levels, medicine-pediatric residents who were on a pediatric rotation, and pediatric chief residents.

Design

A literature review was conducted to assess the evidence behind education about safe storage. The development of the workshop was led by faculty with expertise in advocacy education and with local faculty and law enforcement experts in firearm injury prevention. The workshop was created by assessing the gaps reported in the literature and with feedback from faculty in educational programs, advocacy, and input on firearm safety principles and devices from law enforcement.

Intervention

The 2-hour workshop consisted of 3 segments. An officer from the university police department presented on firearm safety principles, including videos demonstrating the main principles of safe handling of a firearm and safety devices. Second, faculty led a didactic session on the epidemiology of firearm injury, as well as emphasizing the principles of counseling especially as it relates to high-risk situations like domestic violence or suicidality. Third, the residents worked in pairs through a variety of role-play scenarios asking about firearms and how to counsel based on the risks presented to them. A group discussion was facilitated to review the workshop, including conversations about the challenges and successes the residents experienced as well as the feasibility of integrating firearm safety counseling into their clinic visits.

What was known and gap

Despite guidelines from the American Academy of Pediatrics calling for pediatricians to routinely ask about the presence of firearms in the home, only 30% to 50% reported providing routine firearm safety counseling.

What is new

A multimodal firearm safety workshop, including video, didactics with experts, and role-play scenarios was created and implemented.

Limitations

Response rates to follow-up surveys lowered over time.

Bottom line

Education on firearm safety counseling improved pediatric resident comfort level in discussing the topic, which persisted 6 months after the workshop.

Outcomes Measured

At the start of the workshop, residents were invited to participate in an optional anonymous survey to assess their comfort level, self-efficacy, and practice patterns in discussing firearms with families. Participants were invited to complete an immediate post-workshop, 3-month and 6-month post-workshop survey, with survey questions listed in the TABLE. All surveys were administered via Qualtrics (Qualtrics LLC, Provo, UT) and utilized a combination of open-ended responses as well as a 5-point Likert scale, with 5 meaning extremely comfortable.

Data Analysis

Results of the surveys were collated at the time of completion of the survey (pre-workshop, immediate post-workshop, 3- and 6-month follow-up). Statistical analysis was completed with RStudio 1.0.136 (RStudio PBC, Boston, MA). Analysis of open-ended responses was completed by independent review of authors (S.M., M.B., N.Z.) with identification of common themes followed by consensus of the results without objections. Data from pre-workshop and 6-month post-workshop practice patterns were analyzed via Fischer's exact test. Remaining statistical analysis was completed via a one-sided, unpaired Mann-Whitney U test. A binomial exact proportions test was used for open-ended responses.

The workshop evaluation process was deemed exempt by the University of Texas Health Science Center at Houston Institutional Review Board.

Results

A total of 75% of residents (60 of 80) participated in the workshop. The sample size for the number of surveys before, immediately after, and 3 and 6 months after the workshop was 43 (72%), 45 (75%), 24 (40%), and 23 (38%), respectively. There were 47%

TABLE
Survey Questions for All Workshop Stages

Survey Questions			
Pre-Workshop	Post-Workshop	3-Month Follow-Up	6-Month Follow-Up
What year resident are you?	What else would you like to know to better help you provide counseling to your patients about safe gun storage?	N/A	N/A
Do you own a firearm?	N/A	N/A	N/A
Did you grow up with firearms?	N/A	N/A	N/A
Do you feel comfortable asking your patients about firearms?	Do you feel comfortable asking your patients about firearms?	Do you feel comfortable asking your patients about firearms?	Do you feel comfortable asking your patients about firearms?
What are the current AAP recommendations for responsible gun ownership?	What are the current AAP recommendations for responsible gun ownership?	What are the current AAP recommendations for responsible gun ownership?	N/A
How comfortable do you feel initiating a conversation about firearm storage with your patients?	How comfortable do you feel initiating a conversation about firearm storage with your patients?	How comfortable do you feel initiating a conversation about firearm storage with your patients?	How comfortable do you feel initiating a conversation about firearm storage with your patients?
Rate how you agree with the following statements: I believe that asking about firearms during a well visit is a good use of time	Rate how you agree with the following statements: I believe that asking about firearms during a well visit is a good use of time	Rate how you agree with the following statements: I believe that asking about firearms during a well visit is a good use of time	Rate how you agree with the following statements: I believe that asking about firearms during a well visit is a good use of time
I believe that informing patients about firearms is an effective intervention	I believe that informing patients about firearms is an effective intervention	I believe that informing patients about firearms is an effective intervention	I believe that informing patients about firearms is an effective intervention
What barriers prevent you from asking about firearm storage with your patient?	After taking this workshop, what barriers do you perceive are preventing you from asking about firearm storage with your patient?	What barriers do you perceive are preventing you from asking about firearm storage with your patient?	N/A
I can hold an educated conversation about gun violence	N/A	N/A	N/A
How often do you counsel your patients about firearms during a well visit?	N/A	N/A	How often do you counsel your patients about firearms during a well visit?

Abbreviations: N/A, not applicable; AAP, American Academy of Pediatrics.

(20 of 43) postgraduate year (PGY) 1, 26% (11 of 43) PGY-2, 26% (11 of 43) PGY-3, and 1 chief resident. At baseline, 86% (37 of 43) of the pediatric residents who participated were not firearm owners, and 84% (36 of 43) grew up in homes without firearms.

Baseline Assessment

Prior to the intervention participants reported low rates of counseling about firearm storage during well child visits, with 37% (16 of 43) reporting counseling

less than 25% of the time. Additionally, 77% (33 of 43) of residents reported that they were either extremely or somewhat comfortable in initiating a conversation about firearm storage with patients, and 72% (31 of 43) reported they either strongly or somewhat agreed that they could hold an educated conversation about gun violence. See FIGURE 1 for resident survey responses on self-efficacy.

The pediatric residents were asked open-ended questions to describe their perceived barriers to asking about firearm storage with patients. The

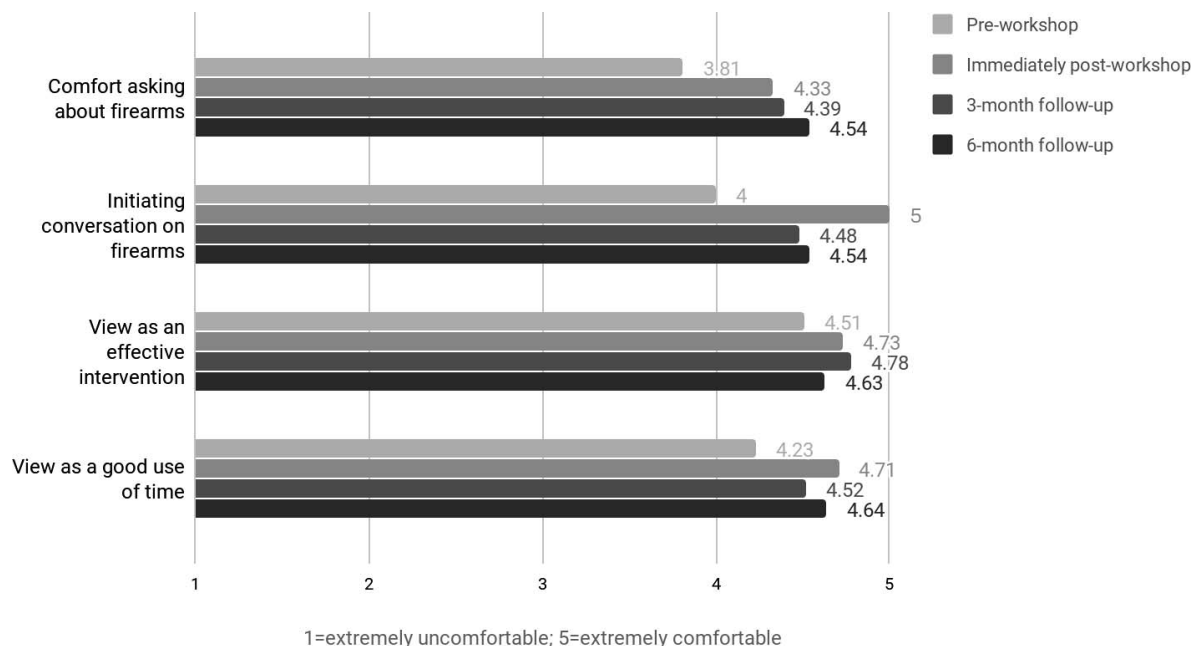


FIGURE 1
Pediatric Resident Report on Firearm Counseling

themes were categorized into 4 common topics: lack of time, perceived parental barriers, physician barriers, and no barriers. The most common reported barrier was lack of time (56%, 24 of 43). Residents who reported perceived parental barriers listed concerns about how a parent would react to the question or concerns about potentially offending the parent with the question. Those who reported physician barriers listed either concerns of their knowledge base or skill in counseling (FIGURE 2).

Knowledge base was assessed through an open-ended question to describe AAP recommendations on safe storage. The AAP states that the safest home is one without a firearm, and that safe storage is to keep the firearm locked, unloaded, and with ammunition separate from the firearm. Answers were scored on their ability to list all 3 recommendations of safe storage from the AAP. Prior to the workshop, 12% (5 of 43) of residents were able to list all 3 steps in safe storage, and 40% (17 of 43) were able to list 2 out of 3 steps. In reviewing the responses, 23% (10 of 43) reported “not own a firearm” as a safe storage recommendation.

Post-Workshop Assessments

Immediately after the intervention, participants reported statistically significant greater average comfort score asking patients about firearms from 3.81 to 4.33 ($P = .020$). Participants’ average ratings of comfort initiating a conversation about firearm storage

increased from 4.00 to 5.00 ($P < .001$). Residents’ average belief that asking about firearms is an effective intervention and asking about firearms during a well visit is a good use of time increased from 4.23 to 4.71 ($P = .004$) and 4.51 to 4.73 ($P = .030$), respectively (FIGURE 1).

At 3-month follow-up, the average score of comfort asking patients about firearms remained similar to the post-intervention survey at 4.39 ($P = .06$), and at the 6-month follow-up, the average score was again similar at 4.54 ($P = .003$). The participants’ average belief that asking about firearms is an effective intervention and asking about firearms during a well visit is a good use of time also showed little change at 4.78 ($P = .59$) and 4.52 ($P = .06$; FIGURE 1).

The number of participants who perceived concern regarding parental barriers decreased significantly from 67% (30 of 45) to 23% (10 of 43; $P = .001$), and those who perceived there were no barriers to providing firearm counseling increased from 14% (6 of 43) to 38% (17 of 45, $P = .004$; FIGURE 2).

Immediately after the workshop, all residents reported knowing at least one of the AAP firearm safety recommendations, and 29% (13 of 45) were able to successfully list all 3 recommendations on safe storage. At the 3-month follow-up, 17% (4 of 24) of residents were able to list all 3 recommendations, and 42% (10 of 24) were able to list at least 2 recommendations. Again, 25% (6 of 24) reported that one should not own a firearm.

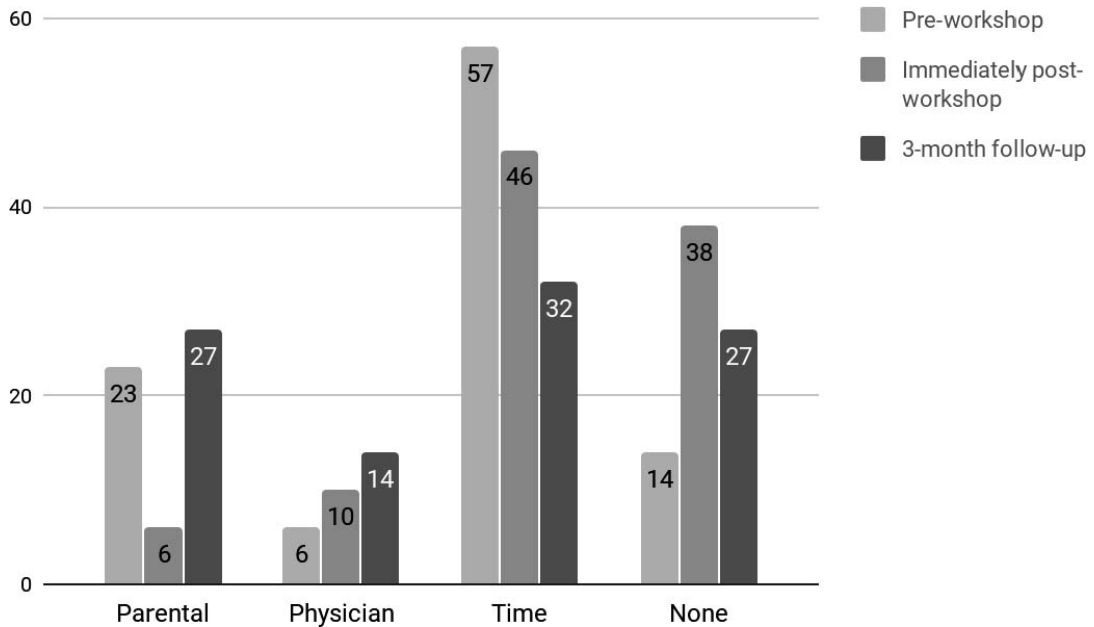


FIGURE 2
Report of Perceived Barriers to Firearm Counseling

Six months after the intervention, participants were 5.14 times more likely to counsel their patients on firearms during more than 75% of their well visits than prior to the intervention ($P = .010$; FIGURE 3).

Discussion

This workshop improved pediatric resident knowledge and comfort in discussing firearm safety and led

to improved practice patterns. This addresses a gap in education, as firearm safety counseling is lacking in pediatric residency training.

The baseline assessment of the participants is consistent with previous reports of resident perceived barriers of time and inadequate training.^{8,9,16} The pediatric residents were overwhelmingly non-firearm owners, which may have impacted their baseline comfort level. Despite their discomfort in asking

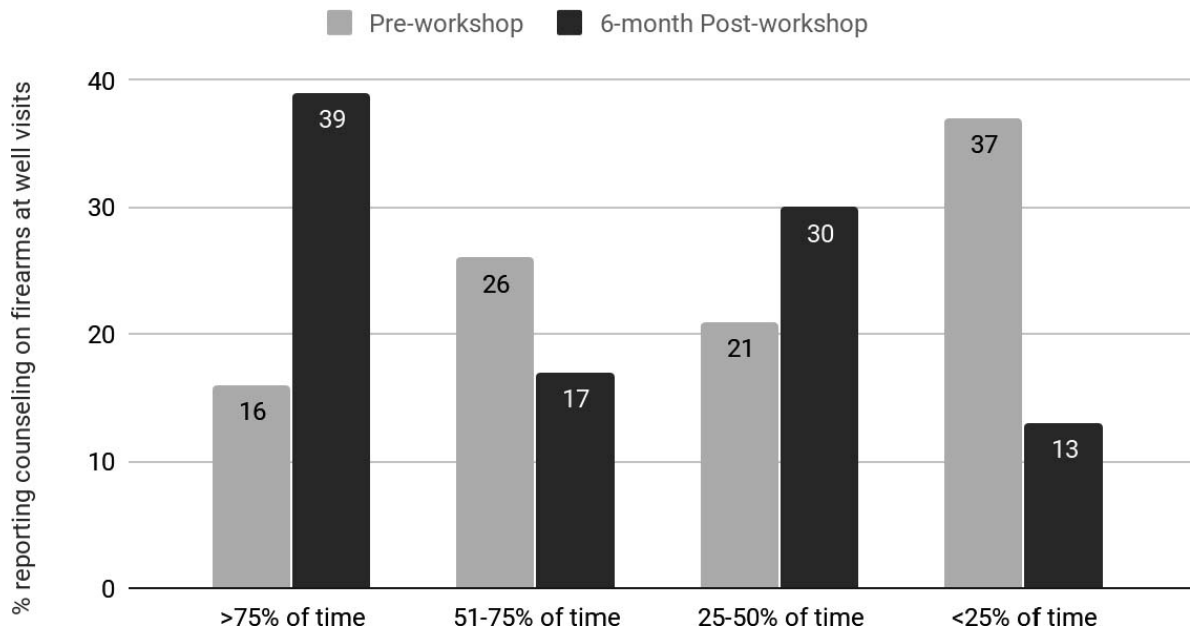


FIGURE 3
Practice Patterns of Pediatric Residents

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about firearms, the majority felt comfortable talking about safe storage, suggesting if pediatricians can initiate the conversation about firearms, they will be able to talk comfortably about safe storage.

The post-workshop survey demonstrated an increase in comfort level in initiating the conversation and asking about firearms and a decrease in perceived parental-based barriers. This is similar to a study by Cohen and Runyan, where residents who had a decreased comfort level or knowledge on injury prevention reported more barriers to injury prevention counseling.¹⁶ In a survey from pediatric emergency medicine providers, improvement of comfort level and instilling a feeling of personal responsibility were felt to be key for education interventions.¹⁸ This workshop was successful in improving the knowledge and comfort level of providers for pediatric residents, but other graduate medical education programs such as emergency medicine may benefit from improved comfort level in firearm safety counseling with patients.

The impact of education on firearm injury prevention can lead to sustained comfort level. In a similar intervention with third-year medical students, the students had short-term improvements in self-efficacy; however, there was a significant decline at 6 months. That intervention was brief (20 minutes) and did not include an interactive role-playing component.¹⁹ It is possible that a multimodal approach with a longer intervention (120 minutes vs 20 minutes) led to longer-term retention of self-efficacy and knowledge base. Additionally, Naughton et al evaluated a video-based firearm safety education module which demonstrated that trainees need additional education but without a role-playing opportunity for skill building.²⁰ The programs that lack time to integrate a full workshop into their curriculum could consider a modified program combining online modules with in-person sessions to maximize the educational experience. This workshop could serve as a template to teach firearm safety counseling in other residency or fellow training programs.

There are several limitations with this study. While the initial response rate was good, follow-up at 3 and 6 months was lower, limiting our assessment of the overall impact of this initial intervention. Improved response rates with further studies would further validate the results. Sustained results at 6 months may indicate that annual training may be sufficient. The results reflect a single urban program, and there is a need for further assessment of the implementation of the program in additional locations across a variety of regions. Replication of the workshop in other graduate medical education specialties will improve the generalizability of this work.

Conclusions

The integration of a multimodal workshop for residents that engages law enforcement and local firearm experts and includes role-playing scenarios in patient-physician interviewing creates an effective venue to improve knowledge base, comfort levels, and practice patterns among pediatric trainees. This could serve as a framework for firearm safety counseling in other areas of graduate medical education.

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