Review of evaluations of educational approaches to promote safe storage of firearms

K S McGee, T Coyne-Beasley, R M Johnson

Objective: To systematically review evaluation studies of educational interventions promoting safe firearm storage.

Methods: Medline, ERIC, PsycINFO, Criminal Justice Periodicals Index, Cumulative Index of Nursing and Allied Health Literature, and Sociofile were searched. The references from each potentially eligible study were checked, and experts in the field were contacted for additional reports. In addition, an internet search was performed to identify programs not published in the conventional literature. Sources relevant to safe firearm storage promotion were selected and evaluated.

Results: Seven studies met inclusion criteria: adult subjects, program description was included, and firearm storage outcomes were measured. One was a randomized controlled trial and the other six were one group pre-test and/or post-test. The studies were classified into the following categories based on the intervention strategies used: (1) counseling and firearm safety materials (n=3); (2) counseling/educational message (n=3); and (3) firearm safety materials distribution (n=1). The outcomes were safe firearms storage (firearms locked up and unloaded or removal from home) after intervention. Four studies, three using counseling and materials distribution, reported improved storage after the interventions.

Conclusions: It is not yet clear what types of interventions, or which specific intervention components, prompt gun owners to securely store their weapons. Increased understanding of gun storage behaviors and stronger evaluation designs will aid further understanding of this important issue.

RESULTS

Seven studies met inclusion criteria. Three other studies were identified during the literature search but were not included because there was not an evaluation component in the programs. Six programs were identified through the internet search. Telephone interviews with program administrators revealed that no evaluation has been completed, therefore, these programs were not included in the review. The studies were classified into the following categories based on the intervention strategies used: (1) counseling and materials distribution (n=3); (2) counseling/educational message (n=3); and (3) materials distribution (n=1). Counseling/educational message programs were characterized by provision of information about the dangers of having a gun in the home and the importance of either removing guns from the home, or storing them unloaded and locked up. Materials distribution programs included dissemination of gun safety devices only. Counseling and materials distribution interventions entailed both dissemination of firearm safety information and distribution of either a safe storage device, or a safe storage device coupon. Results are summarized in table 1.
Counseling and materials distribution interventions

Only one study using the counseling and materials distribution intervention strategy was a randomized controlled trial. Grossman et al targeted families visiting a physician’s office.13 If gun ownership was reported, those in the intervention group were given counseling, safe storage information, and a coupon to purchase an extrinsic safety device. Those who did not own guns were given counseling and a pamphlet. Control group participants received usual care. Outcomes included self report of acquisition of safe storage devices, removal of guns from the home, and acquisition of guns. There was no difference between intervention and control groups in: (1) rate of acquisition of new guns, (2) removal of guns, or (3) acquisition of guns.

Coyne-Beasley et al conducted a community based intervention targeting adult gun owners in North Carolina.14 Participants received a tailored educational message delivered by a health professional, gun safety information, and a free keyed cable gun lock. Law enforcement officers instructed participants on how to secure the lock on their particular firearm. Self report surveys before and after intervention were conducted. Outcomes measured were: number of gun(s) locked up in a compartment and/or unloaded, whether ammunition was locked up and stored separately from guns, and gun lock use. Statistically significant findings included an increase in the percentage of those who were using gun locks and storing guns in a locked compartment.

Horn conducted a community based program targeting randomly selected adult gun owners in two rural towns in Alaska.15 Participants received a gun safe and trigger lock along with a safety message. The outcomes measured, use of the gun safe and trigger lock, were assessed during an unannounced home visit with visual inspection. On follow up, 78% of the participants were using the gun safe correctly to store firearms, and 30% of trigger locks were being utilized by participants.

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Counseling/educational message interventions

Three studies utilized the counseling/educational message intervention strategy.16-18 Brent et al targeted parents whose adolescents were suffering from major depression and were participating in a randomized clinical psychotherapy trial.18
During the intake interview, parents with a gun in the home received an educational message about the risk of firearms in the home and were given recommendations for removal and safe storage of firearms. The outcomes measured were self report of gun removal and gun acquisition. Of those who had guns at intake, 27% reported removing them from the home. Unfortunately, 17% of those who did not own a gun at baseline acquired one over the two year follow up period.

Oatis et al conducted an intervention at a pediatric clinic targeting patients’ parents. Parents received an educational message based on the STOP program of the American Academy of Pediatrics which encourages removal of guns from the home, and if removal is not considered an acceptable option, storing guns unloaded and locked up. Outcomes measured were self reported change in gun ownership and firearm storage. There were no statistically significant changes in firearm ownership or storage practices.

Kruesi and colleagues targeted adults whose children were being seen at an emergency department for a mental health assessment. Parents received an educational message about limiting youth access to firearms and other lethal means for suicide. The outcomes measured were storing guns in a locked compartment or with a trigger lock, and removing guns from the home. The study found a significant association between exposure to the intervention and behavior change.

Materials distribution interventions

Only one study used the material distribution intervention strategy. Coyne-Beasley and Johnson distributed free keyed cable gun locks to law enforcement officers who wanted one. The outcome of interest, use of the device, was measured via anonymous self report. The majority (65%) reported that they were not using the gun lock. The primary reason given for not using the gun locks was a perceived inability to access firearms quickly in case of an emergency or home invasion.

DISCUSSION

Reduction in household firearms through safe storage could reduce the number of firearm injuries to youth, especially unintentional injury and suicides. Educating the public is a strategy for changing firearm storage practices. Therefore, in this review we examined the effectiveness of safe firearm storage promotion programs. After an extensive search, we found only seven such programs that had been evaluated. Unfortunately, there is little evidence that those programs are effective at eliciting behavior change (table 1). The easy conclusion to draw is that evaluations of safe firearm storage promotion programs have a multitude of methodological problems, including weak study designs, potentially biased sampling procedures, and small sample sizes (table 1). Only one of the seven studies employed a randomized controlled trial design. Most of the studies included in this review are one group, pre-test/post-test designs, which makes it difficult to draw solid conclusions about their success. Most outcomes were measured via a self reported survey of participants at some time period before and after intervention; therefore, reporting bias is possible. Some of the programs collected data in a clinical setting so some participants might misreport firearm storage methods or ownership or storage practices. Thus, it is likely that the inklings of success often shine through despite the weakest methods. Additionally, even the strongest studies in this review produced null results. Thus, it is likely that the approach of safe storage promotion programs needs to be re-examined.

Nevertheless, there are some lessons to be learned from unique components of the interventions reviewed here. For example, the “Love Our Kids, Lock Your Guns” program was preceded by a multimedia campaign and included a counseling session and demonstration of the use of the safety device that was provided to participants. In addition, participants self selected into the program and therefore, may have been motivated to change their storage behaviors. The program evaluated by Horn was unique because in addition to including an educational message and providing safety devices, the intervention took place in the homes of participants, focus groups were utilized to identify gun owners’ attitudes and preferences, and the outcome was measured via an unannounced home visit to assess safety device usage. These unique aspects may have influenced the finding that 78% of participants were using the gun safe at follow up.

Limitations

There were six safe storage promotion programs identified during the internet search that have not been evaluated or are in the process of being evaluated. For example, the National Shooting Sports Foundation’s “Project HomeSafe” has distributed over 400,000 free gun locks in recent years, but an evaluation of the program has not been completed (personal communication, Dee Dee Sarff, 7 June 2001). Similarly, the US Department of Justice, the Ad Council and the National Crime Prevention Council’s “Unload and Lock” nationwide, multimedia public service advertising campaign has no plans for program evaluation. Additionally, the Harborview Injury Prevention and Research Center in Seattle, Washington is conducting a case-control study of a safe gun storage campaign promoting the sale and use of handgun lock boxes. Evaluation of the program via random digit dial telephone survey is currently being conducted (personal communication, LuAnn D’Ambrosio, 16 May 2001). These programs may show some effectiveness in changing firearm storage behaviors, but without completed evaluations we have no information about the degree to which they are worthwhile. Additionally, among those safe firearm storage promotion programs that have been evaluated, many are not available in the peer reviewed academic literature, making it difficult to identify and include them in this review. Therefore, we would like to call for increased evaluation, better evaluation, and greater visibility of completed evaluations for safe firearm storage promotion programs. This will aid greatly in planning and designing future programs.

Recommendations for future research

While some of the studies reviewed here offer some evidence that safe firearm storage promotion programs are effective in improving storage practices, improved methodologies for future interventions will lead to clearer answers. Following is a list of potential improvements:

- Use of control groups to account for such things as the effect of self selection or phenomenon that may occur during the study period.
- Measure outcomes such as injury incidence as well as behavior.
- Measure outcomes objectively when possible.
- Use statistical tests to compare changes in pre-tests and post-tests.

Additionally, program designers need to build evaluations into their program plans and completed programs should consider
REFERENCES


Promotion of safe storage of firearms

Key points

- Firearm related injuries are a serious problem in the US.
- US youth having access to firearms in their homes likely contributes to the firearm injury problem.
- Reducing youth access to firearms through certain storage practices is an important strategy for injury prevention.
- The degree to which safe firearms storage promotion programs are successful is unclear.
- This review of safe firearm storage promotion programs suggests that there is little evidence that these programs are effective at eliciting improved firearm storage behaviors.
- Improved methodologies for future interventions are needed and will lead to clearer answers about what prompts gun owners to securely store their firearms.

CONCLUSIONS

Based on the findings in this review we are at the early stages of understanding what types of interventions, or which components of interventions, prompt gun owners to securely store their firearms. Improved understanding of attitudes, beliefs, gun storage behaviors, improved study design and consideration of evaluation methods in program planning will aid further understanding of this important issue.

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