



Appropriateness of a Brief Bleeding Control Curriculum Taught by Medical Students to Laypersons in Heavily Trafficked Locations: A Systematized Review of the Literature



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Background

Trauma is a leading cause of death and deaths from trauma have increased at 2x the rate of population growth. While mass casualty incidents attract much media attention, everyday injuries are responsible for most deaths from trauma. 40% of trauma mortality in the 24 hours after injury is caused by hemorrhage and it is estimated that >50% of these deaths could be prevented with adequate hemorrhage control. Laypersons are often on scene prior to EMS and can act as immediate responders to provide life-saving treatment until professional responders arrive. Victims can die from hemorrhage in under 5 minutes, but arrival times for EMS average 7-15 minutes. This window represents an opportunity for immediate responders to act as a vital link in the chain of survival.

Trauma Combat Casualty Care (TCCC) is a set of trauma management guidelines for the battlefield that advocates for early use of tourniquets. Implementation of TCCC resulted in an 85% decrease in mortality from battlefield extremity hemorrhage. Following the Sandy Hook Elementary massacre, the Hartford Consensus convened experts in pre-hospital and trauma care to translate the lessons learned from the military experience to the civilian environment. Stop the Bleed aims to train laypersons and make bleeding control supplies widely accessible in public places. StB offers bleeding control courses that are 1-3 hours in length and may cost up to \$100.

I created a bleeding control curriculum designed to be taught by medical students to laypersons in high traffic environments in about 5 minutes. The goal of teaching in this format is to incorporate basic bleeding control training into the day-to-day lives of passersby, allowing for more widespread dissemination of bleeding control training as it does not rely on laypersons recognizing their need for training, nor having the means to attend a bleeding control course.

Aim Statement

The purpose of this literature review was to assess the appropriateness and potential benefits of conducting brief, hands-on bleeding control training for laypersons taught by medical students in high traffic settings.

Methods

I conducted a systematized literature review of PubMed.

*I have no conflicts of interests to disclose.

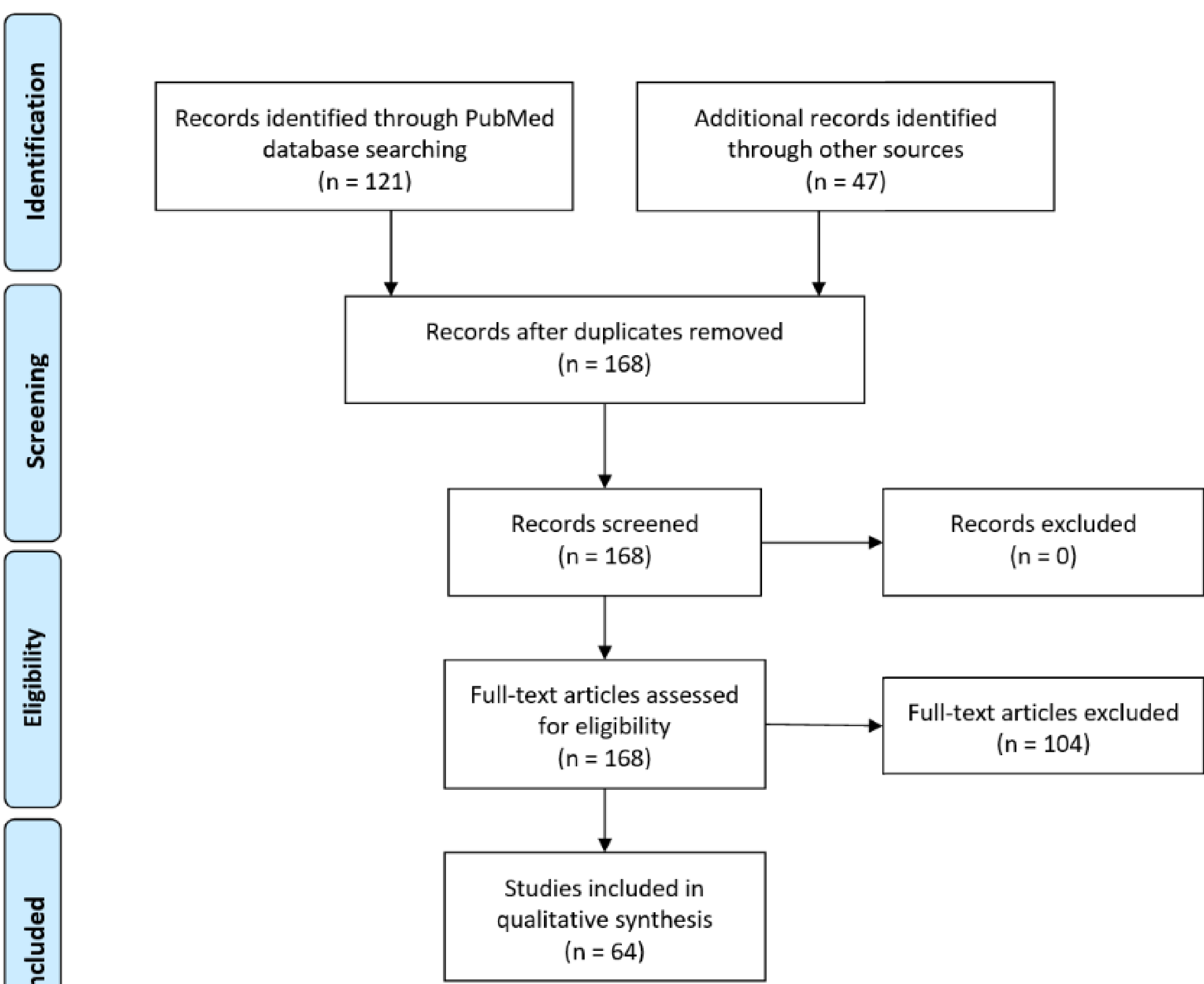


Figure 1: PRISMA flow diagram of systematic literature review

Results

- >90% of laypersons are willing to attempt bleeding control measures.
- Actual intervention rates range from 11-75%
- Untrained laypersons correctly apply a tourniquet <20% of the time.
- Product instructions, Just-in-Time Cards, and color-coded devices have success rates around 50%.
- Training improves knowledge and skill, as well as feelings of confidence, self-efficacy, preparedness, and willingness to act.
- Bleeding control courses have been studied in multiple communities, settings, and age groups.
- Courses that included hands on practice revealed greater improvements in skills.

Source	Intervention	Outcome
Stop the Bleed Education Consortium	Provide tiered training recommendations	Training for the layperson tier should be <15 min and widely available
Goolsby, Strauss-Riggs, Klimczak et al.	15 min mobile app-based training	Those with the mobile app had a 75% success rate compared to 50% in the control group.
Wall, Welander, Singh, et al.	19 sec training video x3 with practice x2	64% success rate that improved further with remediation.
Chang, Gent, Sweet, et al.	1 min CPR training video while practicing on mannequin	23,478 visits to the kiosk, 9000 attempted a test, pass rate of 19%

Figure 2: Summary of studies regarding brief and ultra brief training and medical students as trainers.

Beskind, Stolz, Thiede et al.	Compared 90 sec video to 20 min training course	Both groups showed significant improvement. Compression depth did not improve in brief video group.
Panchal, Meziab, Stolz, et al.	60 sec CPR training video.	Called 911 sooner, less hands off time, better compression rate compared to controls.
Bobrow, Vadeboncoeur, Spaite, et al.	Compared 60 sec video to 5 min video to 8 min video with practice.	All study arms performed compressions more often with improved rate and depth compared to control group.
Schroll, Smith, Zeoli, et al.	Med students took a StB course and then taught.	100% controlled bleeding. 88% average teaching score, 1/3 perfect score, TQ is most difficult to teach.

Figure 2 continued

Discussion

Bleeding control training is needed to make laypersons effective immediate responders. Bleeding control courses are effective at improving participants ability to recognize and treat life-threatening bleeding, while also improving feelings of confidence, preparedness, self-efficacy, and willingness to act – feelings which could lead to an improvement in the gap between those who report willingness to help and those who actually help. These courses have been studied in multiple communities, settings, and age groups and demonstrate that nearly anyone can be taught bleeding control techniques.

Studies have demonstrated the benefit of teaching bleeding control skills in a format that includes hands-on practice, including brief and ultra-brief formats. The literature also supports the ability of medical students to achieve the skills and confidence necessary to teach bleeding control to laypersons in their communities and aid in wide dissemination of these skills.

A brief, hands-on bleeding control curriculum taught by medical students appears to be an effective way to widely disseminate bleeding control training. Training in high traffic areas within a community could be an effective way to address barriers to obtaining bleeding control training and bring training into the communities that need it most.

Areas for Improvement

- Development of tourniquet that can be used by untrained laypersons.
- More realistic training situations and mannequins to improve real-life efficacy of training.
- Widespread access to bleeding control supplies.
- Standardization of type of tourniquet used in the civilian environment.
- Development of a recertification interval.
- Creation of bleeding control courses that are culturally competent and translated into multiple languages.