



Are We Ready in Case of a Campus Shooting?

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Abstract

Objective: The purpose of this study is to examine college students' perception, attitude, and knowledge of an active shooter incident in order to identify and aid their future campus public health emergency preparedness training.

Methods: It is a cross-sectional study, and a total of 455 undergraduate and graduate students were recruited from a variety of majors enrolled in 19 randomly selected classes. A 22-question semi-structured survey questionnaire was distributed and completed by the participants. Data was analyzed both quantitatively and qualitatively.

Results: Approximately, 82% of the participants indicated that they would be panicked or terrified during a campus shooting and more than half of the participants thought that an active shooter incident could happen to any campus and perceived that their current institution was prepared for it. Participants presented moderate knowledge of an active shooter preparedness. Less than 32% of the participants had prior gun violence preparedness training, and more than 83% of them emphasized the importance of routine emergency preparedness training. There was no clear trend indicating that a higher student classification led to a better preparedness.

Conclusions: Attention should largely be given to developing consistent, tailored, and evidence-based institutional emergency training programs to facilitate a campus-wide readiness.

Key Words: Active Shooter Incident, Emergency Preparedness, College Students

Introduction

Between 2000 and 2018, Federal Bureau of Investigation (FBI) reported 277 FBI-designated active shooter incidents in the US, which led to 844 deaths and 1,546 injuries [1]. Approximately, 43.7% of these 277 incidents occurred at areas of commerce, 20.6% at pre-K to 12 schools and institutions of higher education, 13.4% at open spaces, 9.4% at government properties, and the rest at places like residences, healthcare facilities, and houses of worship [1]. The Citizens Crime Commission of New York further reviewed 190 shooting incidents with at least one person being intentionally shot on or near 142 US college campuses between 2001 and 2016 school years [2, 3]. At the time, an estimated 2.5 million students were enrolled at these 142 colleges and were directly and indirectly exposed to these incidents [2, 3]. Compared to the number of shootings during the first five school years (2001 to 2006), the number of shootings during the last five school years (2011 to 2016) was increased by 153%, which caused a 241% increase of

casualties [2, 3]. In 2020, as of July 6th, Gun Violence Archive recorded a total number of 21,283 gun violence related deaths including deaths involved in 282 mass shootings [4]. It also indicated a growing trend of mass shootings in the US with 269 verified incidents in 2014 and 418 incidents in 2019, and a considerable number of mass shootings happened at schools and on college campuses [4]. Gun Violence Archive defined a mass shooting as only the numeric value of 4 or more shot or killed, not including the shooter" [5] while "media outlets, academic researchers, and law enforcement agencies frequently use different definitions when discussing mass shootings, which can complicate our understanding of mass shooting trends and their relationship to gun policy" [6]. Notably, mental health consequences due to mass shootings have been well documented [7, 8]. Empirical data suggested both significantly increased incidence and prevalence of psychiatric disorders in the aftermath of a mass shooting, including posttraumatic stress disorder, major depression, generalized anxiety disorder, acute stress disorder, and alcohol-related conditions, among survivors, victims/survivors' families and friends, as well as members of affected communities [7, 8]. Similarly, ten years after the mass-casualty incident at Virginia Tech, researchers revealed both profound emotional and economic impact of the tragedy in addition to the extremely disturbing number of casualties [9]. The estimated cost of the tragedy itself and aftermath was about \$48.2 million including funds to strengthen safety and security measures, emergency communications, mental health services, and support for survivors and families of victims [9]. As the number of campus shootings increases, how well have institutions of higher education been prepared for an active shooter? Several studies looked into the readiness of campus emergency management plans as well as the preparedness of administrators, faculty/staff, and students. For instance, a study reviewed campus emergency management plans from 27 institutions in Missouri to determine the consistency and accuracy of actual campus responses to different safety scenarios as instructed by these plans. Findings suggested the areas for improvement, including increasing faculty/staff/students' levels of comprehension of emergency plans; increasing comprehensiveness and consistency of institutions' emergency plans across the state; increasing annual training of emergency preparedness; and increasing discussions and evaluations of current emergency plans [10]. Especially for developing a highly visible firearms violence campus plan, Thompson and her colleagues pointed out that firearms violence was not perceived as a problem on campus. Therefore, institutions could be facing additional challenges for their readiness [11]. Another study examined the impact of 2007

Virginia Tech shootings on college emergency procedures using a representative national sample of 161 US college campuses. Although a majority of campuses had appropriate emergency procedures in place, a substantial number of colleges did not realize the importance of regularly conducting campus-wide emergency drills and training [12]. The two most recent studies on students and faculty concurred the previous findings. A majority of college students were not aware that written institutional emergency plans were in place, and they perceived that active shooter protocol was less effectively communicated compared to the communication of general crisis management protocol [13]. Faculty members also reported a significant lack of hands-on training exercises, and only about half of them received institutional active shooter training and perceived themselves as being prepared for campus shootings [14]. Moreover, current literature pinpointed that the average police response to an active shooter incident was often longer than the time it took for an active shooter to complete the act, which is less than 12 minutes with 37% of these incidents lasting less than 5 minutes, and hence, it re-emphasized the importance of being consistent with emergency preparedness of an active shooter incident for all campuses across the nation and address the administrators, faculty/staff, and students' emergency training needs as one of institutions' top priorities [15, 16]. The current study aims to learn and assess perception, attitude, and knowledge of a campus shooting among college students from different student classifications in order to identify and aid their future public health emergency preparedness training on campus.

Methods

Subjects

Participants in this study were college students from different student classifications and were recruited from a Midwestern four-year regional university through stratified random sampling. Sample size was estimated using G*Power. Except for non-traditional classes (e.g., independent study, thesis), all classes from one department for different majors (e.g., Exercise Science, Exercise Science and Sport Psychology, Nutrition, Public Health, Speech-Language Pathology) were considered and stratified into five classifications: freshmen, sophomore, junior, senior, and graduate. Within each classification, classes were randomly selected, and the number of classes selected was determined by the goal of achieving a relatively balanced number of students in each of these five classification. Then, individual instructors were contacted for their consent to a short in-class survey for campus gun violence preparedness. Students who were enrolled in multiple classes that were selected only received one survey request. A total of 455 students in 32 different majors and unknown/undeclared majors from 19 classes participated in this study and completed the survey.

Measurements

A 22-question semi-structured survey questionnaire entitled "Are we ready in case of a campus shooting?" was developed based on the current literature review. All questions are multiple choices except for five partial open-ended questions. The questionnaire were categorized into five domains, (1) Demographics including year of college, gender, ethnicity, and major; (2) Perception including perceived emotional response and perceived institutional readiness to/of a campus shooting; (3) Attitude including students' attitude towards the likelihood of a campus shooting; (4) Knowledge including knowledge of responding to different active shooter scenarios and knowledge of availability of campus e-alert system, crisis management plan, and other campus preparedness resources; for example, students were asked "What would you do if you are in a classroom, and the shooter is in the hallway?" "How would you properly barricade a door if it does not lock during a campus shooting?" "How do you protect yourself if a shooter is in front of you?" "What is the average duration of a shooting?" "What is the

percentage of shootings that end before the police arrive?"; (5) Training including students' previous campus/school gun violence training, and future emergency preparedness training needs and preferences for frequency and format of training. The questionnaire was validated by two campus police officers who had extensive experiences in emergency preparedness and response.

Procedures

It is a cross-sectional study and was approved by the University's Institutional Review Board. After contacting individual instructors, a trained undergraduate research assistant went to each of the 19 selected classes and distributed the paper survey either at the beginning or in the end of these classes. Before students started the survey, the purpose of the study was explained to them, and their consent was obtained. Each questionnaire was completed in no more than 10 minutes. Data was collected, and quantitative data was entered into SPSS 24.0 database.

Analysis

All quantitative data was analyzed using SPSS 24.0 (IBM). Descriptive statistics was used to compute means and frequencies for each variables for 455 participants as a whole and for participants in each student classification: freshmen, sophomore, junior, senior, and graduate students. Means of those five student classifications were further compared using One-way Analysis of Variance (ANOVA) with a statistical significant level at 0.05 (one-tailed). The significance of differences in perception, attitude, knowledge, and training needs among five classifications was examined, and was followed up by Tukey HSD post hoc for multiple comparisons between any of two classifications. The relationship between students' previous training experience and their attitudes towards the likelihood of a campus shooting was also examined. Theme analysis was utilized to identify the emerging themes from the qualitative data, mainly related to areas of campus gun violence preparedness needs and readiness of campus active shooter prevention resources.

Results

A total of 455 students participated in the study with 62 freshmen, 86 sophomores, 112 juniors, 115 seniors, and 79 graduate students (Table 1). Of these students, approximately 72% are females and 70% are Whites. About 30% of the participants identified themselves as minorities including African Americans, Native Americans, Asians, Hispanics, etc. Thirty-two majors were reported, and most of the participants (59%) majored in Public Health, Kinesiology, and Speech-language Pathology. About 21% of the participants did not declare or disclose a major at the time of this study, and 20% consisted of participants majoring in Psychology, Nutrition, Biology, Pharmacy, Dental Medicine, Business, Computer Science, Engineering, Language, Criminal Justice, Communication, etc. Noticeably, nearly 68% of the participants had a health-related major.

Table 2 illustrates the participants' perception, attitude, knowledge and emergency preparedness training of campus gun violence by student classification and all. In each group, more than 80% of the participants perceived that they would be panicked or terrified in response to a campus shooting. More than half but less than 63% of the participants perceived that their campus were very or some what prepared for an active shooter, and some participants indicated that campus police were equipped for this type of incident, and there were campus emergency/crisis management plans in place. More than 50% but less than 62% of the participants seriously thought a campus shooting could happen, and participants concluded that campus shootings had become more common, anyone could access campus buildings at any time, and students were always on edge.

Across all student classifications, participants predominantly did well with some knowledge-based questions, such as how to respond to an active shooter in hallway, how to barricade a door that cannot be

Demographics	Number (Percentage)
Year of College	
Freshman	62 (13.6)
Sophomore	86 (18.9)
Junior	112 (24.6)
Senior	115 (25.3)
Graduate	79 (17.4)
Unknown	1 (0.2)
Gender	
Male	126 (27.7)
Female	327 (71.9)
Other	2 (0.4)
Ethnicity	
White	319 (70.1)
Black/African American	98 (21.5)
American Indian/Alaska Native	2 (0.4)
Native Hawaiian/other Pacific Islander	4 (0.9)
Asian	14 (3.1)
Hispanic/Latino	4 (0.9)
Multiethnic	3 (0.7)
Unknown	11 (2.4)
Major of Study	
Public Health	70 (15.4)
Kinesiology	94 (20.7)
Speech-language Pathology	106 (23.3)
Nutrition	5 (1.1)
Nursing	7 (1.5)
Psychology	18 (4.0)
Biology	7 (1.5)
Dental Medicine	2 (0.4)
Construction Management	2 (0.4)
Education	10 (2.2)
Finance	2 (0.4)
Marketing	2 (0.4)
Accounting	5 (1.1)
Business	6 (1.3)
Computer Science	2 (0.4)
Engineering	3 (0.7)
Criminal Justice	3 (0.7)
Communication	2 (0.4)
Integrative Study	2 (0.4)
Others (Pharmacy, Geography, Social Work, English, Spanish, etc.)	10 (2.2)
Undeclared	23 (5.1)
Unknown	74 (16.3)

Table 1: Participants' Demographics (n=455)

	All (n=455)	Freshman (n=62)	Sophomore (n=86)	Junior (n=112)	Senior (n=115)	Graduate (n=79)
Perception						
Perceived emotional response to a campus shooting						
Being panicked to terrified	81.8	83.9	80.2	81.3	82.6	81.0
Perceived campus preparedness of an active shooter						
Very prepared	9.5	11.3	10.5	8.9	8.7	8.9
Somewhat prepared	50.1	51.6	46.5	58.0	47.0	45.6
Not prepared	10.8	3.2	14.0	8.0	13.0	13.9
Unknown/unsure	27.7	32.3	26.7	24.1	28.7	29.1
Attitude						
Likelihood of a campus shooting						
Very likely	6.8	8.1	3.5	5.4	6.1	12.7
Somewhat likely	50.3	46.8	46.5	53.6	53.0	49.4
Not very likely	34.7	32.3	41.9	33.9	31.3	34.2
Unknown/unsure	5.9	11.3	5.8	6.3	7.0	0
Knowledge						
An active shooter in the hallway*	86.8	79.0	84.9	90.2	87.8	88.6
An active shooter on campus*	45.1	41.9	47.7	47.3	43.5	43.0
Someone next to you that is wounded*	11.4	11.3	11.6	5.4	18.3	10.1
Barricade a door cannot be locked*	89.0	85.5	89.5	90.2	88.7	89.9
Near a shooter who is distracted*	19.6	22.6	17.4	20.5	15.7	24.4
In front of a shooter*	84.6	91.9	84.9	79.5	85.2	86.1
Average duration of a shooting*	39.3	38.7	26.7	42.0	46.1	40.5
Percentage of shootings end before police arrive*	30.8	38.7	25.6	26.8	36.5	27.8
Awareness of campus crisis management plan						
Yes	28.1	33.9	17.4	24.1	30.4	36.7
Subscription of campus e-alert						
Yes	80.4	71.0	70.9	77.7	92.2	84.8
Awareness of campus preparedness resources						
Yes	49.9	51.6	46.5	56.3	39.1	58.2
Emergency Preparedness Training						
Prior gun violence preparedness training						
Yes	31.9	32.3	27.9	31.3	29.6	39.2
Preferred format of emergency training						
Online	17.1	17.7	10.5	14.3	22.6	20.3
In-person	36.5	42.6	40.7	38.4	27.8	36.7
Hybrid	43.7	38.7	45.3	45.5	46.1	40.5
Preferred frequency of emergency training						
Twice a year	19.6	24.2	19.8	23.2	15.7	16.5
Every year	63.7	58.1	58.1	61.6	69.6	68.4
Once every two years	13.4	16.1	15.1	13.4	12.2	11.4
Interest of emergency preparedness						
Yes	73.2	71.0	76.7	70.5	74.8	72.2

* Percentage indicates the best response to a question.

Table 2: Participants' Perception, Attitude, Knowledge, and Emergency Preparedness Training of Gun Violence in Percentage

locked, how to respond when directly facing a shooter, and how to subscribe university's e-alert system. However, participants were also unsure about several scenarios and facts. Participants wondered how they should respond to someone next to them that was wounded. Very few participants chose not to take the wounded person and get out as fast as they could when they knew that they should leave immediately (all: 11.4%, freshman: 11.3%, sophomore: 11.6%, junior: 5.4%, senior: 18.3%, graduate: 10.1%). Very few participants knew how to properly react when an active shooter was near but distracted (all: 19.6%, freshman: 22.6%, sophomore: 17.4%, junior: 20.5%, senior: 15.7%, graduate: 22.4%). Less than 46% of the participants knew the fact that the average duration of a shooting could be 5 minutes or less (all: 39.3%, freshman: 38.7%, sophomore: 26.7%, junior: 42%, senior: 46.1%, graduate: 40.5%), and less than 39% of the participants knew the fact that about 60% of shootings ended before police arrived (all: 30.8%, freshman: 38.7%, sophomore: 25.6%, junior: 26.8%, senior: 36.5%, graduate: 27.8%). Less than 58% of the participants learned the fact that the campus had emergency preparedness resources available and accessible (all: 49.9%, freshman: 51.6%, sophomore: 46.5%, junior: 56.3%, senior: 39.1%, graduate: 58.2%). They listed resources, such as campus police force, emergency stations, and crisis management plans, however, some also indicated that "I can ask and find out," "I do not know but I am sure we have them," "Campus and city police, instructions but still need more knowledge on it," and less than 36.7% of the participants acknowledged the existence of a campus crisis management plan (All: 28.1%, freshman: 33.9%, sophomore: 17.4%, junior: 24.1%, senior: 30.4%, graduate: 36.7%).

Only few participants reported that they had previous gun violence preparedness training, which was received from their high schools,

workplaces, and community colleges (all: 31.9%, freshman: 32.3%, sophomore: 27.9%, junior: 31.3%, senior: 29.6%, graduate: 39.2%). Contrarily, at least 77.9% of the participants from each group agreed that gun violence preparedness training should be conducted once a year or twice a year (all: 83.3%, freshman: 82.3%, sophomore: 77.9%, junior: 84.8%, senior: 85.3%, and graduate 84.9%), and a vast majority of them preferred to have either in-person or hybrid training (all: 80.2%, freshman: 81.3%, sophomore: 86.0%, junior: 83.9%, senior: 73.9%, graduate: 77.2%). In addition, participants identified areas of training, including defense skills, simulation cases, cardiopulmonary resuscitation, escape plans and routes, mental preparedness, different emergency plans for different buildings, and basic medical knowledge.

Comparisons were made among five student classifications, including freshman, sophomore, junior, senior, and graduate. Significant differences were identified among five student groups related to four questions (Tables 3 & 4). Compared to juniors, seniors implied that they were less likely to stay behind with a wounded person or do everything they could to get both of them out when they knew they should leave the scene immediately ($p=0.01$). Graduate respondents seemed having better knowledge about campus crisis management plan than sophomores ($p=0.048$). Compared to both freshmen and sophomores, seniors were more active in subscribing the campus e-alert system ($p=0.01$, $p=0.01$). Graduate students seemed having more awareness of campus resources that could help prepare for a campus shooting than seniors ($p=0.04$). Additionally, there was a significant relationship between participants' emotional response to an active shooter incident and their previous training experiences ($r=0.102$, $p=0.002$).

	Sum of Squares	df	Mean Square	F	P-value
Someone next to you that is wounded Between groups	5.2	4	1.3	2.6	0.04
Awareness of campus crisis management plan Between groups	2.0	4	0.5	2.5	0.04
Subscription of campus e-alert Between groups	3.5	4	0.9	5.9	0.00
Awareness of campus preparedness resources Between groups	2.6	4	0.6	2.6	0.04

Table 3: One-way ANOVA Comparing Means among Five Student Classifications

	Mean	Mean Difference	P-value
Someone next to you that is wounded		0.3	0.01
Junior	2.9		
Senior	2.6		
Awareness of campus crisis management plan		0.2	0.048
Sophomore	1.8		
Graduate	1.6		
Subscription of campus e-alert		0.2	0.01
Freshman	1.3		
Senior	1.1		
Sophomore	1.3	0.2	0.01
Senior	1.1		
Awareness of campus preparedness resources		0.2	0.04
Senior	1.6		
Graduate	1.4		

Table 4: Tukey HSD Post Hoc Multiple Comparisons between Two Student Classifications

Discussion

The current study diversified its participants by major, gender, ethnicity, and student classification although about 68% of them appeared to have a health-related major. Participants presented moderate knowledge of an active shooter preparedness. Unsurprisingly, participants predominantly perceived that they would be panicked or terrified during a campus shooting. Although more than half of the participants were confident in their institutional response to an active shooter incident, they expressed their interest of learning more about campus emergency/crisis plans and other campus emergency preparedness resources that were available to them; leaning more about basic defense and medical skills during an emergency, routes for escaping, and different emergency plans for different buildings. Similar findings were also suggested by Grimsley's early study [13]. Meanwhile, a vast majority of the participants subscribed the campus e-alert system. Previous research indicated that people intended to be more serious about warning messages sent through text messages, like an e-alert does, than messages sent through social media [17]. While there were some differences in areas, such as participants' awareness of campus preparedness resources and subscription of campus e-alert, among different student classifications, there was no clear trend implying that being on campus longer would lead to a better understanding and readiness of campus shooting. About 60% of the participants seriously thought that a campus shooting could happen to any campus, and more than 83% of the participants urged regular campus preparedness training at least once a year or twice a year since only less than 32% of the respondents had prior gun violence prevention and preparedness trainings at some point in life. Likewise, other studies identified the same training needs for both students and faculty in order to respond to campus shooting incidents [10, 12-14, 18]. Clark and Bass concluded from their study that mandatory training should be considered; routine drills should be conducted, and training should be focused on response and preventive measures [18].

Several studies examined the effectiveness of an active shooter preparedness training among college students. For example, a total of 126 incoming undergraduate and graduate students in Social Work from a California state university participated in Welch and Villalta's study in 2019. Participants received a presentation and a short video on preparing for an active shooter on campus. The training was conducted by a university police officer. A follow-up survey was distributed to all the participants to examine their levels of preparedness and ask them to compare their current training with their previous ones. Approximately 87% of the participants reported that they felt more prepared after the training. Participants appreciated the self-defense demonstrations during their training and suggested more hands-on practice would be more beneficial [19]. In Skurka and his colleagues' recent study, a quasi-experimental design with both pre- and post-tests was utilized to evaluate a campus emergency preparedness intervention, including the preparedness of an active shooter incident, and validate the efficacy of a professionally produced video adopted by the intervention and narrated by a campus safety Lieutenant. The video was themed by a slogan, Run-Hide-Fight, that was advocated by the Department of Homeland Security and endorsed by FBI. Researchers recruited 419 undergraduate students enrolled in two large communication classes from a Midwestern university. The intervention achieved its anticipated immediate cognitive and behavioral outcomes, and the favorable effects lasted [20]. An early active shooter resilience intervention using a quasi-experimental post-test-only study design with 136 undergraduate students from a large private university also demonstrated its effectiveness. Compared to the control group without any training, students in the intervention groups with shooter resilience training gained the sense of personal safety and the knowledge of gun violence prevention strategies [21]. On the other hand, researchers also pinpointed that active shooter preparedness training should take issues like participants' gender, their informed

consent to a drill and psychological burden, and cost-effectiveness (simulation vs. tabletop exercise) of a training program. into consideration in order to achieve its true worthiness without increasing students' level of anxiety and fear, as well as satisfy its feasibility [22-24].

Besides routine training, over the years, many other prevention and preparedness strategies have been recommended by governmental agencies, law enforcement officers, university administrators, and researchers. Greenberg commented earlier that in order to effectively prevent and prepare for an active shooter incident, campus officials must consider establishing a relationship with faculty and students based on trust and common interest through ways, such as (1) building a safe environment in which students know how to share information "about rumors, suspicions, and deviant behavior" [25]; (2) reinforcing and increasing the awareness of a campus no weapon policy and penalties for violation; (3) improving faculty skills in dealing with disgruntled students and facilitating a mutual understanding as participants in the current study indicated that "students were always on edge;" and (4) dispelling false assumptions, including "awareness is readiness;" faculty and students clearly understand campus emergency/crisis management plans in contrast to only 28% of the students in the current study reported that they were aware of the existence of a campus crisis management plan; one-time training or orientation is sufficient; and first responders are near like a majority of the students in the current study did not realize that most of the active shooter incidents ended before first responders arrived and endured in less than 5 minutes [25]. In addition, others also stressed the importance of ensuring campus emergency response plans up to date and tailored to an individual institution, and being communicated to faculty and students on a regular basis; implementing an emergency mass notification and communications system that can be easily and widely adopted by a campus community; establishing a multidisciplinary threat assessment team on campus; developing mutual aid agreement with outside community partners, including local mental health service providers and law enforcement agencies [26-28], and adopting evidence-based safety measures and responses [29].

Conclusions

The current study provided a snapshot of its study participants' readiness of an active shooter incident on campus. Although participants presented some knowledge of responding to a campus shooting, needs were also revealed, including routine campus emergency preparedness training, increased communication of campus crisis management plans and other emergency resources, improved emotional resilience during a crisis, as well as correction of misconceptions. Future endeavor should largely focus on developing consistent, tailored, and empirically sound institutional emergency training programs to facilitate a campus-wide readiness.

Declaration of Competing Interest: The author reports no competing interests.

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