

Issues and Innovations in Dental Hygiene Education

Active Shooter Preparedness among Dental Hygiene Students

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Abstract

Purpose: Active shooter incidents (ASIs) occurring in dental hygiene academic settings present unique challenges and research examining institutional preparation of dental hygiene students for such incidents is lacking. The purpose of this pilot project was to examine the perceived preparedness, confidence, and awareness of dental hygiene students regarding ASIs.

Methods: A validated 24-item electronic survey was distributed to dental hygiene students (n=68) at one institution to measure their preparedness, confidence, and awareness regarding ASIs. Descriptive statistics and Pearson correlations were used for data analysis.

Results: Fifty-seven dental hygiene students completed the survey for a response rate of 84%. Many participants felt slightly prepared (n=26, 45.6%) or not prepared (n=15, 26.3%) to respond to an ASI in the classroom. Most were slightly confident (n=26, 45.6%) or not confident (n=16, 26.3%) in helping to control the classroom during an ASI. Over half (n=32, 56.1%) were not certain if their institution provided active shooter trainings and were not certain if drills occurred (n=25, 43.8%). Perceived preparedness was positively correlated with confidence in helping to control an ASI in the classroom ($r(56)=.616, p=.000$). Positive correlations were also identified with perceived preparedness to respond in a lab or clinic with the assumption that ASIs are taken seriously at their institution ($r(56)=.375, p=.004$).

Conclusion: A general lack of preparedness and confidence for responding to ASIs may exist among dental hygiene students along with a lack of awareness regarding trainings and drills. Educational institutions should implement best practices for preparing dental hygiene students for ASIs.

Keywords: dental hygiene students, active shooter, education, disaster preparedness, workplace safety, workplace wellness

This manuscript supports the NDHRA priority area Professional development: Education (evaluation).

Submitted for publication: 7/2/20; accepted: 10/4/20

Introduction

Active Shooter incidents (ASIs) occurring health care settings, including dental hygiene clinics and classrooms, present unique challenges. Dental hygiene on-campus clinics include potentially large gatherings of people and complex building structures with several floors, or a multi-building facility spread over a large area. Additionally, there may be secured and unsecured departments, multiple entryways, potentially confusing hallways, and additional factors including biological waste or other hazardous materials. The unique nature of on-campus clinic facilities and limitations due to size, location, rural versus urban, presence of students, security and modes of communication with individuals on and off campus, law enforcement availability and response times, are some of the many challenges campus health care clinics may face during an ASI.¹

During an ASI, dental hygiene faculty and student providers at on campus clinics, may also be faced with decisions about leaving patients; and patients may have difficulty evacuating due to age, physical disability, and/or language barriers. Regardless of complexity, the greater the familiarity with campus facilities, security personnel, and action plans, the more prepared faculty and students will be for an ASI.² Dental hygiene students, faculty, and staff in educational institutions, community, and clinical practice settings are not immune to shooting violence. An “active shooter” has been defined as “an individual actively engaged in killing or attempting to kill people in a confined and populated area.”³ Authorities use the term “active” to indicate a shooting is currently taking place and is in a susceptible state in which responding law enforcement and targeted

victims have the potential to alter the final result of the event through their actions.³

From 2000 to 2018, a total of 277 ASIs were reportedly carried out by 282 shooters among residential locations, worship centers, healthcare facilities, government/military facilities, educational institutions, commercial locations, and other locations in the United States (US).⁴ Of those incidents, twelve occurred at health care facilities, killing 25 and wounding 30.⁴ Additionally, 57 of those incidents occurred in educational settings, of which fifteen were in higher education institutions with 171 persons killed and another 220 wounded.⁴ According to a study by the Federal Bureau of Investigation (FBI), workplace ASIs increased from an annual average of 6.4 to 16.4 during the years of 2000 to 2013.³ In a study of hospital-based shootings from 2000 to 2011, there was a similar uptick with the average number of annual shootings increasing from nine to seventeen.⁵ These findings are of concern for health care professions and for the educational institutions in which the members of the workforce are prepared, and supports the need to examine prevention strategies so that best practices can be learned.

According to the FBI, most violence in health care settings is a result of encounters with patients,⁶ which is of concern for dental hygiene care facilities on college campuses and private practice dental settings, considering that patients typically pay for services at a front desk or with a cashier. Settings with money exchange via cashiers accounted for 54 of the homicides reported in 2016, an increase of 65% from 2015.⁷ According to Weber et al., preparedness experience can influence disaster readiness and impact behaviors during an actual incident.⁸ Preparedness and guidance on how to appropriately assist patients in clinical care settings and classroom peers during an ASI may be a prudent addition to program orientation sessions.

Preparation for active shooters on college campuses should be part of an overarching disaster preparedness culture, and expectations should be well communicated campus-wide so that resilience can be strengthened.^{8,9} Communicating campus emergency management efforts to students, faculty, staff, and visitors, aids to build, sustain, and improve a comprehensive emergency management plan promoting institutional resilience, departmental and individual preparedness.^{10,11} Research also shows that when campus preparedness training is lacking, concern among students arises and gives the overall perception that their institution's administration is not concerned with student safety.¹¹ Clear communication from the institution that safety is valued for all forms of campus violence, including ASIs, is important, especially for dental hygiene programs due

to their on-campus clinical facilities, although this aspect has yet to be explored in the literature.

Increased communication and preparedness measures implemented by institutions may have a positive correlation with increasing one's ability to appropriately respond during an ASI.¹² However, a survey of 161 US colleges during the 2008-2009 academic year found only half of those surveyed agreed that prevention curriculum was regularly disseminated among their campus communities.¹³ However, while those same institutions had emergency preparation protocols in place, only 25% agreed their students understood the procedures and 30% agreed employees understood.¹³ Similar results among students were identified by Lovekamp et al., regarding a general lack of awareness of the systems their institution had in place for emergencies.¹⁴ In addition, students may have had a false sense of security regarding their institution's preparedness to protect them in the event of an emergency.¹⁴ Higher education institutions should communicate campus emergency management policies and resources, response protocol, and training opportunities to students, faculty, and staff.¹⁵ Furthermore, communication of policies, protocol, training, and drills should occur at all levels of the institution and be tailored to individual programs and be applicable to clinical and laboratory facilities both on and off campus.

According to the Federal Emergency Management Agency (FEMA), educational institutions are responsible for providing preparedness curricula for students, faculty, and staff, including information regarding lock down procedures and expectations for response protocol;⁹ however, regular implementation of such curricula with training seems to be lacking among US institutions of higher education.^{9,12,13,16} Despite this curricular omission, research shows preparation in the form of trainings and drills can be effective.^{16,17} Peterson et al. found feelings of perceived preparedness significantly increased after watching a 20-minute training video when compared to students who watched a control video.¹⁷ Additionally, Skurka et al., found that even showing a short 2-minute training video can have immediate and lasting psychosocial effects, so students are able to react appropriately when faced with an ASI.¹⁶

Despite efforts to plan and train, the response of most targeted victims varies due to their initial shock and instinctual reaction.¹ It has been suggested that understanding perceived preparedness is important since perception may influence how the student responds during an actual emergency event.¹¹ Victims are more likely to recall at least a portion of the training and drills they have participated in. Chances of

survival are increased through the ability to regain self-control and apply what was learned to circumstances surrounding the incident.¹ Adopted and implemented training protocol should be made known to all civilians and potential responders for coordination of efforts and a general understanding of recommended behaviors.

Dental hygiene programs utilize large classrooms, labs, and clinics with rotating schedules throughout the day. Since these facilities are unique in size, layout, and resources, it is important for institutions to investigate how to effectively apply best practices for disaster preparedness.¹⁵ This should be a consideration when conducting drills¹⁸ since one study showed that 26% of the ASIs which occurred between 1900 to 2008 took place in buildings with classrooms and laboratories within college settings.¹⁹ In prior ASIs, researchers have learned that some victims who hid in closed rooms were shot through thin doors/walls.² Adequate cover or protection should be sought as far away from doors as possible and behind solid objects including concrete walls, thick desks, and filing cabinets.¹ It is recommended for facilities to be evaluated for pre-planned assembly areas of refuge for sheltering-in-place to protect potential victims.¹ Dental hygiene program facilities should be evaluated by trained authorities so the safest options for evacuation and concealment can be known, and/or recommendations be made for facility improvements.

Literature exists exploring active shooter preparedness in higher education or specific programs within institutions,^{8,9,11,15,20,21} however this topic has yet to be researched in dental hygiene programs, although they may be especially vulnerable. The purpose of this pilot study was to examine the perceived preparedness, confidence, and awareness of dental hygiene students regarding ASIs at their educational institution.

Methods

This study received exempt status from the College of Health Sciences Institutional Review Board Committee at Old Dominion University.

A convenience sample of first- and second-year dental hygiene students enrolled at Old Dominion University (n=68) were invited to participate. Degree completion and graduate dental hygiene students were excluded since their distance learning programs do not take place on campus. A previously validated survey instrument (Cronbach alpha score of .831 for internal consistency), designed to measure preparedness and confidence of students as related to ASI, was used for the study.²⁰ The survey instrument consisted of 23 multiple choice and demographic items and included one response

option that allowed participants to share final thoughts on active shooter preparedness.

The survey was sent via e-mail invitation over an eight-week period (Qualtrics; Provo, UT) and included general instructions, the purpose of the survey, implied consent, and the survey link. Within the introductory statement, key terms were defined including “active shooter”, “prepared”, “slightly”, “moderately”, and “extremely.” Voluntary consent was understood upon completion of the survey and participants who completed the entire survey were invited to enter a random drawing for a \$50 Amazon gift card. Personal data for the random drawing was not linked to the survey data to protect participant anonymity. Descriptive statistics and Pearson product moment correlations were used to analyze the data (IBM SPSS 25; Armonk, NY).

Results

A total of 57 dental hygiene students completed the survey for a response rate of 84%. All participants were female (n=57) and the majority self-reported as Caucasian (n=37, 64.9%) and were 18-29 years of age (n=50, 87.72%). Sample demographics are shown in Table I.

Table I. Demographics (n=57)

Gender	n (%)
Male	--
Female	57 (100.0)
Prefer not to answer	--
Ethnicity	n (%)
Caucasian	37 (64.91)
Asian	9 (15.79)
African American	7 (12.28)
Hispanic	2 (3.51)
Other	2 (3.51)
Age	n (%)
18-29	50 (87.72)
30-44	6 (10.53)
45-59	1 (1.75)

Most participants indicated that they felt “slightly prepared” or “not prepared at all” to respond to an ASI in the classroom (n=26, 45.61%; n=15, 26.32%) respectively. In regard to preparedness for an ASI in a laboratory or clinical setting, a little more than one quarter (28.07%, n=16) felt “slightly prepared” and 43.86% (n=25) felt “not prepared at

all.” When asked about confidence level in helping to control the classroom in the event of an ASI, almost half felt “slightly confident” (45.61%, n=26). Additionally, when asked about confidence level in helping to protect fellow classmates during an ASI, most felt either “slightly confident” (38.60%, n=22) or “moderately confident” (36.84%, n=21). Participants’ preparedness and confidence respond to an ASI are shown in Table II.

Pearson’s correlations showed significant, positive correlations between participants’ perceived preparedness and confidence levels. Perceived preparedness by the participants to appropriately respond to an ASI in the classroom was significantly, positively correlated with confidence in helping to control the classroom during an ASI ($r(56)=.616, p=.000$); and the effect was large. Additionally, perceived preparedness to respond to an ASI in a lab or clinic setting was significantly, positively correlated with confidence in helping to protect fellow classmates during an ASI ($r(56)=.538, p=.000$). There was a large effect, indicating strength between the variables. Finally, the assumption that the institution takes ASIs seriously was significantly, negatively correlated with whether or not the student was aware if the institution had a policy for ASIs in place ($r(56)= -.334, p=.011$). Pearson correlations are shown in Table III.

Participant awareness of campus policies and trainings were measured and reported by expressed certainty in response to survey questions. Frequencies of responses to questions assessing participants’ awareness about ASIs, policies, trainings, and drills at the institution are shown in

Table IV. More than half of the participants (56.14%, n=32) were “not certain” if an ASI had occurred on campus since the year 2000 and one-half (50.88%, n=29) were “not certain” of the institution’s campus carry policy regarding possession of firearms on campus. When asked if the institution provided training for students to respond to an ASI, over half (56.14%, n=32) were “not certain” and most were either “not certain” (43.86%, n=25) or stated “no” (35.09%, n=20) to the provision of active shooter drills on campus.

If participants responded “yes” to the institution providing training or drills, follow-up questions were asked regarding whether it was mandatory, the frequency of occurrence, and if faculty were involved in the trainings or drills. Seventeen participants (29.82%) responded “yes” to the question about whether their institution provided training to students for ASIs. Of those, more than half (52.94%, n=9) responded that it was not mandatory. Of those that answered “yes” to mandatory trainings, all participants stated that it was required once a year and that the trainings included faculty. Twelve participants (21.05%) responded “yes” to the question about whether their institution provided active shooter drills. Of those respondents, the majority (41.67%, n=5) were “not sure” how often drills occurred, whereas the remainder of the participants answered that the drills occurred every six months (n=3), annually (n=3), and monthly (n=1). Additionally, most of these participants responded “yes” to the inclusion of the faculty in active shooter drills on campus (n=9, 75%). When participants were asked for final comments, some (n=3) mentioned that they felt safer in the classroom when the door

Table II. Responses to preparedness and confidence items (n=57)

	Not prepared at all n (%)	Slightly prepared n (%)	Moderately prepared n (%)	Extremely prepared n (%)
How prepared are you to respond to an active shooter event in one or more of your classrooms?	15 (26.32)	26 (45.61)	15 (26.32)	1 (1.75)
How prepared are you to respond appropriately to an active shooter event in one of your labs or clinics on campus?	25 (43.86)	16 (28.07)	14 (24.56)	2 (3.51)
	Not confident at all n (%)	Slightly confident n (%)	Moderately confident n (%)	Extremely confident n (%)
In the event of an active shooter incident, how confident are you that you could help control the classroom if needed?	15 (26.32)	26 (45.61)	16 (28.07)	--
In the event of an active shooter incident, how confident are you that you could help protect fellow classmates if needed?	11 (19.30)	22 (38.60)	21 (36.84)	3 (5.26)

Table III. Pearson correlations between self-reported preparedness and confidence levels (n=57)

	Perceived preparedness to respond in classroom	Perceived preparedness to respond in lab or clinic	Perceived confidence in helping control classroom	Perceived confidence in protecting classmates	Assumption that ASIs are taken seriously at institution	Institution has policy on ASIs
Perceived preparedness to respond in classroom	1	.739**	.616**	.476**	.277*	-.202
Perceived preparedness to respond in lab or clinic	--	1	.532**	.538**	.375**	-.224
Perceived confidence in helping control classroom	--	--	1	.592**	.264*	-.118
Perceived confidence in protecting fellow classmates	--	--	--	1	.409**	-.155
Assumption that ASIs are taken seriously at institution	--	--	--	--	1	-.334*
Institution has policy on ASIs	--	--	--	--	--	1

* Correlation is at the 0.05 significance level (p≤ 0.05)

**Correlation is at the 0.01 significance level (p≤ 0.01)

Table IV. Awareness of campus active shooter incidences, policies, trainings, and drills (n=57)

	Not certain n (%)	No n (%)	Yes n (%)		
Has your institution experienced an active shooter event since the year 2000?	32 (56.14)	20 (35.09)	5 (8.77)		
Does your institution have a policy in place for active shooter events?	23 (40.35)	1 (1.75)	33 (57.89)		
Does your institution provide active shooter training to teach students how to respond appropriately?	32 (56.14)	8 (14.04)	17 (29.82)		
Does your institution run active shooter drills?	25 (43.86)	20 (35.09)	12 (21.05)		
	Not certain n (%)	Not permitted n (%)		Concealed carry n (%)	Open carry n (%)
Which of the following best describes your institution's campus carry policy? Campus carry refers to the possession of firearms on college or university campuses in the United States.	29 (50.88)	28 (49.12)		--	--
	Strongly disagree n (%)	Disagree n (%)	Neither agree nor disagree n (%)	Agree n (%)	Strongly Agree n (%)
The possibility of an active shooter incident is taken seriously at my institution.	--	3 (5.26)	13 (22.81)	20 (35.09)	21 (36.84)

was locked (n=3) and felt that more training and drills would be beneficial (n=4).

Discussion

All health care facilities, including campus dental and dental hygiene clinics, must be prepared to mitigate injury and death from ASIs. Local and campus law enforcement officials and emergency management departments can actively assist departments and college administrators in planning and guidance to deal with an ASI. Incorporating an ASI plan into emergency management policies should be standard for dental and dental hygiene clinics located on college campuses.

Dental hygiene programs with on-campus clinical facilities may be especially vulnerable due to daily interactions with patients, as well as the collection of fees for service. Due to the nature of clinical care facility operations, it may be best practices for dental hygiene programs to have their own ASI policies, training, and drills in addition to those offered by their respective institutions. This practice would be in alignment with the recommendation by Lovekamp et al., that the institutional disaster curriculum should be student-specific.¹⁴ This should also be considered in ASI policies and training for private dental clinics as they tend to maintain open areas with no doors for the operatories, front office, sterilization, and laboratory areas. Typically, in dental clinics, the only rooms with a door are the entrance to the reception area, restrooms, personal offices, and storage closets. Finding a safe room with a door to lock or barricade would be difficult, especially if several staff members and patients needed the safe space at the same time. Considering these challenges, it would be advantageous to have local law enforcement personnel visit dental hygiene programs and private practice clinics and consult regarding areas for possible concealment in the event of an ASI.

Disaster preparedness and response literature have placed an emphasis on the importance of training and drills for potential ASIs. While the conversation of what to do in the event of such tragedies may be uncomfortable, some individuals may find it reassuring knowing that their institution is prepared and ready to keep them safe. Most respondents in this study indicated believing that their institution takes active shootings seriously, yet results showed that most were unaware of measures being taken to prepare for active shooters. It is unclear why the participants concluded that the institution takes ASI seriously when a majority were uncertain regarding the campus firearm carry policy, trainings, and drills related to ASIs. Based on these

findings, the communication of active shooter policies and trainings for students may be lacking at the institution.

It should be mentioned that the institution which served as the basis for the study population, has a policy forbidding firearms and has adopted an active shooter policy based on the principles of the FBI protocol “Run, Hide, Fight.”²⁴ The university also offers trainings by campus police, and holds drills on campus that include students. Though not directly associated with this study, it should be noted that within the previous year, the dental hygiene students and faculty completed an online active shooter training course designed by Vector Solution’s Safe Colleges Training program²² and the dental hygiene care facility had a panic button installed at the reception desk. Faculty and students in the department were also appraised of the location of the button and given directions for use. In addition, the students in this study have been required to participate in evacuation drills, for example fire drills, while in their clinic sessions. Though these policies can be easily found on the website and in policy manuals at the institution, it is likely students need more direct communication regarding active shooter policies and preparedness. It has been suggested that communication with students could be facilitated by posters, fliers, emails, phone calls, text messages, and/or Twitter to announce trainings and drills.¹⁵ Additionally, dental hygiene students specifically may benefit from clearer policies, training, and drills in the designated clinical facilities associated with their program, due to the increased vulnerability of these settings.

Previous literature has identified significant, positive correlations between perceived preparedness and the institution having an active shooter policy in place;²³⁻²⁷ however this correlation was not found in the current study. In this study, very few students reported being prepared or confident in their ability to help during ASIs. Of those who reported perceived confidence, there was a significant, positive correlation of perceived preparedness with a large effect size, indicating that participants’ confidence may have given them a perception of readiness for ASIs.

Responses on this survey, indicated that despite having policies, drills, and trainings on campus, in general, dental hygiene students did not feel prepared or confident to handle ASIs in classroom, laboratory, and clinic settings. Only one third of the students reported feeling prepared to respond in the classroom and laboratory or in being confident in helping control the classroom and protect classmates. Because the students were seemingly unaware of policies and trainings available on campus, it is possible that their general lack of preparedness and confidence is a result of

ineffective communication from the university regarding available campus trainings and drills. Findings from this study regarding a general lack of preparedness among dental hygiene students aligns with previous research¹³⁻¹⁵ further reinforcing the need for clear communications to students regarding policies and training related to ASIs. These findings also reiterate the need for dental hygiene programs to adopt policies and training in their own unique settings to increase confidence and preparedness of students should an ASI occur in one of their classes, laboratories, or clinics. It may be beneficial to require mandatory training for students, faculty, and staff and track participation through documentation. Considering the manner that a targeted victim reacts can alter the end results of an ASI, it would be best for these reactions to be influenced by practice and learned skills, not panic and hasty decisions. Policies, curriculum, communication, trainings, and drills must be well thought out, updated, implemented and documented regularly.

Participants provided open-ended comments related to active shooter preparedness. A small number of respondents indicated that they would feel safer if the doors stayed locked during classroom instruction and several felt more trainings and drills would be beneficial. One student indicated that primary schools provide active shooter trainings and drills to students and would like to see the same occur at institutions of higher education. These comments further demonstrate that students were unaware of drills and trainings already occurring on campus and that they would benefit from these activities occurring specifically in their classrooms and clinics.

This pilot study had several limitations. The convenience sample of dental hygiene students from one institution, in one geographic location limits the generalizability of the findings. Demographic information regarding college attendance rates, or previous degrees, to compare responses between first- and second-year students, was not included. The demographic differences between students who have attended higher education campuses for longer periods of time may have influenced perceived ASI preparedness and awareness. Additionally, the questionnaire required self-reporting of preparedness, confidence, and awareness, which may have impacted results.

Future research should focus on samples that expand the geographic location to include a cross section of dental hygiene students. Since all dental hygiene programs include clinical facilities that may be vulnerable to ASIs, it would be beneficial for a multidisciplinary threat assessment team to study such facilities for vulnerabilities. Trainings and drills, specifically in dental hygiene clinical facilities and classrooms, should be evaluated to determine best practices. Finally, it

may be beneficial to include dental hygiene faculty and staff perceptions of active shooter policies and preparedness in their respective programs.

Conclusion

A general lack of preparedness and confidence for responding to ASIs may exist among dental hygiene students along with a lack of awareness regarding trainings and drills. Dental hygiene students' confidence regarding their ability to help control a classroom setting or protect their classmates was correlated with the assumption that the institution took ASIs seriously. Active shooter policies, trainings, and drills may not be easily applied to dental hygiene programs and their unique clinical settings. Planning to counter an ASI requires an interprofessional team and an approach that includes multiple scenarios and practice routines to strengthen preparedness efforts. Educational institutions should implement best practices for preparing dental hygiene students for ASIs.

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