

United States Air Force Academy Cadets' Perceived Costs of Concussion Disclosure

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ABSTRACT Introduction: Concussion is unique among sport-related injuries as effective clinical diagnosis and treatment often rely on symptom-report for clinician diagnosis and treatment. However, at-risk populations such as collegiate athletes and military academy cadets often have been shown to under-report concussions and symptoms, complicating diagnosis, treatment, and policy-based interventions. The purpose of this study was to explore factors influencing concussion reporting in United States Air Force Academy (USAFA) cadets. Materials and Methods: Semi-structured interviews were conducted on 34 cadets (18 with concussion history; 16 without concussion history). This study was approved by the USAFA Institutional Review Board. Analysis included a five-cycle process of clarifying the topic at hand through an introduction, conducting a literature review, data collection and summarization, relating current findings to current literature, and making final interpretations. Data were summarized by creation of a codebook after reading five transcripts and identifying meaningful units. A four-person research team read and identified meaningful units individually, then met to discuss common meaningful units and codebook creation. Once the codebook was created, the lead researcher used the codebook to code all transcripts. Results: Eight themes were generated from interview transcripts. This manuscript focuses on the *perceived costs following a concussion* theme and the following subthemes: perceived costs to physical fitness, military career aspirations, pilot qualifications, sport, reputation, academics, and lack of time. Conclusions: Cadet interviews described a complex environment where concussions were often viewed as costly to future career ambitions and provided potential reasons for non-disclosure largely including disruption in daily life. Reduction in perceived and actual harms due to concussion disclosure will require not only improving clinical care, but also addressing barriers to self-disclosure. Additionally, research suggests the sooner one reports a concussion, the sooner they return to physical or military activity. Educational interventions should be designed to address the perceived costs identified from our study and educate cadets that while some costs may be reality, others may not. Secondly, it should also be stressed to cadets that the sooner one seeks medical attention following a concussion, the sooner they may return to activity. Messaging around these themes may decrease the costs associated with time removed from academics, athletics, or military activities therefore minimizing attempts at concussion self-management. Lastly, if efforts are made to improve the overall concussion disclosure stigma, cadets may increase seeking care after injury because their reputation may not be as impacted.

INTRODUCTION

In the past 17 years, over 370,000 traumatic brain injuries have been diagnosed within the United States military.¹ In 2016, 8,924 traumatic brain injuries in the United States Military were diagnosed with 84.6% of those being concussions.¹ Despite the prevalence of concussion injuries, authors estimate that as many as 50% of sport-related concussions go unreported.²⁻⁵ Addressing the issue of non-disclosure is critical for clinical treatment, as clinicians often rely on patient symptom self-report for concussion return-to-play

decisions and even initial identification and diagnosis. For example, after injury, an athlete may report “feeling in a fog” or experience a headache, both of which are symptoms that cannot typically be detected by clinician observation alone.

The importance of self-disclosure is heightened within the United States Air Force Academy (USAFA) environment. Once a concussion has been sustained, immediate removal from activity is prescribed to prevent secondary injury.⁶⁻⁹ In a military context, reporting may require additional steps before reaching appropriate medical care and failing to report or diagnose injury may lead to life altering consequences¹⁰ and prolonged recovery.¹¹⁻¹³ If a cadet reports a concussion, he or she would be removed from activity and treated by medical personnel which includes enrollment in a post-concussion academic recovery program.¹⁴

Delays in reporting a concussion can prolong recovery.^{11,13} (D'Lauro et al., In Review) If researchers and clinicians can better understand the unique factors that influence a cadets' decision to report or conceal a concussion, more precisely targeted interventions may have greater success in influencing cadet attitudes towards concussion reporting.

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The primary factors that influence concussion reporting in the USAFA cadet population are career concerns, personal perception of negative outcomes, and time costs^{15,16}; however, surveys are necessarily limited to predicted reasons for not reporting and may not capture the perspective of the target population. A bottom-up qualitative approach that uses participants' own statements as data may reveal important social dynamics of how these perceived costs appear from cadet perspectives, offering more specific and comprehensive view on this important topic.

This is the first qualitative approach addressing concussion reporting in a cadet population, which is necessary to explore this topic. Qualitative data collection will guide understanding of the factors unique to the military service academy environment that influence concussion-reporting decisions. Therefore, the purpose of this study was to explore factors influencing concussion reporting from USAFA cadets.

METHODS

This study was approved by the USAFA Institutional Review Board. Convenience sampling was used as participants were recruited through the USAFA research participant pool from two behavioral science courses consisting of freshman and junior cadets. Cadets were offered extra credit for study participation. In order to ensure anonymity, participants were asked to check a box if they were willing to participate in this study after reading a consent form. Before audio recording began, participants were reminded that the information provided would not be a part of their medical record and they had the right to stop the interview at any time.

A demographic form and two semi-structured interview scripts were developed by three concussion experts, two of whom were also qualitative research experts. The interview scripts were mostly similar, however varied slightly based on concussion history which was determined by indicating if they had a concussion or "bell-ringer/ding" history on the demographic form. Interview scripts were identical with the exception of minor phrasing between those with and without

a history of concussion or "bell-ringer/ding." For example, the script for individuals with a history of concussion asked: "On the demographic questionnaire, you indicated you had personally experienced a concussion and/or a "bell-ringer/ding"... What immediately went through your head following your concussion and/or "bell-ringer/ding"?" Individuals without a concussion or "bell-ringer/ding" history were asked: "On the demographic questionnaire, you indicated you had never personally experienced a concussion and/or a "bell-ringer/ding". Can you describe someone you know who has had a concussion?" Scripts and analysis followed a hermeneutic phenomenological approach examining the lived experience of concussion reporting. A pilot study conducting interviews were conducted and no changes were made to the script following these interviews. Interviews were conducted until data saturation for both interview scripts. Semi-structured interviews were administered in an academic building by the principal investigator (MWR) and assistant investigator (CD). Since the principal investigator had no previous research experience with the military an assistant investigator was present. The principal investigator primarily led the interviews, however the assistant investigator was invited to interject as needed. Interviews ranged from 10–35 minutes. The principal and assistant investigators were confident that saturation, or hearing no new information from participants, occurred following interviews of 12 participants in those with concussion history, and 11 in those without concussion history. In order to ensure data credibility and trustworthiness,¹⁷ prolonged exposure was completed with 11 additional interviews for 18 interviews total for those with concussion history and 16 for those without concussion history. Prolonged exposure in qualitative research is conducted as a methodological step in order to establish trustworthiness, meaning that the researcher has spent sufficient time in the research setting to understand the context shaping the experience. It provides confidence in the truth of the results.^{18,19} Additional interviews beyond saturation were collected to ensure data consistency.

Following the completion of each interview, audio files were transcribed (Rev.com; San Francisco, CA). The

TABLE I. Research Team Description

	Investigator 1	Investigator 2	Investigator 3	Investigator 4	Investigator 5	Investigator 6
Team Role	Lead researcher; conducted interviews, codebook development	Conducted interviews, codebook development	Codebook development	Codebook development	External reviewer	External reviewer
Qualitative Research Experience	Experienced	Novice	Novice	Expert	Novice	Experienced
Concussion Research Experience	Experienced	Expert	Expert	Novice	Expert	Expert
Military Experience	Novice	Experienced	Novice	Expert	Expert	Experienced

principal investigator ensured transcripts were completed appropriately by listening to audio files and reading transcripts simultaneously. Identifying information such as names, places, or other relevant identifying information was redacted.

Data analysis included a five-cycle process as described by Anderson²⁰ and Wertz.²¹ The first cycle includes creating an introduction and clarifying the topic at hand. This cycle was completed above. The second cycle includes a literature review to develop the initial lenses of the topic. The principal and assistant researchers have completed this step extensively outside of this manuscript. Cycle three includes collecting and summarizing the data. In order to summarize the data, the research team (Table I) identified meaningful units using Wertz, Charmaz, McMullen, Josselson, Anderson, McSpadden²¹ recommendations. Transcripts were initially read by the principal investigator to gain a sense of the entire data corpus. Five transcripts were chosen using a random number generator based on number assigned participants (three in those with concussion history, and two of those without concussion history) and three other research team members read the selected transcripts. The research team then met in person to discuss transcripts and develop a codebook. During the meeting, the research team determined information from the two different interview scripts were similar and yielded parallel information, therefore transcripts could be analyzed together. The codebook contained themes and subthemes identified from meaningful units. Transcripts were then re-read by the lead researcher to identify themes and subthemes as outlined in codebook. Through this process eight themes presented and this manuscript focuses on the perceived cost theme. Cycle four of analysis includes relating our findings to the current literature. Cycle five incorporates making final interpretations of findings. Cycles four and five are completed in the discussion of this article.

In order to establish data credibility and trustworthiness, we conducted prolonged exposure as described above.¹⁷ Dependability and confirmability was confirmed through two external reviewers.¹⁷ The external reviewers completed the reviewing process separate from the research team in cycle three of analysis by each reading the same five transcripts (three in those with concussion history, and two of those without concussion history). The external reviewers then examined the codebook to determine if they agreed with our original themes and subtheme identification, and corresponding identified data from transcripts.

RESULTS

We interviewed 34 participants (males = 23, females = 11, age = 19.91±1.14 years). Participant demographic information is included in Table II. Within the perceived cost theme, seven subthemes were developed including perceived costs

to: physical fitness, military career aspirations, pilot qualifications, sport, reputation, academics, and lack of time. Pseudonyms were assigned to each participant to maintain anonymity, and some quotes may relate to more than one subtheme.

Physical Fitness

Military activities require cadets be in peak physical fitness. Due to this, cadets may not report due to having to be removed from physical activity. One participant said, “I think physical stuff too. Being like not allowed to do physical stuff for so long puts you so far behind, which is also kind of stressful when you start thinking about it.”

Military Career Aspirations

Cadets frequently discussed fear of inability to pursue military careers as a reason one might not disclose a concussion. Charlotte commented:

I think a lot of people are afraid to report concussions...If your ALO [Administration Liaison Officer – a USAFA representative that helps high school students with the application process], which is your air liaison officer who basically follows you through the entire process of you getting into the academy essentially tells you... I’ve talked to a lot of people whose liaison officers have told them this. They’re like, “You do not do anything. You do not put anything on that form that could possibly give them a reason to say “no” to you, medically.”

Amelia also noted the fear of losing military career experience, but also noted the effort to decrease the belief that concussions can affect one’s military career aspirations:

I think they’re working really hard to debunk the belief that it can hurt your career, but I think there’s still a little bit of that idea that, ‘I don’t wanna report it because it’ll go on my medical report, and even though they say it won’t hurt my career, you never know how that could come back.’ I know to get in here, too, the medical screening process is kind of insane. I was originally medically disqualified ‘cause I was told I have asthma. I have no history of asthma, and I am very active and athletic. Just because I got flagged, I might not have had the chance to come here. So because they scrutinize the medical process so much, I think a lot of cadets feel like, ‘Well if I put something like concussion on my medical record, there’s no way that that’s gonna totally be irrelevant to my career. Somehow it’s gonna pop up again. So I think they’re a little bit more hesitant to report it.

Another cadet made this observation more plainly: “Just because of that belief that it could negatively impact your

TABLE II. Participant Demographic Variables ($n = 34$)

Average age (years)	19.91±1.14
Gender ($n, \%$)	
Males	23 (67.6%)
Females	11 (32.4%)
Concussion history variables	
Participants with concussion history ($n, \%$)	9 (26.5%)
Total count of previous concussions	13
Participants with bell-ringer/ding history ($n, \%$)	13 (38.2%)
Total count of previous bell-rings/dings	21
Participants with pilot aspirations ($n, \%$)	21 (61.8%)

career, and that they might believe they could just get better from it without medical help.”

Pilot Qualifications

Many cadets noted how reporting a concussion could negatively impact the desire to become a pilot. This is often described as “losing pilot qualification.” Stephanie commented:

I will be honest, if I was to get a concussion now and no one really saw it, I probably wouldn't report it, unless it was really affecting me, like I couldn't focus at all, I was throwing up profusely. I would report it, but otherwise, I'd probably not, just I already have two, and I don't know what the magic number is to not become pilot qualified, but I wouldn't want to risk it.

Michael talked about how others at the USAFA may influence their decision: “... I think they would ask you, ‘hey, do you want to be a pilot or not? Because if you do, then I wouldn't report it’...” And lastly, a cadet illustrated the fear of losing pilot qualification, stating... “I don't know if I would report it, because I want to go pilot, so I don't know if I would. If I would report it.”

Sports

Cadets also described aversions to concussion reporting in sport, especially in regards to letting their teammates down. One participant said: “Just afraid of not being able to participate if there was some big event coming up for their sport. They were like, ‘Oh the concussion's probably not that bad. I'm fine. My head hurts, but it's pretty much fine.’ They'd still wanna participate, they wouldn't wanna let their team down, let other people down.” Andrew discussed the health care appointment requirements and also how teammates may be influenced: “You have to go in the clinic. You have to go repeated appointments to go check up on them. And then if you play a sport, then it takes away from your sport. It's kind of like a trap, where it takes away from your sport, and then you feel bad about your teammates. You let them down.”

Reputation

Perception from other cadets was indicated as to why a concussion may not be reported. However, some cadets noted that this perception was not always negative and were greatly influenced by those who had a positive perception of those who reported a concussion.

To illustrate the stigma of reporting a concussion, Jacob described: “You can tell I wasn't faking, because we have some cadets here who take boxing class or combatives, and they'll be like, ‘I have a concussion.’ It just happens to be a freshman right before the big Recognition weekend [when first year cadets must complete physical challenges to be recognized into the larger USAFA community] so they can get out of... We call them Form 18 pilots [Form-18's excuse cadets from activities due to medical conditions].” Another cadet believed others thought they were faking their injury stating: “But yeah, I knew a bunch of people - not a bunch, but a select few, they thought I was faking it...” Additionally, a cadet said reporting a concussion may label you as weak: “...I know a few people in particular, who, they just seemed very, ‘Oh, yeah my head is killing me.’ It wasn't very believable, but then they got put on form 18 for most of Basic [Training]... they don't wanna report either concussion or other kinds of injuries because they don't wanna be labeled as weak.” The reputation that cadets receive while at the Academy may even follow them throughout their career:

...Stigmas and rumors get passed really quickly here, so if you get labeled as that person, that can stick with you through your cadet career, but also your career. ... So when that gets attached to you, that's going to be here possibly for the rest of your cadet career, and then even going on to the Air Force when you commission with everybody. That's an interesting attachment to being labeled as somebody here.

Although some cadets discussed being encouraged to report a concussion: “Obviously, you get a couple people on the team who are gonna kind of say, ‘What are you doing? You never report a concussion. But that was really just one or two people, and everybody told them, you know, ‘shut up.’”

Academics

USAFA cadets perceived costs to academics as a frequent reason individuals may not report their concussion. Amelia said: “Or if they do report it, then they're gonna have to miss school, and that is really hard to make up here. Even if teachers are understanding, and give you extended deadlines, it's still hard 'cause then you're just behind. So you don't wanna have to deal with it, so they just kinda push through.” Cadets take six to seven courses per semester. They are often scheduled from early morning military duties to late evenings with study groups. They frequently noted that

reporting a concussion was challenging due to the academic demands. The text descriptions display the fear of missing class due to a concussion. However, Stephanie said: "...academics is our biggest thing here... not saying if you can get out of it, but if you actually bombed a test and didn't report a concussion, the teacher's not gonna...understand because they don't know that you had a concussion." In this case the cadet noted how helpful reporting a concussion could be for academic support. The text illustrates a negative case of costs to concussion reporting within the USAFA cadet community.

Lack of Time

USAFA cadets have many commitments outside of academics and indicated lack of time as a reason they may not disclose a concussion. To illustrate this point, Dylan said: "But typically, I feel like it's more do I want to just take the time out of my day. Especially here with everything being so busy. Do I want to take the time out of my day and go report on this? Or do I want to just tough it out, and get it over with, and focus on what I need to focus on?" And lastly, another cadet talked about how difficult and time constraining medical appointments were within a cadet schedule:

I schedule out my week pretty jam packed with... every hour is filled with something that I need to be doing. And if something gets a wrench thrown in there, it throws me off for the rest of the week. So it's kind of a pain to call the clinic, and then to schedule an appointment that works with them and with me, because I'm always so busy. It's really a hassle on my schedule to make an appointment with them to do that.

DISCUSSION

Themes suggest USAFA cadets may not disclose a concussion for a variety of reasons including perceived costs to physical fitness, military, pilot qualifications, sport, reputation, academics, and lack of time. Understanding these factors can drive implementation of active measures to diminish the costs to these areas including dispelling any untrue beliefs or aiding in support among those items which are costly for cadets following a concussion.

Physical Fitness

Historically, cognitive and physical rest were believed to be the cornerstones in concussion management.²² However, the idea of complete physical rest until the patient is asymptomatic is no longer strictly recommended.⁹ Cadets from our sample discussed the aversion to being removed from sport or not allowed to complete physical activity as a feature that may deter concussion disclosure. Current consensus guidelines now recommend a short period of rest

(24–48 hours) followed by a small amount of physical activity as symptoms allow and guided by a health care professional.⁹ Once the following criteria are met, a gradual return-to-activity may begin: (1) patient is symptom-free, (2) concussion assessments have returned to baseline or performance compares to normative values, and (3) the concussion management team agrees the patient is ready to progress. This is also after the student is fully able to participate in the classroom.^{6,9} New recommendations allow for some physical activity to be completed in order to maintain a small amount of physical fitness, and may be perceived as less detrimental. One aspect of encouraging concussion reporting may be to communicate the change in clinical practice towards earlier activity and effective treatments for concussion.

Military Career Aspirations and Pilot Qualifications

Fear of losing military or pilot qualification was commonly cited within our findings as a reason for not disclosing a concussion. While many medical requirements exist to be admitted to the military and pilot training, the requirements are often to ensure the particular job is done safely. For example, if one is unable to run a mile due to a knee injury, that would impede one's performance and ability to complete certain missions within the military. Therefore, it may not be prudent to join or be cleared for certain duties. Secondly, though cadets widely believe that a specific number of concussions would automatically disqualify them from gaining pilot qualifications as result of a concussion,¹⁶ no such regulation exists. In fact, authors have found the earlier one reports a concussion, the sooner they can return to physical activity.¹¹ (D'Lauro, In Review) While a removal from some activities is likely a component of concussion management, it should be noted to cadets that complete disqualification rarely occurs and the sooner one discloses their concussion, the sooner they can return to activity.

Reputation

Stigma surrounding health related behaviors is not uncommon in military and sport communities alike. Cadets frequently noted the fear of losing their reputation or stigma surrounding reporting a concussion. Many authors have researched the stigma about seeking treatment for mental health.^{23–26} Findings align with our results indicating career stigma, or how their condition may impact a career, was a strong deterrent for seeking treatment.^{23,24} Many barriers were perceived in help-seeking behaviors within the larger, non-military population regarding mental health again, eating disorders, and sexual assault.^{27–30} However, efforts have been made to decrease mental health stigma and encourage help-seeking behavior such as Real Warriors.³¹ While stigma or fear of poor reputation after health behavior reporting is not uncommon, measures should be taken to reduce this stigma and enhance the disclosure environment.

Academics

Our participants' comments rightfully noted that academic support cannot be administered unless a teacher or health care professional is aware of the injury, and that concussions may hinder academic performance. Once the right personnel at any institution are aware of the injury, various steps can be taken in order for the student to be supported in the classroom throughout recovery. Academic adjustments following a concussion are often necessary.^{6,9} USAFA has unique operating instructions compared to civilian universities due to its status as a military academy; however, a USAFA-designed return-to-learn plan exists to smooth cadets' academic recovery after a concussion.¹⁴

Lack of Time

The time cost of reporting a concussion is a fair reality. Concussion assessments do take time to complete and often require serial evaluations with extensive testing taking time away from other tasks in cadets' very tight schedule. However, cadets receive free walk-in medical care from 0730 to 1700 on weekdays at the cadet medical clinic. The availability of health care providers and ability to walk into the clinic aims to minimize the amount of time required for waiting for care and assessments. Even though the time cost of concussion reporting may be more than desired, it should be stressed to cadets the sooner one reports, the sooner they can return to activity (D'Lauro, In Review) and can receive necessary health care aid.

Our findings align well with those of collegiate student-athlete studies. Many authors have reported that student-athletes fail to report a concussion due to not believing the injury was serious enough, not wanting to be removed from athletic participation, not knowing the injury was a concussion, and not wanting to let their teammates down.^{2,3,10,32,33} We found cadets did not want to be removed from physical activities, military training, or career aspirations, much like athletes do not want to be removed from athletic participation. Additionally, cadets frequently noted the stigma surrounding concussion reporting and the result it may have on their reputation. This relates to student-athletes not wanting to let their teammates down, in that cadets do not want to be seen, as one participant said, "as a wimp" or unable to carry out their duties.

Practical implications of these findings include educational interventions targeted at creating a conducive concussion disclosure environment. Current concussion education efforts are being conducted by USAFA via lecture based educational sessions in courses at USAFA. Additionally, strong efforts have been made to support USAFA cadets through return-to-learn initiatives.¹⁴ These are all necessary and noble measures. If USAFA cadets and leaders surrounding them can further understand the benefits of reporting a concussion including academic support, potential for safe

and medically supervised physical activity, faster return to activity, along with many others, disclosure rates may rise. Increased reporting would be beneficial for treatment for this complicated injury.

Limitations and Future Research

One limitation of this study is that data were only collected from one service academy with a small sample. Although qualitative research results do not aim to be generalizable, our findings only relate to those who were interviewed at USAFA. Future research should aim to continue this mixed-methods approach to investigating these perceived barriers to concussion reporting longitudinally, so that changes over time can be detected and assessed. Additional development and research could utilize our findings in educational interventions and determine the effectiveness of those programs. Our results presented potential variation between cadet experience based on duration of time at the academy. Future research should compare concussion reporting perceptions and experiences between lower and upper classmen cadets. Lastly, limited research exists regarding concussion nondisclosure and long-term health consequences. As such, future research should also examine the long-term health consequences should concussions be nondisclosed.

CONCLUSIONS

If health care professionals can better understand which factors may lead cadets to report or conceal a concussion, we can implement strategies to identify and change those factors. By acknowledging and targeting perceived costs in physical fitness, military aspirations, pilot qualifications, sport, reputation, academics, and lack of time in educational interventions, more cadets with concussions may choose to report the injury, receive treatment sooner, and potentially lessen the long-term impact. These changes may aide in creating a conducive concussion reporting environment within military service academy settings.

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