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AN EPIDEMIOLOGICAL ANALYSIS OF
A UNIVERSITY THREAT ASSESSMENT TEAM CASE LOAD

by
Yanyan Cao

A thesis submitted in partial fulfillment
of the requirements for the Master of
Science degree in Occupational and Environmental Health
in the Graduate College of
The University of Iowa

July 2011

Thesis Supervisor: Professor Corinne Peek-Asa

Graduate College
The University of Iowa
Iowa City, Iowa

CERTIFICATE OF APPROVAL

MASTER'S THESIS

This is to certify that the Master's thesis of

Yanyan Cao

has been approved by the Examining Committee
for the thesis requirement for the Master of Science degree in
Occupational and Environmental Health at the July 2011 graduation.

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INTRODUCTION

Although schools are expected to provide a safe environment for learning, they are at risk for violence and crime. The records from the National Center for Educational Statistics showed 85.5% of public schools recorded at least one violent event, theft, or other incident during the school year 2007-2008, amounting to a rate of 42.7 events per 1,000 students per year [1]. In the same year, 4.3 per 1,000 students aged 12-18 reported criminal victimization at school and 7.5% of teachers were threatened with injuries or physical attack by students from schools during the previous 6 months [1]. These data show that both students and teachers and staff can be the victims of violence in schools.

Violence is recognized as an important risk exposure for morbidity and mortality in workplaces. Though National Crime Victimization Survey (NCVS) reported the rate of violent crime in employed persons has decreased since 1993, there were still approximately 572,000 nonfatal violent crimes against persons aged 16 or older at work or on duty and 521 victims of homicides aged 16 or older at work or on duty in 2009 in the United States [2]. The average annual rate of violent victimization in the workplace was 5.1 per 1,000 persons from 2005 to 2009 [2].

Universities are complicated environments where people work and live, and they include characteristics of workplaces, schools, and homes. Violence from multiple sources is a potential threat for the university community. As a special school setting, universities have the same function for instructing as schools. However, university students live and work on the campus. At the same time, universities have open surroundings, which are more easily accessed by potential perpetrators than k-12 schools or many other types of workplaces. Saewyc et al studied university students in the U.S.

and Canada and reported that 16.5% of a total of 2091 students had experienced emotional and physical abuse [3]. However, very little research has examined the prevalence of threats in the population of college and university students.

The physical characteristics of a University environment play an important role to increase the safety. If university environments provide adequate security, lighting, entry/exit control, or other crime preventive measures, they will be less violence-prone. Crime Prevention Through Environmental Design (CPTED) is one approach that could be applied in university setting to modify the environment factors in the university campus [4]. Thus, safe characteristics of the campus environment can contribute to safety.

In addition, individual and family contributors are also related to the safety and security of the University. Individual characteristics including gender, depression, delinquent behaviors, teachers' support, and maltreatment of students are significantly associated with violence occurring in schools [5]. Family background, such as neglectful behavior, physical punishment or emotional abuse by parents is a risk factor for violence against a dating partner, which is a common type of violence among university students [6, 7]. Research found that domestic violence, particularly verbal or sexual, was strongly related with suicidal behavior among Mexican university students [8].

Good organization and suitable policies in Universities are other beneficial contributors to the safe university campus. Schools with safety-related policies, and student awareness of these policies, have been associated with less violence [9]. However, institutions with hierarchical structures and unresponsive to student or employee needs are generally considered to be violence-prone, as are agencies with poor

communication or highly vertical communication strategies. One study of ninth-grade students and teachers in public high schools in Virginia pointed out school safety was associated with consistent enforcement of school discipline and availability of caring adults [10]. Ramirez et al also found that school behavioral policies could contribute to the safety culture and reduce violence at schools [11]. A supportive climate is potentially valuable for engaging students in the prevention of threats of violence [12].

In summary, the research literature indicates that violence in schools and universities is diverse, with multiple components that contribute to or reduce the risk of violence. Thus, organized multi-system approaches may be an effective strategy to reduce the risk of threat in universities.

A series of school shootings has led university administrators across the nation to recognize that addressing the threat of violence is essential. A survey of university campus police chiefs in 2008 indicated that 25% of university campuses had at least one firearm incident in the past year and 35% of campuses reported an event within the past 5 years [13]. Addressing the safety and security needs of universities can help reduce the risk of and potential severity of violence and can contribute to a generally safer school climate.

In 2000, the Federal Bureau of Investigation (FBI) [14] presented a model procedure for school threat assessment and intervention, which served as a vital foundation to prevent crime and keep schools safe for students and staff. In 2002, the U.S. Secret Service and U.S. Department of Education worked together and put forward a guide to managing threatening situations and creating safe school climates [15], which is another important criterion for the work of threat assessment in schools. These

documents are two examples of the growing number of resources available to schools to build comprehensive threat management approaches. The primary goals of a threat assessment are to prevent targeted violence and intervene after the threat has occurred [15]. When done effectively, threat assessment will help identify potential threats early, provide appropriate resources, guide the intervention effectively to de-escalate the threat, and contribute to the generally safe climate of the University [16, 17].

Threat Assessment Process

A typical procedure for a threat assessment often includes the following 4 steps. The first basic step is threat identification. By focusing on actions, communications, and specific circumstances of students and staff, threat assessment can be conducted to discern and identify potentially risky attitudes and behaviors [15]. The second step is threat evaluation. Once a threat is identified, the threat assessment team gathers the information from many related departments to evaluate the severity and level of threat. The third step is threat intervention, another important function of threat assessment. A process for reacting and intervening as early as possible needs to be in place and also requires the integration of many different school community components. In specific cases, the mental health and psychology specialists on the threat assessment team can effectively prevent the situation from becoming worse and may also decrease the stress and emotional burden of victims. Finally, follow-up is the last critical process of threat assessment. Threat assessment team members will consider the necessary follow-up depending on the specific situations of cases.

Establishment of a University Threat Assessment Team

The establishment of the threat assessment team at the University of Iowa took place over several stages. In November 2006, the regents asked for a large-scale self-study related to campus security when they received requests to approve amendments to the Iowa Board of Regents Comprehensive Campus Safety and Security Policy (Chapter 11) to allow officers of the University of Iowa Police Department to carry firearms. In June 2007, the UI Campus Security Report detailed broad approaches to campus security and revealed that UI had several strong programs focused on response to potentially threatening situations, such as Human Resources' Behavior Risk Management Program. However, these programs were separated for students and faculty and were not highly consistent or coordinated. There was no specific entity or policies focused on early identification, assessment, and de-escalation of potential threats. Based on this evaluation, a UI team developed a white paper that called for a multidisciplinary, team approach to threat management with the goals of identifying problems upstream, responding with consistency and continuity, and helping reduce under- and over-response to individual events in response to the self-assessment. Key stakeholders began training in threat management by reading existing literature, talking with other institutions, and attending threat management conferences. A proposal to establish a Threat Assessment Team was approved by the University Office of the Provost, which called for stakeholders from across the campus to develop and participate in a threat assessment process. The proposal called for two new staff positions to lead the team. In August 2008, two full time specialists were hired as threat assessment specialists and the TAT began

responding to cases. After that, the TAT began outreach activities to educate the campus community about the team and its goals.

The Threat Assessment Team (TAT) is established as an infrastructure to meet the UI goals for threat assessment. The goal of the TAT is to provide an integrated and coordinated process for identifying and responding to students, faculty, staff and other individuals who may be at risk of harming themselves or others. The essential tenet of the UI threat assessment process is that response to potential threats should be timely, consistent, cohesive, and appropriate. Threat assessment and response should be a partnership between stakeholders throughout the university community, with added value to all involved. Without the establishment of the TAT, the University will lose an important resource to acquire the threat reports timely and consistently. In addition, the TAT can help link the individuals who need help to the resources across campus. The TAT can also use data system to track potential cases.

Even with the availability of evidence-based guidelines, universities often have very different environments and approaches when addressing potential violence. To date, no research has systematically examined the effects of threat assessment approaches among universities. Very little about these approaches has been documented in the literature.

Study Aims

This study provides an epidemiological assessment of the types of cases that involved a University Threat Assessment Team. Not all of the cases represented a threat or a threat with high potential for escalation. Thus, these data are more useful for describing the types of situations faced by Threat Assessment Teams, but they are not a

good indicator of the potential levels of severe threats on campus. The aims of the case description in our study are to describe the characteristics of subjects involved in TAT cases; to describe the different referral parties and affiliations with University units; and to identify factors associated with response type, situation type, and the need to follow up.

METHODS

Study Design and Population

We analyzed cross sectional data collected by the University of Iowa Threat Assessment Team from August 2008 to December 2010. Each event that required response or consultation from a Threat Assessment Team member was entered into a database. Information collected included: demographic information of the individuals involved; characteristics of the cases including the type, contributing factors, referral sources, and associations with University units; and, case processing information including opening and closing date; follow-up activities, and final status. During the study period, the Threat Assessment Team responded to 284 events. These involved employees, students and visitors of the University of Iowa.

Study Variables

Subject characteristics

Gender and race were two main demographic characteristics included, and these were collected for both threat subjects and any identified victim.

UI affiliation was defined as the relation between the subject and the University of Iowa units. Employee, student and visitor of the university were recorded.

Contributing factors to threat were documented for each reported case: alcohol/drug involvement; history of mental health problems including eating disorders, mental issues, or any mental health history; criminal history; and, gun permit or weapon possession. A sum of the total contributing factors for each case was calculated to explore the hypothesis that the more of these contributing factors present the more complicated the case.

Referring source was defined as the university unit that referred the event to the TAT. Subject-victim relation was defined as the relation between the subject and the victim for each event, including categories such as an academic relationship (involving a student with a professor or mentor), a working relationship such as employee-to-employee, or a student-to-student relationship.

Threat characteristics

Events were also categorized according to response type, or the action of the TAT to handle each case. Response types were categorized as either a response or a consultation. Threat response included cases in which the TAT took action with involved parties. Threat consultation involved concerns expressed to the TAT about how to handle a situation, and the TAT provided input to the responding parties, but did not respond directly with the involved subjects.

Situation types were classified based on the type of event and included the two broad categories of external threats and self-harm /behavior problems. External threats included behaviors that involved a potential threat from one individual to either another person or entity such as expressed anger, assaultive behavior, expressed physical aggression, firearm concerns, threats, unwelcome electronic or written communication, unwelcome verbal communication, verbal aggression, or harassment or stalking. Self-harm /behavior problem included behaviors that did not involve an expressed threat to another individual. These included suicidal concerns such as suicidal ideation or attempt, ongoing suicidal concerns, welfare checks; and mental health related behavior such as alcohol or drug issues, delusion, disturbing or disruptive behavior, mental health issues, sexual behavior, suspicious activity, termination, or work performance issues.

The need to follow up was classified based on the decisions made by the TAT about the subjects of the event and whether the event needed to be followed up directly by the TAT members or by third party monitoring, or not necessary to follow up.

Statistical Analysis

The distribution of demographic characteristics, contributing factors to threat, reported threat, referring parties and subject-victim relationship were compared among employee, student, and visitor using chi-square tests. In addition, we built logistic regression models and used odds ratios to predict the associations of response type, situation type, and the need to follow up with the contributing factors as exposure variables after controlling for gender, race, and UI affiliation.

RESULTS

Over the three-year study period, the Threat Assessment Team was involved with 284 cases: 13.03% were in 2008, 48.94% were in 2009, and 37.68% were in 2010, with 1 case missing the reported year. Over the whole study period, the number of consultations increased from 5 (13.51%) in 2008 to 48 (44.86%) in 2010. The number of threat response cases increased 71 from 2008 to 2009, and then decreased by 44 from 2009 to 2010.

Of the total cases that involved the TAT, 200 (70.4%) subjects were males and 76 (26.8%) were females (Table 1). Nearly three quarters were Caucasian (74.1%). The majority of subjects were students (60.2%), followed by employees (21.5%) and visitors (18.3%). A history of mental health problems was the most common contributing factor, and over one third of cases had a history of mental health problem, followed by 19.7% of cases with a contributing factor of alcohol problems. Criminal history was a contributor in 14.4% of cases and weapons to only 5.3%. Over half of cases (51.8%) had at least one contributing factors and 51 cases (18.0%) had more than two contributing factors. There were no statistically significant differences in gender, race, or contributing factors between subjects who were students, employees, or visitors.

Table 1 Characteristics of subjects reported in the threat assessment database, 2008-2010
(N=284)

| Subject Characteristics | Total N (%) ¹ | Employee N(%) ² | Student N(%) ² | Visitor N(%) ² | p value ³ |
|--|-----------------------------|-------------------------------|------------------------------|------------------------------|----------------------|
| Total | 284 | 61(21.5) | 171(60.2) | 52(18.3) | |
| Gender | | | | | 0.1385 |
| Male | 200(70.4) | 40(67.8) | 119(70.8) | 41(83.7) | |
| Female | 76(26.8) | 19(32.2) | 49(29.2) | 8(16.3) | |
| Missing | 8(2.8) | 2 | 3 | 3 | |
| Race | | | | | 0.7606 |
| Caucasian | 180(63.4) | 41(85.4) | 112(82.4) | 27(87.1) | |
| Other Races | 35(12.3) | 7(14.6) | 24(17.6) | 4(12.9) | |
| Missing | 69(24.3) | 13 | 35 | 21 | |
| Contributing Factors to Threat | | | | | |
| Alcohol/Drug Involvement | | | | | 0.8643 |
| Yes | 56(19.7) | 13(21.3) | 34(19.9) | 9(17.3) | |
| No | 228(80.3) | 48(78.7) | 137(80.1) | 43(82.7) | |
| History of Mental Health Problems | | | | | 0.4761 |
| Yes | 94(33.1) | 23(37.7) | 57(33.3) | 14(26.9) | |
| No | 190(66.9) | 38(62.3) | 114(66.7) | 38(73.1) | |
| History of Criminal Charged | | | | | 0.7840 |
| Yes | 41(14.4) | 9(14.8) | 23(13.5) | 9(17.3) | |
| No | 243(85.6) | 52(82.2) | 148(86.5) | 43(82.7) | |
| Weapon | | | | | 0.0736 ⁴ |
| Yes | 15(5.3) | 7(11.5) | 6(3.5) | 2(3.9) | |
| No | 269(94.7) | 54(88.5) | 165(96.5) | 50(96.1) | |
| Number of Contributing Factors to Threat | | | | | 0.2500 |
| 0 | 137(48.2) | 28(45.9) | 80(46.8) | 29(55.8) | |
| 1 | 96(33.8) | 21(34.4) | 67(39.2) | 12(23.1) | |
| 2-4 | 51(18.0) | 12(19.7) | 24(14.0) | 11(21.1) | |

1. Percentages are column percent;

2. Percentages are column percent without missing values;

3. p values based on chi-square tests ;

4. p value based on Fisher's exact test.

The number of events requiring a Threat Assessment Team response was double the number of events needing consultation (Table 2). The proportion of TAT response among students was significantly higher than events among employees or campus visitors that required TAT response ($p=0.0317$). External threats and self-harm/behavior events required a TAT response with approximately the same frequency. The most common situation type among employee was assaultive behavior (33.3%). The most common situation for students was suicidal behavior (35.1%) and for visitors was potentially threatening behavior (47.3%). These differences were statistically significant ($p<0.0001$). The proportion of cases requiring follow up among reported threats was similar. No significant relation was found between need to follow up and UI affiliations.

Table2 Reported threat in the threat assessment database, 2008-2010 (N=284)

| Reported Threat | Total N(%) ¹ | Employee N(%) ² | Student N(%) ² | Visitor N(%) ² | p value ³ |
|-------------------------------------|----------------------------|-------------------------------|------------------------------|------------------------------|----------------------|
| Total | 284 | 61(21.5) | 171(60.2) | 52(18.3) | |
| Response Type | | | | | 0.0373 |
| Response | 195(68.7) | 43(70.5) | 124(72.5) | 28(53.8) | |
| Consultation | 89(31.3) | 18(29.5) | 47(27.5) | 24(46.2) | |
| Situation Type | | | | | <0.0001 ⁴ |
| External Threat(n=140) | | | | | |
| Assaultive Behavior | 44(15.5) | 20(33.3) | 17(9.9) | 7(13.5) | |
| Potential Threat Behavior | 67(23.6) | 11(18.3) | 34(19.9) | 22(42.3) | |
| Harassment/ Stalking | 29(10.2) | 6(10.0) | 15(8.8) | 8(15.4) | |
| Self-harm /Behavior Problem (n=143) | | | | | |
| Suicidal Concerns/Intent | 72(25.4) | 10(16.7) | 60(35.1) | 2(3.8) | |
| Mental Health Related behavior | 71(25.0) | 13(21.7) | 45(26.3) | 13(25.0) | |
| Missing | 1(0.4) | 1 | 0 | 0 | |
| Need to Follow up | | | | | 0.5750 |
| Yes | 99(34.9) | 18(46.2) | 61(45.9) | 20(55.6) | |
| No | 109(38.4) | 21(53.8) | 72(54.1) | 16(44.4) | |
| Missing | 76(26.8) | 22 | 38 | 16 | |

1. Percentages are column percent;
2. Percentages are column percent without missing values;
3. p values based on chi-square tests;
4. p value based on test of “External Threat vs. Self-harm/Behavior Problem”.

Overall, the majority of events were referred through academic units (22.5%) (Table 3). When comparing each referring party with all other referring parties, for employees, UIHC ($p < 0.0001$), human resource ($p < 0.0001$) and non-academic units ($p = 0.0178$) were more frequent than other referring parties; for students, student services ($p = 0.0001$) and outside agencies ($p = 0.0265$) were more frequent than other referring parties; for visitors, outside agencies were more frequent than other referring parties ($p = 0.0265$).

The most common subject-victim relationship was a romantic partner (14.8%).

When comparing each subject-victim relation with all other subject-victim relations, for employees, academic relationships were more common than other subject-victim relationship ($p < 0.0001$); for students, academic ($p = 0.0390$), friend or acquaintance ($p = 0.0115$), and not applicable or self ($p = 0.0012$) were more common than other subject-victim relationships.

Table 3 Referring party and subject-victim relation of threat cases, 2008-2010, by UI affiliation

| Variables | Total (N=284) N(%) ¹ | Employee (N=61) n(%) ² | Student (N=171) n(%) ² | Visitor (N=52) n(%) ² | p value ³ |
|--------------------------------|---------------------------------------|---|---|--|----------------------|
| Referring Party | | | | | |
| UIPD | 44(15.5) | 8(18.2) | 26(59.1) | 10(22.7) | 0.7720 |
| Student Service | 45(15.8) | 1(2.2) | 39(86.7) | 5(11.1) | 0.0001 |
| UIHC | 21(7.4) | 12(57.1) | 4(19.0) | 5(23.8) | <0.0001 ⁴ |
| Human Resource | 13(4.6) | 10(76.9) | 2(15.4) | 1(7.7) | <0.0001 ⁴ |
| Friend/ Family | 14(4.9) | 1(7.1) | 12(85.7) | 1(7.1) | 0.1891 ⁴ |
| Academic Unit | 64(22.5) | 8(12.5) | 45(70.3) | 11(17.2) | 0.0834 |
| Non-academic Unit | 26(9.2) | 10(38.5) | 9(34.6) | 7(26.9) | 0.0178 |
| Outside Agency | 15(5.3) | 1(6.7) | 7(46.7) | 7(46.7) | 0.0265 ⁴ |
| Missing | 42(14.8) | 10(23.8) | 27(64.3) | 5(11.9) | ---- |
| Subject-Victim Relation | | | | | |
| Academic | 10(3.5) | 1(10.0) | 9(90.0) | 0(0.0) | 0.0390 ⁴ |
| Employment | 15(5.3) | 12(80.0) | 1(6.7) | 2(13.3) | <0.0001 ⁴ |
| Family | 4(1.4) | 0(0.0) | 2(50.0) | 2(50.0) | 0.3510 ⁴ |
| Friend/Acquaintance | 14(4.9) | 0(0.0) | 12(85.7) | 2(14.3) | 0.0115 ⁴ |
| Partner | 42(14.8) | 12(28.6) | 17(40.5) | 13(30.9) | 0.1692 |
| No relation | 9(3.2) | 1(11.1) | 2(22.2) | 6(66.7) | 0.0118 ⁴ |
| Not applicable /Self | 18(6.3) | 2(11.1) | 16(88.9) | 0(0.0) | 0.0012 ⁴ |
| Other | 2(0.7) | 0(0.0) | 0(0.0) | 2(100.0) | 0.0545 ⁴ |
| Missing | 170(59.8) | 33(19.4) | 112(65.9) | 25(14.7) | ---- |

1. Percentages are column percent;

2. Percentages are row percent;

3. p values based on chi-square tests: category vs. all others;

4. p values based on Fisher's exact test.

The cases requiring TAT response were more likely to be male than female subjects ($p=0.0011$) and students than visitors ($p=0.0373$) (Table 4). After mutually controlling for gender, race and UI affiliation, response cases were 3.06 (95% CI: 1.56-6.01) times more likely to have a male than female subject and 2.89 (95% CI: 1.23-6.78) times more likely to be students than visitors. Response cases were related with mental health issues ($p=0.0223$), criminal history ($p=0.0441$), and the total number of contributing factors ($p=0.0180$). When controlling for gender, race, and UI affiliation, response cases were 1.78(95% CI: 0.90-3.53) times more likely to involve subjects with mental health issues than those without and 3.37(95% CI: 1.09-10.39) times more likely to involve subjects with criminal history than those without. Compared with the number of contributing factors, response cases were 1.96 (95% CI: 0.96-3.99) and 2.42(95% CI: 0.96-6.09) more likely to have 1 and 2-4 contributing factors than none, which showed a clear dose response trend.

Table 4 Associations of threat subject characteristics with response type

| Subject Characteristics ¹ | Threat Response Type(N=284) | | p value ² | Crude OR | Adjusted OR ⁴ |
|---|-----------------------------|--------------------|----------------------|-----------------|--------------------------|
| | Response N (%) | Consultation N (%) | | | |
| Total | 195 | 89 | | | |
| Gender | | | 0.0011 | | |
| Male | 151(75.5) | 49(24.5) | | 2.50(1.43-4.35) | 3.06(1.56-6.01) |
| Female | 42(55.3) | 34(44.7) | | Reference | Reference |
| Race | | | 0.8163 | | |
| Caucasian | 132(73.3) | 48(26.7) | | 1.10(0.49-2.46) | 1.19(0.51-2.78) |
| Other Races | 25(71.4) | 10(28.6) | | Reference | Reference |
| UI Affiliation | | | 0.0373 | | |
| Employee | 43(70.5) | 18(29.5) | | 2.05(0.94-4.44) | 2.57(0.94-7.03) |
| Student | 124(72.5) | 47(27.5) | | 2.26(1.19-4.29) | 2.89(1.23-6.78) |
| Visitor | 28(53.9) | 24(46.1) | | Reference | Reference |
| Contributing Factor to Threat | | | | | |
| Alcohol/Drug Involvement | | | 0.2538 | | |
| Yes | 42(75.0) | 14(25.0) | | 1.47(0.76-2.86) | 1.39(0.62-3.10) |
| No | 153(67.1) | 75(32.9) | | Reference | Reference |
| History of Mental Health Problems | | | 0.0223 | | |
| Yes | 94(75.8) | 30(24.2) | | 1.83(1.09-3.08) | 1.78(0.90-3.53) |
| No | 101(63.1) | 59(36.9) | | Reference | Reference |
| Criminal History | | | 0.0441 ³ | | |
| Yes | 34(82.9) | 7(17.1) | | 3.26(1.10-9.69) | 3.37(1.09-10.39) |
| No | 161(66.3) | 82(33.7) | | Reference | Reference |
| Weapon | | | 0.7828 ³ | | |
| Yes | 11(73.3) | 4(26.7) | | 0.90(0.27-3.00) | 0.85(0.24-3.06) |
| No | 184(68.4) | 85(31.6) | | Reference | Reference |
| Number of Contributing Factor to Threat | | | 0.0180 | | |
| 0 | 83(60.6) | 54(39.4) | | Reference | Reference |
| 1 | 76(76.0) | 24(24.0) | | 2.06(1.16-3.65) | 1.96(0.96-3.99) |
| 2-4 | 36(76.6) | 11(23.4) | | 2.13(1.00-4.54) | 2.42(0.96-6.09) |

1. Sample numbers less than total number due to missing value;

2. p values based on chi-square tests;

3. p values based on Fisher's exact tests;

4. For gender, race and UI affiliation: adjusted ORs are mutually controlling for gender, race and UI affiliation; for others, adjusted ORs are controlling for gender, race and UI affiliation.

External threats were more likely to involve male than female subjects ($p=0.0076$) and less likely to involve students than visitors ($p<0.0001$) (Table 5). After mutually controlling for gender, race and UI affiliation, external threats were 2.04(95%CI: 1.04-3.99) times more likely to involve male than female subjects and 0.26(95%CI: 0.11-0.60) times less likely to involve students than visitors. Controlling for gender, race and UI affiliation, external threats were 0.53(95%CI: 0.29-0.97) times likely to involve subjects with mental health issues than those without and 4.91(95%CI: 2.04-11.78) times likely to involve subjects with a criminal history than those without.

Table 5 Associations of threat subject characteristics with situation type

| Subject Characteristics ¹ | Threat Situation Type (N=283) | | p value ² | Crude OR | Adjusted OR ⁴ |
|---|-------------------------------|---|----------------------|------------------|--------------------------|
| | External Threat N (%) | Self-Harm/ Behavior Problem N (%) | | | |
| Total | 140 | 143 | | | |
| Gender | | | 0.0076 | | |
| Male | 107(53.5) | 93(46.5) | | 2.08(1.21-3.60) | 2.04(1.04-3.99) |
| Female | 27(35.5) | 49(64.5) | | Reference | Reference |
| Race | | | 0.4121 | | |
| Caucasian | 79(43.9) | 101(56.1) | | 0.74(0.36-1.53) | 0.66(0.31-1.40) |
| Other Races | 18(51.4) | 17(48.6) | | Reference | Reference |
| UI Affiliation | | | <0.0001 | | |
| Employee | 37(60.7) | 23(37.7) | | 0.65(0.30-1.44) | 0.78(0.29-1.99) |
| Student | 66(38.6) | 105(61.4) | | 0.26(0.13-0.50) | 0.26(0.11-0.60) |
| Visitor | 37(71.2) | 15(28.8) | | Reference | Reference |
| Contributing Factor to Threat | | | | | |
| Alcohol/Drug Involvement | | | 0.6133 | | |
| Yes | 26(46.4) | 30(53.6) | | 0.86(0.48-1.54) | 1.02(0.51-2.03) |
| No | 114(50.2) | 113(49.8) | | Reference | Reference |
| History of Mental Health Problems | | | 0.0785 | | |
| Yes | 54(43.6) | 70(56.4) | | 0.61(0.35-1.05) | 0.53(0.29-0.97) |
| No | 86(54.1) | 73(45.9) | | Reference | Reference |
| Criminal History | | | <0.0001 ³ | | |
| Yes | 32(78.1) | 9(21.9) | | 5.38(2.31-12.52) | 4.91(2.04-11.78) |
| No | 108(44.6) | 134(55.4) | | Reference | Reference |
| Weapon | | | 0.1939 ³ | | |
| Yes | 10(66.7) | 5(33.3) | | 2.34(0.76-7.23) | 1.95(0.60-6.35) |
| No | 130(48.5) | 138(51.5) | | Reference | Reference |
| Number of Contributing Factor to Threat | | | 0.5655 | | |
| 0 | 68(50.0) | 68(50.0) | | Reference | Reference |
| 1 | 46(46.0) | 54(54.0) | | 0.85(0.51-1.43) | 0.76(0.40-1.44) |
| 2-4 | 26(55.3) | 21(44.7) | | 1.24(0.64-2.41) | 1.20(0.55-2.64) |

1. Sample numbers less than total number due to missing value;

2. p values based on chi-square tests;

3. p values based on Fisher's exact tests;

4. For gender, race and UI affiliation: adjusted ORs are mutually controlling for gender, race and UI affiliation; for others, adjusted ORs are controlling for gender, race and UI affiliation.

The need to follow up was not significantly associated with gender, race, UI affiliation, or any contributing factor to threat (Table 6).

Table 6 Associations of threat subject characteristics with the need to follow up

| Subject Characteristics ¹ | Need to Follow up(N=208) | | p value ² | Crude OR | Adjusted OR ⁴ |
|---|--------------------------|-------------|----------------------|-----------------|--------------------------|
| | Yes N (%) | No N (%) | | | |
| Total | 99 | 109 | | | |
| Gender | | | 0.2627 | | |
| Male | 76(49.4) | 78(50.6) | | 1.44(0.76-2.72) | 1.06(0.52-2.13) |
| Female | 21(40.4) | 31(59.6) | | Reference | Reference |
| Race | | | 0.0965 | | |
| Caucasian | 74(51.4) | 70(48.6) | | 2.01(0.87-4.62) | 2.01(0.87-4.62) |
| Other Races | 10(34.5) | 19(65.5) | | Reference | Reference |
| UI Affiliation | | | 0.5750 | | |
| Employee | 18(46.2) | 21(53.8) | | 0.69(0.28-1.71) | 0.56(0.19-1.60) |
| Student | 61(45.9) | 72(54.1) | | 0.68(0.32-1.42) | 0.81(0.34-1.91) |
| Visitor | 20(55.6) | 16(44.4) | | Reference | Reference |
| Contributing Factor to Threat | | | | | |
| Alcohol/Drug Involvement | | | 0.8548 | | |
| Yes | 21(48.8) | 22(51.2) | | 1.07(0.54-2.08) | 0.98(0.46-2.05) |
| No | 78(47.3) | 87(52.7) | | Reference | Reference |
| History of Mental Health Problems | | | 0.4086 | | |
| Yes | 52(50.5) | 51(49.5) | | 1.27(0.70-2.31) | 1.21(0.65-2.25) |
| No | 47(44.8) | 58(55.2) | | Reference | Reference |
| Criminal History | | | 0.1352 | | |
| Yes | 17(60.7) | 11(39.3) | | 2.12(0.88-5.11) | 2.12(0.86-5.27) |
| No | 82(45.6) | 98(54.4) | | Reference | Reference |
| Weapon | | | 0.3573 ³ | | |
| Yes | 7(63.6) | 4(36.4) | | 1.96(0.55-6.95) | 2.19(0.59-8.07) |
| No | 92(46.7) | 105(53.3) | | Reference | Reference |
| Number of Contributing Factor to Threat | | | 0.2158 | | |
| 0 | 37(41.6) | 52(58.4) | | Reference | Reference |
| 1 | 41(49.4) | 42(50.6) | | 1.37(0.75-2.51) | 1.31(0.67-2.59) |
| 2-4 | 21(58.3) | 15(41.7) | | 1.97(0.90-4.32) | 1.94(0.81-4.65) |

1. Sample numbers less than total number due to missing value;

2. p values based on chi-square tests;

3. p values based on Fisher's exact tests;

4. For gender, race and UI affiliation: adjusted ORs are mutually controlling for gender, race and UI affiliation; for others, adjusted ORs are controlling for gender, race and UI affiliation.

DISCUSSION

The present study assessed the type of cases that involve a large University Threat Assessment Team. As the TAT actively reached out to other University units, they responded to many cases that were not critical threats.

Report Threats Have Divergent Direction for Different Gender

Data from our study showed that gender was an important demographic characteristic for threat response type and situation type when controlling for race and affiliation. The threat response subjects and external threat subjects were more likely to be male than female in the reported cases of our study. This finding is consistent with many studies. Nansel et al (2001) reported males had a higher prevalence of bullying than females in a nationally representative survey of the US youth in grades 6 through 10 during the spring of 1998[18]. Chen and Astor's study (2010) also reported that males had a significantly higher prevalence of perpetrating violent behavior than females with respect to both the overall violence and the different types of violent behavior in schools separately [19]. In Gormley's research (2010), male college students were more frequently reported to be perpetrators of emotional abuse in dating relationships than female when they were experiencing high stress level and could not find adequate coping resources [20]. The gender difference suggests that males should be a focus of planning efforts and perhaps primary prevention educational strategies.

Alcohol and Drug Involvement May Be Related with Threat

Our study pointed out that one-fifth of threat cases that needed TAT response involved alcohol or drugs. We did not find the significant association between alcohol or drug involvement and threat response or situation types. Previous research reported

alcohol use to be a major university problem [21]. In Knight's research (2005), 31% of college students met the alcohol abuse diagnosis criteria and 6% met the dependence diagnosis in the past 12 months [22]. Research in these previous reports supports a relationship between alcohol involvement and threats. Hove et al. (2010) and Nabors et al. (2010) showed a positive association between alcohol consumption and intimate partner violence (IPV) [23, 24]. Chen et al found earlier problem drinking was one of the common predictors of perpetrated threat for both genders using prospective study [24]. Wang et al (2004) interviewed 3910 students from two Chinese universities and drew a similar conclusion [25]. In our setting, we compared threat response vs. threat consultation and external threat vs. self-harm or behavior problem, in which the research population was different from what have reported in literature. In addition, information about the involvement of drug or alcohol was not recorded from the subjects but from the referring parties, which also might lead to information bias. Also, additional years of data may yield a clear trend in the relationship of alcohol or drug use with potential threats on campus. Thus, we cannot conclude that involvement of drug or alcohol is not contributing to the occurrence of threats on university campus based on the insignificant association between alcohol or drug involvement and different type response or situation observed in our study. In fact, more attention needs to be given to the influence of alcohol and drug involvement on the university campus.

Threat Is Closely Related with Mental Health

In our research, mental health history was marginally associated with response cases and significantly associated with self-harm/behavior problems when controlling for gender, race and UI affiliation, which was also supported by other studies. Mental health

issues had contributed nearly one-half of the disease burdens for young adults in the U.S and the number of college students who suffered mental health problems was revealed to increase [27]. First onset of lifetime mental disorders usually occurred by the age of 24 years, and symptoms may first appear during college years [28]. Many studies identified a relationship between mental health and violence [29], although this relationship was controversial and lacked specificity. Bjöklund et al (2010) reported that exposure to violence was strongly associated with mental health and alcohol consumption [30]. Hodgins (2006) also found that persons with mental illness had higher risk to commit violent crimes than those without [31]. Persons with schizophrenia were at increased risk to commit homicide, and symptoms of schizophrenia often emerge during the age of college students. Cuellar et al (2006) used a cohort study to show a causal relationship between youth mental disorders and crime, and pointed out mental health diversion could be used effectively to delay or prevent youth recidivism [32]. The TAT responded to students' mental health issues and linked students to resources needed, which is beneficial to better identify potential threat cases.

Criminal History Is Associated with the Response and Situation Type

Our study suggests that those subjects with an external threat were more likely to have a criminal history than those without when controlling for gender, race and UI affiliation. Though no research has shown the direct association between criminal history and threats, literature supported that those who were criminally charged previously might have some characteristics to possibly contribute to the occurrence of subsequent threat behaviors. Bartusch et al (1996) used "labeling theory" to depict the relationship between criminal charged history and subsequent threat behavior, which pointed out that the

stigma of delinquency imposed on those young offenders by society would have significant impacts on their own perceptions of being labeled delinquent and on their following delinquent behavior [33]. The inner influence of those individuals with criminal charged history might be the possible cause for them to be closely associated with threat behavior. For this reason, we need to focus on those who had criminal charged history especially when employing the prevention measures.

LIMITATION

Several limitations in our research should be considered. First, according to research confidentiality, no individual identifying information was included in the data and we could not identify subjects who might have multiple case records. Thus, it was possible that some cases came from the same subject. Second, we could not gather more information about socio-demographical characteristics that would help discern and screen the risk factors for the threat subjects further. Besides gender, race, UI affiliation, more elements of wide social contexts, including neighborhood characteristics, community impact [34], and family member relationships could contribute to understanding the risk characteristic of threat subjects. Domestic violence, particularly verbal or sexual, was indicated to be closely related with suicidal behavior in University students [35, 36]. Third, the variables included in this study were limited to those routinely collected for the TAT data log since the TAT was not designed for research purpose. The detailed data on the root causes and outcomes of cases were not captured.

CONTRIBUTION

This is the first study to describe the types of events in the university population that required response and input from a newly-established University Threat Assessment Team. The TAT formulates an effective system and network to identify and report threat cases in a timely and consistent manner on the university campus. The work of the TAT leads to earlier identification of situations that could evolve into potential threats as well as identification of situations that might not otherwise come to light. The TAT then helps link members of the university campus to resources they need to address a potentially threatening situation, which in turn could reduce the potential of a situation to escalate to a more serious problem. Previous studies have focused primarily on students, but these data allowed us to examine events involving students, employees, and visitors to the University. The university community is a complex population with many potential avenues to influence the campus safety directly or indirectly. Only when we assess the overall threats in the university properly can we design and implement effective prevention and intervention methods to make sure all the members of the university community can benefit from this work.

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