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Treatment Use Among College Women Following a Campus Shooting

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Abstract

Despite increases in campus shootings, there is limited research on treatment utilization after these tragic events. The present study prospectively examined the prevalence and predictors of treatment use among college women following a campus shooting. Predictors included age, race/ethnicity, education level, severity of exposure to shooting, and post-shooting sequelae (i.e., social support, posttraumatic stress disorder [PTSD] severity, depression severity). Present data were obtained from 516 women on campus at the time of the shooting. They completed electronic and online surveys across three time points – pre-shooting (T1), 1-month post-shooting (T2), and 6-months post-shooting (T3). As expected, few participants (14.4%) sought any treatment. Of note, 77.5% of participants endorsed at least one risk factor for PTSD. Prevalence rates of probable PTSD significantly decreased from 51.8% of the full sample at T2 to 12.9% at T3. Results showed that a significantly higher proportion of participants with probable PTSD at T3 sought treatment than those participants at minimal to no risk for PTSD. Psychotherapy was sought at higher rates than medication or combined treatment across risk groups. No reliable predictors of treatment use were observed for at-risk participants or those with probable PTSD. Research and clinical suggestions for optimizing post-disaster recovery and improving treatment utilization among students following campus shootings are discussed.

Keywords

campus shooting; treatment use; women; PTSD; at-risk college students; psychotherapy; medication; logistic regression; Adult Survivor; Treatment; Trauma; Community Violenceboy

Campus shootings and violence have steadily increased within the last few decades (North & King, 2009), even though campus attacks involving murder and non-negligent homicide comprise less than 0.1% of campus violence (Drysdale, Modzeleski, & Simons, 2010). Recently, campus shootings have involved an unusually high number of fatalities and injuries – e.g., 33 fatalities and 23 injured in the 2007 Virginia Tech shooting (Sanburn, 2015). Individual reactions to such events vary widely and findings show that survivors are largely resilient, exhibiting only minor disruptions in their normal functioning (Orcutt, Bonanno, Hannan, & Miron, 2014). A minority of victims develop persistent posttraumatic stress disorder (PTSD) among other psychiatric conditions (e.g., major depression,

generalized anxiety, substance abuse; for a review, see Lowe & Galea, 2015; see also Orcutt, Miron, & Seligowski, 2014). As PTSD symptoms persist, college students may evidence declining academic performance that exacerbates psychological symptoms and contributes to lower graduation rates among these students (Eisenberg, Golberstein, & Hunt, 2009; Megivern, Pellerito, & Mowbray, 2003; Storrie, Ahern, & Tuckett, 2010). This underscores the importance of developing strategic emergency response plans at colleges and universities that reduce the negative impact of mass disasters (e.g., campus shootings) and maximize the post-disaster recovery of the campus community.

Campus shootings pose a unique threat to campus safety and can escalate quickly (U.S. Department of Education, 2013). Postsecondary institutions are encouraged to collaborate with community partners (e.g., first responders, police officers, fire department) to develop emergency response and evacuation plans to identify, prepare, prevent, and respond to these potentially deadly situations. They are legally required to have policies that detail how the institution will confirm an emergency posing imminent threat to its students and staff, how the campus and surrounding community will be notified (unless issuing the notification will compromise efforts to contain the emergency), and how the emergency response and evacuation procedures will be routinely tested. Part of these procedures should also describe strategies for facilitating post-disaster recovery. For example, psychological first aid is a widely-implemented, evidence-informed approach that takes into account that not all survivors develop psychological problems or have long-term adjustment difficulties. Its objective is to provide comfort, support, psychoeducation as well as resources that re-establish a sense of security to promote natural recovery. Victims are encouraged to process acute reactions to the event and its implications through support groups, written or verbal psychoeducation about common reactions to disaster, and a variety of other therapeutic options. This approach contrasts with large-scale, single-session psychological debriefings, which have some benefits (e.g., lift morale, facilitate group cohesion). Nonetheless, research shows that psychological debriefings are largely ineffective and potentially harmful (see Ursano et al., 2004 for a review; see also Litz et al., 2002).

Given that neither psychological first aid nor psychological debriefings prevent the development of PTSD and related symptoms (e.g., depression, substance abuse), secondary prevention treatments are recommended for victims at increased risk for these disorders (Litz et al., 2002). Further, current practice guidelines for managing acute trauma exposure emphasize the importance of distinguishing between victims demonstrating effective coping and those evidencing more complicated responses (Litz et al., 2002; Ursano et al., 2004). This practice ensures that survivors at greatest risk for adverse psychological outcomes can receive timely clinical intervention to prevent further complications. Moreover, this allows for services to be allocated in a way that does not interfere with resilience or natural recovery. Emerging research shows that trauma survivors who receive as few as four sessions of cognitive-behavioral treatment (or trauma-specific treatments) immediately following trauma exposure are less likely to develop PTSD than survivors who receive supportive counseling or wait-list/no intervention (Kornor et al., 2008; Roberts, Kitchner, Kenardy, & Bisson, 2009). Selective serotonin reuptake inhibitors (SSRIs) also show promise as a preventative treatment for PTSD, though further research is needed (Shalev et al., 2012).

Identifying At-Risk Students

In the aftermath of trauma, initial assessments are critical for identifying individuals at greatest risk for pathological responses, including PTSD. The timing and nature of these assessments may be affected by the traumatic event and the extent of destruction caused by the event. During a mass disaster (e.g., campus shooting), victims are usually triaged according to their physical injuries and/or psychological reactions to the event. Group interviews, consultations, or a battery of self-report measures may be utilized during this preliminary evaluation process (Ursano et al., 2004). While Litz and colleagues (2002) argue against a “one-size-fits-all” assessment approach, they also recognize it may not be feasible to obtain full psychiatric histories during a mass emergency. In fact, they suggest that even brief screenings might be logistically difficult to execute and may also feel intrusive to victims. Ursano et al. (2004) propose conducting more extensive evaluations once victims are stabilized. Recommended clinical domains to assess are previous trauma exposure, imminent safety risks, dissociative symptoms, trauma-related symptoms (e.g., Acute Stress Disorder, PTSD), military history, other behavioral and health risks (e.g., substance use, pre-existing mental conditions), personal characteristics (e.g., coping skills, interpersonal functioning), psychosocial situation (e.g., social support, employment), other stressors (e.g., poverty, bereavement), and legal system involvement. As of now, no specific algorithm exists for determining which individuals will develop trauma pathology. Thus, mental health providers and other involved parties conducting these assessments should be informed about which factors (or combination of factors) are associated with increased vulnerability to trauma-related symptoms.

Common Risk Factors of PTSD

Lowe and Galea (2015) recently reviewed 49 studies concerning mental health outcomes following mass shootings and noted several proposed risk factors. The studies included in their review covered 15 different mass shootings that occurred between 1984 and 2008 in the U.S. and in Finland. PTSD symptoms were the most commonly studied post-shooting outcome with some data on the prevalence of other psychiatric conditions (e.g., major depression, generalized anxiety, alcohol misuse, panic attacks). Proposed risk factors for PTSD included demographic characteristics (e.g., female gender, lower socioeconomic status [SES], lower education), pre-incident characteristics (e.g., psychological functioning, prior trauma exposure), incident characteristics (e.g., greater proximity to incident, emotional reactivity during or after incident, peritraumatic dissociation), and poor social support.

Other studies examining risk factors for PTSD more broadly have found similar results. Brewin, Andrews, and Valentine (2000) investigated the effects of 14 predictors of PTSD across 77 articles published between the 1980s and 1990s. The 14 predictors were female gender, younger age, low SES, lack of education, low intelligence, racial minority status, psychiatric history, history of childhood abuse, other trauma exposure prior to index event, other adverse childhood events, family psychiatric history, trauma severity, lack of social support, and subsequent life stress. All risk factors were significant predictors of PTSD with varied effect sizes. Following the recommendations of Ferguson (2009), predictors yielding

effect sizes equal to or greater than a minimum weighted r value of .20 can be considered more reliable indicators of PTSD risk (i.e., practical significance). Based on that criterion, greater trauma severity (weighted $r = .23$), lack of social support (weighted $r = .40$), and more subsequent life stress (weighted $r = .32$) were better estimates of PTSD risk than the other predictors.

Building on Brewin et al.'s (2000) work, Ozer, Best, Lipsey, and Weiss (2008) reviewed 68 studies concerning predictors of PTSD symptoms published between a similar time frame (1980–2000). They examined predictors that were “a potential contributor to variability in PTSD symptom levels or diagnostic status” (p. 8). In other words, they focused on predictors that reflected personal characteristics involved in psychological functioning and that reflected aspects of the traumatic event and its associated outcomes. They excluded demographic characteristics, arguing that these factors are not implicated in the psychological processes of trauma responses. Based on these selection criteria, Ozer et al. included 21 studies not included by Brewin et al. (2000), although they selected fewer studies than Brewin et al. overall. Ozer et al. studied the following seven predictors – prior trauma exposure, prior adjustment, family history of psychopathology, perceived life threat, perceived support, peritraumatic emotions (e.g., guilt, shame), and peritraumatic dissociation. Results showed that all predictors were statistically significant. However, only perceived life threat (weighted $r = .26$), perceived social support (weighted $r = .28$), peritraumatic emotional responses (weighted $r = .26$), and peritraumatic dissociation (weighted $r = .35$) were reliable predictors. It is worth noting that, although prior trauma exposure yielded a relatively weak effect (weighted $r = .17$), prior exposure to nonmilitary-related interpersonal trauma (e.g., physical assault, sexual assault) was a stronger predictor (weighted $r = .27$). Additionally, more detailed analyses revealed that a history of prior depression yielded a stronger effect (weighted $r = .32$) than broadly defined measures of pre-trauma adjustment (weighted $r = .17$). Consistent with these latter findings, several studies that postdate this review have implicated a history of PTSD and depression as good predictors of subsequent PTSD (Boykin, Dunn, & Orcutt, in press; Breslau & Peterson, 2010; Breslau, Peterson, & Schultz, 2008).

In sum, trauma severity, prior exposure to nonmilitary interpersonal trauma, prior depressive or PTSD symptoms, lack of social support, subsequent life stress, perceived life threat, peritraumatic emotional responses, and peritraumatic dissociation were reliable predictors of PTSD across numerous studies. Many of these predictors have also been noted as risk factors for PTSD following campus shootings (e.g., trauma severity, social support; Lowe & Galea, 2015). During post-disaster evaluations, prioritizing assessments for these particular risk factors could allow professionals to identify at-risk students more quickly and refer them for appropriate secondary prevention services (e.g., individual psychotherapy, medication). With limited research on treatment utilization following mass campus disasters, it is difficult to say whether at-risk students would follow through on referrals for additional treatment. Even less is known about what factors might impact treatment utilization within this population.

Predictors of Treatment Use for PTSD Symptoms

Predictors of treatment utilization for individuals with PTSD symptoms have been examined using a widely adopted behavioral model of health service use (Andersen, 1995). This model proposes three types of individual-level factors that influence treatment utilization. First, *predisposing factors* impact one's natural tendencies toward service use, although they are not reasons for service use. For example, demographic characteristics (e.g., sex, age), social status (e.g., race, education level), and beliefs/values can promote and/or hinder treatment seeking. Second, *enabling factors* refer to how services can be obtained, including knowledge of accessible services, financial means, and health insurance. Finally, *need factors* consist of the perceived severity of one's illness. Consistent predictors of treatment use in diverse trauma samples include age, gender, race/ethnicity, education level, income level, medical insurance, disability, pension benefits and compensation, severity of psychopathology, a diagnosis of PTSD, functional impairment, and psychiatric comorbidities (Calhoun, Bosworth, Grambow, Dudley, & Beckham, 2002; Elhai, North, & Frueh, 2005; Elhai, Patrick, Anderson, Simons, & Frueh, 2006; Erbes, Westermeyer, Engdahl, & Johnsen, 2007; Gavrilovic, Schutzwahl, Fazel, & Priebe, 2005; Koenen, Goodwin, Stuenkel, Hellman, & Guardino, 2003; New & Berliner, 2005; Roberts, Gilman, Breslau, Breslau, & Koenen, 2011). Other predictors of treatment utilization specific to trauma populations are severity and proximity to traumatic events, prior trauma history, and diminished social support (Gavrilovic et al., 2005; Schrieber, Maercker, & Renneberg, 2010). Miquelon et al. (2014) found that female gender and the presence of certain psychiatric conditions (i.e., depression, alcohol dependence, social phobia, agoraphobia) were significantly associated with increased use of professional resources (e.g., psychiatrist, psychologist, counselor) following the 2006 Dawson College shooting in Montreal, Canada. Surprisingly, a diagnosis of PTSD was not related to use of professional resources. It is worth noting that Miquelon et al. assessed treatment use among students and staff exposed to the shooting without consideration of risk status. Further, their predictors were limited to demographic characteristics and psychiatric conditions.

The Present Study

The present study examined the prevalence rate and predictors of treatment use among women exposed to a campus shooting at [university name masked]. On the afternoon of [date masked], a lone gunman opened fire in [location masked], killing [number masked] and injuring [number masked] before killing himself. Based on Miquelon et al. (2014), we expected that less than 15% of women would utilize any treatment (e.g., psychotherapy, medication) within six months of the shooting. Moreover, we did not expect that being at-risk for PTSD or qualifying for a probable diagnosis of PTSD would impact treatment use. In this study, at-risk for PTSD was defined as the presence of at least one of the following risk factors (based on available data): (1) a history of nonmilitary interpersonal violence, (2) elevated pre-shooting depressive symptoms, (3) elevated pre-shooting PTSD symptoms, (4) high exposure to the shooting, (5) elevated peritraumatic dissociation, or (6) lack of immediate post-shooting social support. We examined predictors of treatment use for at-risk students using Andersen's (1995) behavioral model of health service use to identify potential barriers to treatment utilization within this subgroup. Predictors included age, race/ethnicity,

education level, severity of shooting exposure, and post-shooting sequelae (i.e., social support, PTSD symptoms, depressive symptoms). Although gender is a robust predictor of treatment use, the all-female sample prevented exploration of its effect in this sample.

Method

Participants and Procedures

Present data were drawn from a sample of college women enrolled in a larger longitudinal study when a campus shooting occurred. Original study aims were immediately expanded from assessing sexual revictimization to also examining short- and long-term reactions to this fateful event. Prior to the shooting, participants who were female gender, at least 18-years-old, and fluent in English were recruited from introductory psychology courses between [date masked] and [date masked]. One thousand and forty-five participants completed the computerized pre-shooting survey during a 90-minute individual session for which they received course credits. Of the 885 participants who consented to future contact, 812 participants were current [university name masked] students at the time of the shooting and invited to an online assessment approximately 1-month post-shooting (T2). Only the 691 (of 812) participants who completed T2 were invited to subsequent time points (T3-T8). The present study focused on the first 3 time points with the last online survey collected approximately 6-months post-shooting (T3). Following each completed post-shooting survey, participants had the option of receiving course credits (if currently enrolled in introductory psychology) or \$40 compensation. The study protocol was approved by [university name masked] institutional review board.

For this study, only women on campus during the shooting were included ($n = 527$). Eleven participants were removed as extreme outliers (± 3 *SDs*) on age or for being reportedly under the age of 18, resulting in a final sample of 516. The average age was 18.54 ($SD = 0.87$) years old at T1. Most participants self-identified as non-Hispanic Whites (64.9%) and as first- or second-year undergraduate students (77.9% and 16.5%, respectively).

Measures

PTSD risk status.

As stated above, participants were categorized as “at-risk” if they endorsed at least one of the following risk factors – history of nonmilitary interpersonal trauma, elevated T1 PTSD severity, elevated T1 depressive severity, high exposure to the shooting, elevated T2 peritraumatic dissociation, or low T2 social support. Each risk factor was dichotomized into “present” (=1) or “absent” (=0) based on pre-determined scoring criteria (as described below).

Prior exposure to nonmilitary interpersonal trauma was assessed at T1 using the Traumatic Life Events Questionnaire (TLEQ; Kubany, Haynes, et al., 2000). The TLEQ measures lifetime exposure to a range of potentially traumatic events. Nonmilitary interpersonal trauma was defined as “human-perpetrated violence that occurred in a civilian or nonmilitary context” (p. 10, Ozer et al., 2008). Qualifying events were robbery, physically assault, rape, molestation, domestic violence, and childhood sexual or physical abuse. A

dichotomous variable (0 = *no prior interpersonal trauma*, 1 = *prior interpersonal trauma*) was created and used to determine risk status. The TLEQ has good reliability and convergent validity (Kubany, Haynes, et al., 2000).

T1 depression severity was assessed using the Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 consists of three subscales including one for depression. On the DASS-21, participants rated the degree to which they experienced depressive symptoms in the past week. A severity score was computed by summing the subscale items and multiplying it by two (range 0–42; Lovibond & Lovibond, 1995). Scores at or greater than 21 indicate severe depression and this cutoff was used to determine risk status. Depression severity assessed at T2 and T3 was included as predictors of treatment use at T3. The DASS-21 has acceptable internal consistency and convergent validity (Lovibond & Lovibond, 1995). Internal consistency for the Depression subscale was adequate across time points (*as above* .83).

T1 PTSD severity was assessed using the Distressing Events Questionnaire (DEQ; Kubany, Leisen, Kaplan, & Kelly, 2000). Participants rated the degree to which they experienced PTSD symptoms (as defined by DSM-IV; American Psychiatric Association, 2000) in the last 30 days secondary to a worst-identified trauma from the TLEQ. PTSD severity secondary to the shooting was also assessed at T2 and T3. Severity scores were computed across time points by summing the items (range from 0–68). A cutoff score of 18 is indicative of probable PTSD (Kubany, Leisen, et al., 2000). This cutoff was used at T1 to determine risk status. This cutoff was also used at T2 and T3 to assess prevalence of probable PTSD. Finally, T2 PTSD and T3 PTSD severity scores were included as predictors of treatment use at T3. The DEQ has high internal consistency, good short-term reliability, and adequate convergent and discriminant validity (Kubany, Leisen, et al., 2000). The DEQ showed high internal consistency across time points (*as above* .92).

At T2, level of exposure to the shooting (1 = *low*, 2 = *moderate*, 3 = *high*) was based on responses to an open-ended question, “Please describe how you learned about the mass shooting that took place on [*university name masked*] campus on [*date masked*]. Where were you when you first knew something was wrong?” Responses were coded by five independent coders who exhibited acceptable inter-rater reliability (Cronbach’s $\alpha = .86$). Low physical exposure referred to individuals who were not physically on campus during the shooting. These participants were excluded from this study. Moderate physical exposure referred to individuals on campus, but not directly in the vicinity of the shooting. These included individuals who reported seeing people running from the shooting, watching events unfold from windows above, or were “locked down” in a campus building. High physical exposure referred to participants who reported seeing victims or blood in the vicinity of the shooting. For a subset of participants who indicated seeing individuals running from the shooting that did not specify whether these individuals were visibly wounded or bloody, responses were cross-checked against responses to a 12-item measure of physical exposure to the shooting adapted from Littleton, Axsom, and Grills-Tauchel (2009). Those participants giving an affirmative response to the item, “Did you see individuals who had been wounded or killed?”, were classified as high exposure ([*citation masked*]). Risk status was determined by whether participants indicated high (=1) or moderate exposure (=0).

The Peritraumatic Dissociative Experiences Questionnaire (PDEQ; Marmar et al., 1994) measured potential dissociative reactions during the shooting at T2. A mean score was computed (range 1–5) with higher scores indicating greater peritraumatic dissociation. Mean scores greater than or equal to three on the PDEQ have been associated with a diagnosis of PTSD and this cutoff was used to determine risk status (Birmes et al., 2003; Shalev et al., 1996). The PDEQ had acceptable internal consistency in this ($\alpha = .87$) and other studies (Birmes et al., 2003; Kumpula, Orcutt, Bardeen, & Varkovitzky, 2011; Miron, Orcutt, & Kumpula, 2014; Sijbrandij et al., 2012).

Perceived adequacy of social support from friends, family, and significant others at T2 was measured by the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1998). A mean score was computed (range 1–7) with higher values reflecting greater T2 perceived social support. Mean scores less than 5.20 have been associated with a diagnosis of PTSD and this cutoff was used to determine risk status (Clapp & Beck, 2009). T2 social support was also included as a predictor of treatment use at T3. MSPSS has good internal consistency, reliability, and construct validity (Zimet et al., 1988; Zimet, Powell, Farley, Werkman, & Berkoff, 1990). Internal consistency was acceptable in this study ($\alpha = .93$).

Predictors of treatment use.

Predictors included demographic characteristics, severity of shooting, T2 social support, T2 PTSD severity, and T2 depression severity. Single items were used to measure demographic characteristics (i.e., age [in years], race/ethnicity, education level) at T1. Race and ethnicity were collapsed into a single dichotomous variable – non-Hispanic, White (=1) or minority (=0). Education level ranged from first-year college students (=1) to fourth-year college students (=4). Severity of shooting exposure was assessed using the 12-item measure adapted from Littleton et al. (2009). Participants indicated whether they experienced different aspects of the shooting. Most participants were in a building placed on lockdown ($n = 321$) or saw police and other personnel surrounding buildings ($n = 421$). One-hundred and eighty-eight students knew someone wounded, 111 knew someone killed, and 136 saw individuals who were wounded or killed. Very few participants heard gunfire ($n = 42$) or were in [building name masked] at the time of the shooting ($n = 23$). Of those 23 in [building name masked], 15 saw the gunman, 11 saw the gunman fire on others, and 3 were fired at and hurt. A count score was computed by summing these items (range 0–12). Higher values reflected greater exposure severity. The measures for T2 social support, T2 PTSD severity, T2 depression severity, T3 PTSD severity, and T3 depression severity were described above.

Treatment utilization.

Treatment use was assessed at T3 by single items. Items were “Since the mass shooting on [date masked], have you received any sort of professional counseling or therapy for problems with your emotions, nerves, or mental health,” and “Since the mass shooting on [date masked], have you taken any prescription medicines for problems with emotions, nerves, or mental health”? Treatment use was dichotomized into any treatment (= 1) or no treatment (= 0). (Due to the nature of the data, pre-shooting treatment use was unknown.)

Results

Variable means, standard deviations, ranges, and bivariate correlations are shown in Table 1. Negligible amounts of data were missing across study variables – race/ethnicity (2.9%), T1 age (0.4%), T1 education level (0.2%), T2 social support (1.0%), and T2 PTSD severity (2.7%). Therefore, pairwise deletion was used to remove only those participants missing data on all variables of interest ($n = 75$). Four hundred participants (77.5%) endorsed at least one risk factor for PTSD, including 289 with a history of nonmilitary interpersonal trauma, 97 endorsing elevated T1 PTSD symptoms, 22 endorsing severe levels of T1 depression, 92 indicating high exposure to the shooting, 165 endorsing elevated T2 peritraumatic dissociation, and 107 reporting low T2 social support. Of those 400 at-risk participants, 228 (58.4%) met for probable PTSD at T2. (Note: 10 at-risk participants omitted answers to the DEQ at T2). A minority of participants with no risk at T2 ($n = 33$ of 114 or 28.9%) met for probable PTSD. There was a significant decrease in the overall prevalence of probable PTSD from T2 ($n = 261$ of 504 or 51.8%) to T3 ($n = 58$ of 447 or 12.9%), $\chi^2(1) = 38.07$, $\phi(\phi) = .29$, $p < .001$. This suggests that most at-risk participants ($n = 186$ or 47.7%) with a probable diagnosis of PTSD at T2 showed symptom remission by T3. Of the 58 participants with probable PTSD at T3, the majority ($n = 52$ or 89.7%) were identified as at-risk and had also met for probable PTSD at T2 ($n = 53$ or 91.4%). It is worth noting that five participants with probable PTSD at T3 (three at-risk participants and two participants with no risk) did not qualify for probable PTSD at T2. Participants with probable PTSD, on average, endorsed more risk factors than those only at-risk for PTSD at T2 ($t(386.33) = 8.65$, $p < .001$, Hedge's $g = 0.83$) and T3 ($t(59.08) = 6.78$, $p < .001$, $g = 1.36$).

As shown in Table 2, a small percentage (14.4% or $n = 65$) of the total sample reported use of psychotherapy and/or medication within 6-months following the shooting. Treatment use was separated according to risk status (i.e., no risk, at-risk only, probable PTSD at T3). A similar pattern of treatment use emerged among the three groups with a higher percentage of participants participating in psychotherapy compared to medication alone or the combination of these treatment modalities. A chi-square analysis showed that a significantly higher proportion of participants with probable PTSD at T3 sought treatment compared to those at-risk or without risk for PTSD, $\chi^2(2, N = 452) = 23.24$, $p < .001$, Cramer's $V = .23$. Based on Ferguson's (2009) recommendations, this effect is small, yet practically significant. Notably, 19.4% ($n = 36$ of 186) of those participants whose symptoms remitted from T2 to T3 sought treatment. It is also worth mentioning that 64 participants (of 516) declined to answer questions about their treatment utilization. Independent t tests showed that these participants were more likely to self-identify as a racial/ethnic minority, endorse less T2 social support, and endorse lower T2 PTSD severity than their peers (all p s $< .05$). In light of study aims, data imputation strategies were not employed to ensure an accurate estimation of utilization rates.

To better understand potential barriers to treatment use among at-risk participants, post-shooting treatment use ($yes = 1$, $no = 0$) was regressed on age, race/ethnicity, education level, shooting exposure severity, T2 PTSD severity, T2 depression severity, T2 social support, T3 PTSD severity, and T3 depression severity using logistic regression. The Hosmer and Lemeshow goodness-of-fit test was non-significant ($p = .520$) suggesting that

the proposed model fit the data well. Surprisingly, only T2 PTSD severity significantly predicted treatment use. However, the effect size was below the recommended cutoff for practical significance (odds ratios ≤ 2.0 ; Ferguson, 2009), implying that T2 PTSD severity was not a reliable predictor. Similar results were found when only including those participants with probable PTSD at T3.

Discussion

This study expanded previous research by examining prevalence and predictors of treatment use among college women exposed to a campus shooting. As expected, less than 15% of the sample sought formal treatment (i.e., psychotherapy, medication) within six months of the shooting. Results showed that a higher proportion of participants with a probable diagnosis of PTSD reported treatment use compared to those only at-risk for PTSD or those without any risk for PTSD at T3. This finding suggests that shooting survivors with increasing emotional distress are more likely to participate in some form of treatment. However, our data lacked information regarding how individuals became involved in treatment (e.g., provider referral, self-referred) or specific details about individual treatment experiences (e.g., treatment type, treatment format, treatment progress). Ideally, psychological first aid would have been implemented as the first-line treatment and only those individuals evidencing increased risk for adverse outcomes (e.g., PTSD) would be referred for specialty clinical services (e.g., psychotherapy, medication; Litz et al., 2002). It was difficult to discern from present data whether that recommendation was implemented and/or effective. A critical element of this approach is the ability to appropriately identify at-risk victims following a mass campus disaster to maximize post-disaster recovery (Litz et al., 2002; Ursano et al., 2004).

Present data highlight the complexity of determining which victims will develop clinically significant trauma symptomatology, underscoring the necessity for multiple assessments. While there was no 1:1 correspondence between risk status and a probable diagnosis of PTSD in our sample, prevalence rates of probable PTSD were considerably higher among at-risk participants at both time points. Our data also showed that endorsing an increasing number of risk factors was associated with a greater likelihood of reporting clinically significant PTSD symptoms. Additional research is needed, however, to better understand which combinations of risk factors or minimal number of risk factors are associated with highest conditional risk for PTSD and related psychopathology. At minimum, college administrators and mental health providers should consider administering an initial screening and follow-up evaluation after a mass campus disaster to monitor individuals who demonstrate on-going or delayed trauma reactions. While obtaining a full psychiatric history in the wake of a disaster would be impractical, briefly screening for common risk factors of trauma pathology seems reasonable. Some reliable predictors of PTSD include prior exposure to interpersonal trauma, pre-existing depression or PTSD symptoms, trauma severity, peritraumatic responses (e.g., perceived life threat, fear) and dissociation, social support, and current life stressors (Brewin et al., 2000; Ozer et al., 2008). Ursano et al. (2004) suggest conducting preliminary evaluations as group interviews or a battery of self-report measures. Permitting availability and accessibility of technology, college administrators may consider distributing these assessments electronically through forums,

such as online surveys or smartphone applications, to reach a broader audience more quickly. Benefits of this approach include the ability to monitor victims' reactions, reassess needs for treatment, and identify at-risk individuals needing more in-depth, follow-up evaluations across time. The timing of follow-up evaluations matters. Most trauma survivors demonstrate acute trauma reactions that often remit within the first few months of exposure (Bonanno & Diminich, 2013; Orcutt et al., 2014). This pattern was observed in present data where a high percentage of participants endorsing clinically significant levels of PTSD at T2 remitted by T3. Toward this end, it may be useful to conduct follow-up evaluations several months post-disaster or near the conclusion of psychological first aid so that mental health providers can make appropriate referrals for secondary interventions.

In this study, participants who sought treatment reported greater use of psychotherapy compared to medications or the combination of these treatment modalities. This pattern was consistent across risk status. Other studies have shown that female trauma survivors strongly prefer psychotherapy over medication for reasons such as beliefs that it is more effective and positive feelings about talking (Angelo, Miller, Zoellner, & Feeny, 2008; Cochran, Pruitt, Fukuda, Zoellner, & Feeny, 2008; Feeny, Zoellner, Mavissakalian, & Roy-Byrne, 2009; Roy-Byrne, Berliner, Russo, Zatzick, & Pitman, 2003; Zoellner, Feeny, Cochran, & Pruitt, 2003). As stated earlier, preliminary evidence supports cognitive-behavioral therapies and SSRIs as effective treatments following acute trauma exposure (Bisson et al., 2003; Bryant et al., 1999; Ehlers & Clark, 2003; Kornor et al., 2008; Roberts et al., 2009; Shalev et al., 2012; Sijbrandij et al., 2007). Effective cognitive-behavioral strategies include anxiety management, cognitive restructuring, exposure therapy, and relapse prevention (Litz et al., 2002; Ursano et al., 2004). Mental health providers are encouraged to use these early clinical interventions judiciously as many victims may profit from delayed treatment (Litz et al., 2002). It is also worth noting that not every treatment is appropriate for every client. For example, Bryant and colleagues (1999) caution against using exposure-based treatments for acutely traumatized individuals who express other unresolved traumas, dissociative reactions, acute suicidal ideation, significantly elevated pathology (e.g., anxiety, borderline features, psychosis, substance abuse), or demanding ongoing life stressors.

Present findings provided limited insight about factors contributing to treatment underutilization among participants at-risk for or with a probable PTSD diagnosis. No reliable predictors were observed. This contrasts with Miquelon et al. (2014) who found that female gender and presence of a mental or substance use disorder were associated with increased treatment use following the Dawson College shooting. While surprising, differences in sample characteristics and methodology may have contributed to the discrepancy in findings. For example, our sample was comprised of female college students whereas Miquelon et al. recruited a mixed-gender sample of staff and students. Additionally, Miquelon et al. conducted a more comprehensive assessment of treatment use. They collected information on utilization, costs, sites, and satisfaction with a wide range of services (e.g., psychiatrist, general practitioners, counselors, internet, crisis hotline, religious/spiritual counselor). In this study, single items were used to assess psychotherapy and medication use since the shooting in the context of broad emotional problems as opposed to trauma-specific symptoms. We assumed that participants initiated treatment services following the shooting due to shooting-related difficulties. However, present data

were not sufficient to test this assumption. Specific to the item about psychotherapy use, it cannot be discerned what participants classified as psychotherapy. In other words, we cannot determine whether participants were reporting use of secondary prevention treatments (e.g., cognitive behavioral therapy) or standard post-disaster services (e.g., support groups, debriefings). Knowing this information would have provided a better estimate of the types of treatment services at-risk college women sought in the aftermath of this university shooting.

The present study had many limitations, some of which have been previously discussed. As noted above, specific details about treatment experiences were lacking. Further, it is unclear why 15% of the sample did not answer questions about treatment use and further research would be needed to delineate why race/ethnicity, T2 PTSD severity, and T2 social support distinguished those who answered from those who did not. Another limitation was that present data were based on college women who were primarily first-year college students between the ages of 18 and 20. Therefore, present data may not generalize to older college women with higher levels of education or college men. Research suggests that college men, in particular, are less likely to seek treatment than college women (e.g., Addis & Mahalik, 2003). In addition to gender, other factors shown to affect treatment utilization (e.g., beliefs/attitudes about treatment-seeking or treatment effectiveness, fear of being stigmatized) were not included (e.g., Elhai et al., 2005; Gavrilovic et al., 2005).

In light of these limitations, the present study illustrates the importance of investigating treatment use following mass campus violence. The unpredictability of mass campus disasters (e.g., campus shootings) makes it difficult to optimally design prospective studies such as this. While a campus shooting constitutes a minute proportion of campus violence, its devastating effects are widespread among the campus and surrounding community. To optimize post-disaster recovery and improve emergency response policies, colleges and universities would greatly benefit from additional research on treatment use after mass campus disasters. Specific questions to ask may include treatment motivation (e.g., disaster-related problems, other problems), treatments/resources used (e.g., supportive counseling, psychotherapy, medication, internet/telemedicine), treatment site (e.g., university, private practice, medical hospital), and satisfaction with available services. Clinical recommendations suggest offering psychological first aid as a first-line intervention and reserving secondary preventative treatment (e.g., cognitive behavioral therapy, trauma-focused therapy, SSRIs) for at-risk victims (Litz et al., 2002). Litz et al.'s (2002) also advise mental health providers to use these early clinical interventions judiciously since many individuals profit from delayed treatment.

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References

- Addis ME, & Mahalik JR (2003). Men, masculinity, and the contexts of help seeking. *American Psychologist*, 58, 5–14. doi:10.1037/0003-066X.58.1.5 [PubMed: 12674814]

- American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders—4th Edition (DSM-IV)* Washington, DC: Author.
- Andersen RM (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior*, 36, 1–10. doi:10.2307/2137284 [PubMed: 7738325]
- Angelo FN, Miller HE, Zoellner LA, & Feeny NC (2008). “I need to talk about it”: A qualitative analysis of trauma-exposed women’s reasons for treatment choice. *Behavior Therapy*, 39, 13–21. doi:10.1016/j.beth.2007.02.002 [PubMed: 18328866]
- Birmes P, Brunet A, Carreras D, Ducassé J, Charlet J, Lauque D, ..., Schmitt L (2003). The predictive power of peritraumatic dissociation and acute stress symptoms for posttraumatic stress symptoms: A three-month prospective study [Brief Report]. *American Journal of Psychiatry*, 160, 1337–1339. [PubMed: 12832251]
- Bonanno GA, & Diminich ED (2013). Annual research review: Positive adjustment to adversity – Trajectories of minimal-impact resilience and emergent resilience. *Journal of Child Psychology and Psychiatry*, 54, 378–401. doi:10.1111/jcpp.12021 [PubMed: 23215790]
- Boykin DM, Dunn QT, & Orcutt HK (in press). Cumulative trauma and adjustment in women exposed to a campus shooting: Examining the role of appraisals and social support. *Journal of Interpersonal Violence*. Advanced online publication. doi:10.1177/0886260517710483
- Bradley R, Green J, Russ E, Dutra L, & Westen D (2005). A multidimensional meta-analysis of psychotherapy for PTSD. *American Journal of Psychiatry*, 162, 214–227. doi:10.1176/appi.ajp.162.2.214 [PubMed: 15677582]
- Breslau N, Davis GC, Peterson EL, & Schultz L (1997). Psychiatric sequelae of posttraumatic stress disorder in women. *Archives of General Psychiatry*, 54, 81–87. doi:10.1001/archpsyc.1997.01830130087016 [PubMed: 9006404]
- Breslau N, Peterson EL, & Schultz LR (2008). A second look at prior trauma and the posttraumatic stress disorder effects of subsequent trauma: A prospective epidemiological study. *Archives of General Psychiatry*, 65, 431–437. doi:10.1001/archpsyc.65.4.431 [PubMed: 18391131]
- Brewin CR, Andrews B, & Valentine JD (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*, 68, 748–766. doi:10.1037//0022-006X.68.5.748 [PubMed: 11068961]
- Calhoun PS, Bosworth HB, Grambow SC, Dudley TK, & Beckham JC (2002). Medical service utilization by veterans seeking help for posttraumatic stress disorder. *American Journal of Psychiatry*, 159, 2081–2086. doi:10.1176/appi.ajp.159.12.2081 [PubMed: 12450960]
- Clapp JD, & Beck JG (2009). Understanding the relationship between PTSD and social support: The role of negative network orientation. *Behaviour Research and Therapy*, 47, 237–244. doi:10.1016/j.brat.2008.12.006 [PubMed: 19162260]
- Cochran BN, Pruitt L, Fukuda S, Zoellner LA & Feeny NC (2008). Reasons underlying treatment preference: An exploratory study. *Journal of Interpersonal Violence*, 23, 276–291. doi: 10.1199/0886260507309836 [PubMed: 18162641]
- Drysdale D, Modzeleski W, & Simons A (2010). *Campus Attacks: Targeted Violence Affecting Institutions of Higher Education*. U.S. Secret Service, U.S. Department of Homeland Security, Office of Safe and Drug-Free Schools, U.S. Department of Education, and Federal Bureau of Investigation, U.S. Department of Justice. Washington, D.C. 2010.
- Eisenberg D, Golberstein E, & Hunt JB (2009). Mental health and academic success in college. *The B.E. Journal of Economic Analysis & Policy*, 9, Online Publication. doi:10.2202/1935-1682.2191
- Elhai JD, North TC, & Frueh BC (2005). Health service use predictors among trauma survivors: A critical review. *Psychological Services*, 2, 3–19. doi:10.1037/1541-1559.2.1.3
- Elhai JD, Patrick SL, Anderson S, Simons JS, & Frueh BC (2006). Gender-and trauma-related predictors of use of mental health treatment services among primary care patients. *Psychiatric Services*, 57, 1505–1509. doi:10.1176/aapi.ps.57/10.1505 [PubMed: 17035574]
- Erbes C, Westermeyer J, Engdahl B, & Johnsen E (2007). Post-traumatic stress disorder and service utilization in a sample of service members from Iraq and Afghanistan. *Military Medicine*, 172, 359–363. Retrieved from: <http://psycnet.apa.org/psycinfo/2007-06403-001> [PubMed: 17484303]

- Feeny NC, Zoellner LA, Mavissakalian MR, & Roy-Bryne PP (2009). What would you choose? Sertraline or prolonged exposure in community and PTSD treatment seeking women. *Depression and Anxiety*, 26, 724–731. doi:10.1002/da.20588 [PubMed: 19544313]
- Ferguson CJ (2009). An effect size primer: A guide for clinicians and researchers. *Professional Psychology: Research and Practice*, 40, 532–538. doi:10.1037/a0015808
- Gavrilovic JJ, Schutzwohl M, Fazel M, & Priebe S (2005). Who seeks treatment after a traumatic event and who does not? A review of findings on mental health service utilization. *Journal of Traumatic Stress*, 18, 595–605. doi:10.1002/jts.20068 [PubMed: 16382432]
- Koenen KC, Goodwin R, Stuening E, Hellman F, & Guardino M (2003). Posttraumatic stress disorder and treatment seeking in a national screening sample. *Journal of Traumatic Stress*, 16, 5–16. doi: 10.1023/A1022051009330 [PubMed: 12602647]
- Kornor J, Winje D, Ekeberg O, Weisaeth L, Kirkehei I, Jahansen K, & Steiro A (2008). Early trauma-focused cognitive-behavioural therapy to prevent chronic post-traumatic stress disorder and related symptoms: A systematic review and meta-analysis. *BioMed Central Psychiatry*, 8, 1–8. doi: 10.1186/1471-244X-8-81 [PubMed: 18173833]
- Kubany ES, Haynes SN, Leisen MB, Owens JA, Kaplan AS, Watson SB, & Burns K (2000). Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: The Traumatic Life Events Questionnaire. *Psychological Assessment*, 12, 210–224. doi: 10.1037/1040-3590.12.2.210 [PubMed: 10887767]
- Kubany ES, Leisen MB, Kaplan AS, & Kelly MP (2000). Validation of a brief measure of posttraumatic stress disorder: The distressing events questionnaire (DEQ). *Psychological Assessment*, 12, 197–209. doi:10.1037/1040-3590.12.2.197 [PubMed: 10887766]
- Kumpula MJ, Orcutt HK, Bardeen JR, & Varkovitzky RL (2011). Peritraumatic dissociation and experiential avoidance as prospective predictors of posttraumatic stress symptoms. *Journal of Abnormal Psychology*, 120, 617–627. doi:10.1037/a0023927 [PubMed: 21604826]
- Littleton HL, Axsom D, & Grills-Taquechel AE (2009). Adjustment following the mass shooting at Virginia Tech: The roles of resource loss and gain. *Psychological Trauma: Theory, Research, Practice, and Policy*, 1, 206–219. doi:10.1037/a0017468
- Litz BT, Gray MJ, Bryant RA, & Adler AB (2002). Early intervention for trauma: Current status and future directions. *Clinical Psychology and Practice*, 9, 112–134. doi:10.1093/clipsy.9.2.112
- Lovibond SH, & Lovibond PF (1995). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Sydney, Australia: Psychology Foundation.
- Lowe SR, & Galea S (2015). The mental health consequences of mass shootings. *Trauma, Violence, & Abuse*. Advanced online publication. doi:10.1177/1524838015591572.
- Marmar CR, Weiss DS, Schlenger WE, Fairbank JA, Jordan BK, Kulka RA, & Hough RL (1994). Peritraumatic dissociation and posttraumatic stress disorder in male Vietnam theater veterans. *American Journal of Psychiatry*, 151, 902–907. doi:10.1176/ajp.151.6.902 [PubMed: 8185001]
- Megivern D, Pellerito S, & Mowbray C (2003). Barriers to higher education for individuals with psychiatric disabilities. *Psychiatric Rehabilitation Journal*, 26, 217–231. doi: 10.2975/26.2003.217.231 [PubMed: 12653444]
- Miquelon P, Lesage A, Boyer R, Guay S, Bleau P, & Seguin M (2014). Mental health service utilization among students and staff in 18 months following Dawson College shooting. *AIMS Public Health*, 1, 84–99. doi:10.3934/publichealth.2014.2.84 [PubMed: 29546078]
- Miron LR, Orcutt HK, & Kumpula MJ (2014). Differential predictors of transient stress versus posttraumatic stress disorder: Evaluating risk following targeted mass violence. *Behavior Therapy*, 45, 791–805. doi:10.1016/j.beth.2014.07.005 [PubMed: 25311288]
- New M, & Berliner L (2005). Mental health service utilization by victims of crime. *Journal of Traumatic Stress*, 13, 693–707. doi:10.1023/A1007818402277
- North CS, & King RV Eyewitness to mass murder In Neria Y, Galea S, & Norris FH (Eds.). *Mental Health and Disasters* (pp. 497–507). New York: Cambridge University Press.
- Orcutt HK, Bonanno GA, Hannan SM, & Miron LR (2014). Prospective trajectories of posttraumatic stress in college women following a campus mass shooting. *Journal of Traumatic Stress*, 27, 1–8. doi:10.1002/jts.21914 [PubMed: 24515534]

- Orcutt HK, Miron LR, & Seligowski AV (2014). Impact of mass shootings on individual adjustment. *PTSD Research Quarterly*, 25, 1–9. Retrieved from: <http://www.ptsd.va.gov/professional/newsletters/research-quarterly/V25N3.pdf>
- Ozer EJ, Best SR, Lipsey TL, & Weiss DS (2008). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Trauma: Theory, Research, Practice, and Policy*, 1, 3–36. doi:10.1037/1942-9681.S.1.3
- Roberts AL, Gilman SE, Breslau J, Breslau N & Koenen C (2011). Race/ethnic differences in exposure to traumatic events, development of post-traumatic stress disorder, and treatment-seeking for post-traumatic stress disorder in the United States. *Psychological Medicine*, 1–13. doi:10.1017/S0033291710000401
- Roberts NP, Kitchiner NJ, Kenardy J, & Bisson JI (2009). Systematic review and meta-analysis of multiple-session early interventions following traumatic events. *The American Journal of Psychiatry*, 166, 293–301. doi:10.1176/appi.ajp.2008.08040590 [PubMed: 19188285]
- Roy-Byrne P, Berliner L, Russo J, Zatzick D, & Pitman R (2003). Treatment preferences and determinants in victims of sexual and physical assault. *Journal of Nervous and Mental Disorders*, 191, 161–165. doi:10.1097/01.NMD.0000055343.62310.73
- Sanburn J (2015, 10 9). These are all the college campus shootings in 2015. Time. Retrieved from <http://time.com/4058669/northern-arizona-university-school-shootings-2015/>
- Schreiber V, Maercker A, & Renneberg B (2010). Social influences on mental health help-seeking after interpersonal traumatization: a qualitative analysis. *BMC Public Health*, 10, Online publication. doi:10.1186/1471-2458-10-634
- Shalev AY, Ankri Y, Israeli-Shalev Y, Peleg T, Adessky R, & Freedman S (2012). Prevention of posttraumatic stress disorder by early treatment: Results from the Jerusalem trauma outreach and prevention study. *Archives of General Psychiatry*, 69, 166–176. doi:10.1001/archgenpsychiatry.2011.127 [PubMed: 21969418]
- Shalev AY, Peri T, Canetti L, & Schreiber S (1996). Predictors of PTSD in injured trauma survivors: A prospective study. *The American Journal of Psychiatry*, 153, 219–225. [PubMed: 8561202]
- Sijbrandij M, Engelhard IM, Opmeer BC, van de Schoot R, Carlier IVE, Gersons BPR, & Olff M (2012). The structure of peritraumatic dissociation: A cross validation in clinical and nonclinical samples [Brief Report]. *Journal of Traumatic Stress*, 25, 475–479. doi:10.1002/jts.21716 [PubMed: 22821635]
- Sijbrandij M, Olff M, Reitsma JB, Carlier IVE, de Vries MH, & Gersons BPR (2007). Treatment of acute posttraumatic stress disorder with brief cognitive behavioral therapy: A randomized controlled trial. *American Journal of Psychiatry*, 164, 82–90. doi: 10.1176/appi.ajp.164.1.82 [PubMed: 17202548]
- Storrie K, Ahern K, & Tuckett A (2010). A systematic review: Students with mental health problems – a growing problem. *International Journal of Nursing Practice*, 16, 1–6. doi:10.1111/j.1440-172X.2009.01813.x [PubMed: 20158541]
- Tabachnick BG, & Fidell LS (2007). *Using Multivariate Statistics* (3rd ed.). New York: Harper Collins.rd
- Ursano RJ, Bell C, Eth S, Friedman M, Norwood A, Pfefferbaum B, ... & Charles, S. C. (2004). Practice guideline for the treatment of patients with acute stress disorder and posttraumatic stress disorder. *American Journal of Psychiatry*, 161, 3–31.
- Department of Education US. (2013). *Guide for Developing High-Quality Emergency Operations Plans for Institutions of Higher Education*. Washington, DC: Author.
- Zimet GD, Dahlem NW, Zimet SG, & Farley GK (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52, 30–41. doi:10.1207/s15327752jpa5201
- Zimet GD, Powell SS, Farley GK, Werkman S, & Berkoff KA (1990). Psychometric characteristics of the multidimensional scale of perceived social support. *Journal of Personality Assessment*, 55, 610–617. doi:10.1080/00223891.1990.9674095 [PubMed: 2280326]
- Zoellner LA, Feeny NC, Cochran B, & Pruitt L (2003). Treatment choice for PTSD. *Behaviour Research and Therapy*, 41, 879–886. doi:10.1016/S0005-7967(02)00100-6 [PubMed: 12880643]

Table 1
Means, Standard Deviations, Ranges, and Zero-Order Correlations among Study Variables

	1	2	3	4	5	6	7	8	9	10
1. Age	-									
2. Race/ethnicity (<i>minority</i> = 0)	-.05	-								
3. Education level	.80**	-.08	-							
4. Shooting exposure severity	.02	.07	<.01	-						
5. T2 social support	.02	.07	.01	.10*	-					
6. T2 PTSD severity	.10*	.05	.09*	.36**	-.16**	-				
7. T2 depression severity	.04	.06	.05	.23**	-.34**	.59**	-			
8. T3 PTSD severity	<.01	<.01	-.03	.33**	-.22**	.54**	.43**	-		
9. T3 depression severity	-.03	.02	-.06	.19**	-.27**	.28**	.43**	.50**	-	
10. Treatment use (<i>none</i> = 0)	.01	.05	.03	.19*	-.14*	.31**	.28**	.30**	.19**	-
<i>Mean</i>	18.54	0.67	3.47	3.47	5.91	21.41	9.79	8.03	7.14	0.14
<i>Standard Deviation</i>	0.87	0.47	1.44	1.44	1.07	14.57	8.80	9.47	8.17	0.35
<i>Minimum</i>	18	0	1	1	1.00	0	0	0	0	0
<i>Maximum</i>	24	1	4	12	7.00	68	42	59	42	1

Note. *N* = 516. T2 = Time 2; T3 = Time 3; PTSD = posttraumatic stress disorder.

* $p < .05$.

** $p < .01$.

Table 2

Prevalence of Treatment Use Among College Women with Varying Risk for PTSD at 6-months Post-shooting

	No Risk	At-Risk	Probable PTSD ^a	Total
Any treatment	6 (9.2)	41 (63.1)	18 (27.7)	65
<i>Psychotherapy</i>	<i>4 (9.3)</i>	<i>27 (62.8)</i>	<i>12 (27.9)</i>	<i>43</i>
<i>Psychotropic medication</i>	<i>1 (12.5)</i>	<i>5 (62.5)</i>	<i>2 (2.5)</i>	<i>8</i>
<i>Combined treatment</i>	<i>1 (7.1)</i>	<i>9 (64.3)</i>	<i>4 (28.6)</i>	<i>14</i>
No treatment	95 (24.5)	258 (66.7)	34 (8.8)	387
Total	101 (22.3)	299 (66.2)	52 (11.5)	452

Note. Treatment was collapsed into a dichotomous variable (*no treatment* vs. *any treatment*). Italicized text provides descriptive information about utilization of specific treatment modalities. Percentages shown in parentheses. PTSD = posttraumatic stress disorder.

^a Probable PTSD assessed at 6-months post-shooting.

Table 3

Results of Logistic Regression Analysis Predicting Treatment Use Among At-Risk College Women at 6-months Post-shooting

Variables	B	SE	OR	95% CI	Wald
Age	-0.21	0.28	0.81	[0.47, 1.42]	0.54
Race/Ethnicity	-0.11	0.34	0.89	[0.46, 1.73]	0.11
Education Level	0.38	0.43	1.47	[0.64, 3.37]	0.81
Shooting Exposure Severity	0.12	0.11	1.12	[0.91, 1.39]	1.14
T2 social support	-0.12	0.14	0.89	[0.67, 1.18]	0.62
T2 PTSD severity	0.03 [*]	0.01	1.03	[1.00, 1.06]	5.03
T2 depression severity	0.02	0.02	1.02	[0.98, 1.07]	1.33
T3 PTSD severity	0.03	0.02	1.03	[0.99, 1.06]	2.07
T3 depression severity	0.02	0.02	1.02	[0.98, 1.06]	0.68

Note. $N = 516$. Reference group = no treatment. T2 = time 2; T3 = time 3; PTSD = posttraumatic stress symptoms; OR = odds ratio; CI = confidence interval.

^{*}
 $p < .05$.