Prevalence and Correlates of Self-Injury Among University Students

Sarah Elizabeth Gollust, BA; Daniel Eisenberg, PhD; Ezra Golberstein, BA

Abstract. **Objective**: The authors' purpose in this research was to establish estimates of the prevalence and correlates of nonsuicidal self-injury among university students. **Participants**: The authors recruited participants (N = 2,843) from a random sample of 5,021 undergraduate and graduate students attending a large midwestern public university. **Methods**: Using an Internet-based survey, the authors measured the prevalence of self-injury and potential risk factors, including depression, anxiety, eating disorders, suicidal thoughts, and negative health behaviors. **Results**: Seven percent of students reported any self-injury over the previous 4 weeks. Factors associated with a significantly higher likelihood ($p < .05$) of self-injury included cigarette smoking, concurrent depressive and anxiety disorders, and for men, growing up in a family of low socioeconomic status and having symptoms of eating disorders. Only 26% of those who reported self-injury received mental health therapy or medication in the previous year. **Conclusions**: Students who harm themselves experience high anxiety and distress, yet are unlikely to seek help.

Keywords: college health, community health, counseling, mental health, self-injury

For the past 10 years, there has been increasing attention in the scholarly and lay press on *self-injury*—the deliberate destruction of body tissue without conscious suicidal intent—among young people, and college students in particular.[1,2] Traditionally linked to borderline personality disorder, self-injury has been associated with more prevalent mental health diagnoses, including depression, anxiety, substance abuse, and eating disorders.[3] The most common forms of self-injurious behaviors are cutting or burning skin, banging body parts, scratching, and interfering with wound healing.[4] Behaviors usually begin in adolescence or young adulthood,[5,6] and information about self-injury is readily available to young people through the media and Internet.[7]

The authors are with the Department of Health Management and Policy at the University of Michigan School of Public Health, Ann Arbor.

Although self-injury is often conflated with suicidal ideation, researchers suggest that the 2 are different in intent and function. Young people who self-injure clearly distinguish their acts from suicidal ideation,[8] and research suggests that the behavior serves as a maladaptive coping function—to decrease tension, provide relief from troubling emotions, and manage stress or distress.[1,5,9] Still, young people who self-injure are more likely to report suicidal thoughts and are at greater risk for future suicidal actions.[10,11] Moreover, engaging in self-injury can engender negative social reactions, disrupt relationships, produce feelings of shame and isolation,[1] and confer serious physical harm, suggesting cause for concern about its prevalence among college students.

Until recently, there were few reliable prevalence estimates of self-injury within the nonpsychiatric population. Estimates among adults range from 4% (lifetime) among military recruits[12] and 4% (in the past 6 months) among a representative sample of adults,[9] to 22% (lifetime) among women presenting for gynecological care.[13] Among samples of adolescents, reported prevalence estimates of self-injury range from 14% (lifetime)[14] and 16% (lifetime),[15] to a recent study's report of a 12-month prevalence as high as 46.5%.[16] The prevalence of self-injury may be similarly high among college students, ranging from 12% to 38% (lifetime) among undergraduate psychology students.[17,18] Among a random sample of college students at 2 elite northeastern US universities, the lifetime prevalence was 17%, with a 12-month prevalence of 7.3%.[19] Because investigators in college student studies have relied on convenience samples,[17,18] had relatively low response rates (37% in the case of the northeastern college student sample[19]), or did not adjust extensively for the possibility of nonresponse bias, more work is needed to establish the prevalence of self-injury.

Research is also needed to clarify the demographic and health-related correlates of self-injury. Although self-injury was originally thought to be more common among women,

recent studies do not suggest sex differences.[9,12,15,16,18,19] Eating disorders have been linked to self-injury,[17,19] and depression and anxiety may be co-occurring conditions.[12,14] To our knowledge, no researchers have addressed the relationship between self-injury and drug or alcohol abuse in community-based samples of young people, although research on convenience samples suggests such associations.[20]

We conducted the *Healthy Minds Study* to assess mental health needs and service use among students attending a large public university in the Midwest. Unlike prior research on self-injury, we used detailed information to adjust for *nonresponse bias*—the possibility that those who respond to a survey on a sensitive topic may be significantly different from those who do not respond. We also used validated screening instruments to measure co-occurring depressive and anxiety disorders. In this article, we use these data to answer several research questions. First, what is the prevalence of self-injury in a representative sample of university students? Second, does self-injury co-occur with eating disorders, suicidal thoughts, or depressive and anxiety disorders? In addition, we attended to research questions that have not been explored adequately in prior research of self-injury among young adults, including investigating the differences in the prevalence of self-injury across socioeconomic and racial and ethnic groups, and the relationship between self-injury and tobacco and alcohol use.

METHODS

Sample and Data Collection

In fall 2005, we conducted the *Healthy Minds Study*, a Web-based survey of students attending a large public university in the Midwest. This student population is similar to the population of enrolled students at all US degree-granting institutions in terms of sex (50% female at the sample university vs 58% nationwide) and race and ethnicity (68% white, non-Hispanic, 8% black, 5% Hispanic, and 13% Asian/Pacific Islander at the sample university vs 64%, 13%, 11%, and 7%, respectively, nationwide).[21] In other aspects, such as being a large and academically competitive research university, the institution is not necessarily representative of colleges and universities. We randomly selected 5,021 students (2,495 undergraduates and 2,526 graduate or professional students) from a database of enrolled students who were aged at least 18 years.

We fielded the survey in October–November 2005. We chose this time period to avoid the beginning and end of the semester, when students are typically undergoing a variety of stresses associated with moving, settling into a routine, or preparing for final exams and projects. To recruit students, we first mailed an introductory letter with $2 as incentive for participation. We then sent up to 4 e-mail reminders with a link to the survey for those who had yet to respond. We also notified potential participants that they had been entered into a cash sweepstakes regardless of participation. After reading a description of the study on an online consent form, participants indicated their consent by clicking on the link to begin the survey. The university's Health Sciences Institutional Review Board approved the study. For additional details about the sample, recruitment strategy, and study design, see our previous article.[22]

We used a Web-based survey mode for several reasons. First, Web surveys of college populations have been shown to produce results similar to mail surveys for questions related to substance use and other sensitive topics.[23] Second, because we investigated sensitive topics, a self-administered survey is preferable to a face-to-face or telephone interview to reduce social desirability bias.[24] Third, although Web-based surveys can raise questions about biased findings, given unequal access to the Internet, college students generally—and at the studied university in particular—have excellent Internet access and computer literacy.[25]

Accounting for Nonresponse Bias

To account for the potential of nonresponse bias, we constructed nonresponse weights to adjust for differences between respondents and nonrespondents, using administrative data on demographic characteristics of the whole sample (sex, race and ethnicity, year in school, international student status, and grade point average) and data from a brief survey of nonrespondents to the main survey. The brief nonresponse survey achieved a 55% response rate and revealed, relative to the main sample, significantly lower prevalence of positive screens for depression and significantly less use of mental health services. These results highlighted the importance of adjusting for response bias. Full details about the construction of the response propensity weights are available elsewhere.[22]

Measures

Self-Injury

One question, developed for this study, assessed self-injury in the past 4 weeks. The item asks about the most common forms of self-injurious behaviors[4,26]: "This question asks about ways you may have hurt yourself on purpose, without intending to kill yourself. In the past 4 weeks, have you ever done any of the following intentionally? (Select all that apply.) *Cut myself*, *burned myself*, *banged my head or other body part*, *scratched myself*, *punched myself*, *pulled my hair*, *bit myself*, *interfered with wound healing*, *other (specify)*, or *no, none of these*." If respondents specified behaviors exclusively in the *other* category, which were not consistent with self-injury as the deliberate and direct destruction of body tissue resulting in injury severe enough for tissue damage[1] (eg, alcohol abuse, minor nail biting, or binge eating), we reclassified them as *no, none of these*. One author (SEG) coded such responses, and Dr Kim L. Gratz (personal communication, August 14, 2006) classified them. Given ambiguity in the literature about whether hair pulling should be classified as self-injury, we conducted our analyses with and without the hair-pulling item. To be consistent with a definition of self-injury that results in tissue damage,[1] results reported herein exclude the item.

Mental Health Status

We measured symptoms of depression in the past 2 weeks using the Patient Health Questionnaire-9 (PHQ-9),

a screening instrument based on the 9 *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition, (*DSM-IV*) criteria for a major depressive episode.[27] We used the PHQ-9's standard algorithm to categorize people as screening positive for major depression, other depression (which includes dysthymia or depression not otherwise specified), any depression (either major or other), or neither. In the original PHQ validation study, the sensitivity and specificity for major depression were 73% and 98% in a sample of primary care patients.[27] We measured symptoms of panic disorder and generalized anxiety disorder over the past 4 weeks using items from the PHQ anxiety module. We used the standard algorithm to categorize people as screening positive for panic disorder, generalized anxiety disorder, either, or neither. In the original validation study, the sensitivity and specificity of this scale were 81% and 99%, respectively, for panic disorder and 63% and 97% for generalized anxiety disorder.[27]

We measured potential eating disorders using the SCOFF screening instrument, a 5-item questionnaire.[28] We classified respondents who agreed with 2 or more of the items as having a probable eating disorder, per the standard SCOFF algorithm. In a validation study with a graduate student population, this screen had a positive predictive value of 66.7% and a negative predictive value of 88.7%.[29]

One item asked whether the participant had seriously thought about committing suicide in the past 4 weeks.[30] Participants also were asked whether a health professional had ever diagnosed them with a mental health condition.

Substance Use

We defined substance use on the basis of criteria that correspond to behavior likely to be harmful, which includes regular cigarette use and any marijuana use or binge drinking. We classified participants as smokers if they reported smoking at least 1 cigarette per day in the past 4 weeks. We classified them as marijuana users if they reported using marijuana at least once in the past 4 weeks. Following previous studies of college student binge drinking,[31] we classified them as binge drinkers if they reported consuming 5 drinks (for men) or 4 drinks (for women) in a row on at least 1 occasion in the past 2 weeks.[32] Because of the need to limit the length of the survey as well as concerns about redundancy with other student surveys focused on substance abuse, we did not ask students about other (legal or illegal) substance use.

Sociodemographic Characteristics

We collected information on the following characteristics: sex, age, race and ethnicity, nationality (US or international), sexual orientation, graduate or undergraduate status, year in current degree program, perceived financial situation when growing up, and current relationship status.

Perceived Need and Service Use

We asked all participants about their perceived need for and use of mental health services over the past year, using items from the Healthcare for Communities study.[33] Perceived need was indicated if participants responded affirmatively to the question: "In the past 12 months, did you think you needed help for emotional or mental health problems such as feeling sad, blue, anxious, or nervous?" Service use was indicated if participants reported receiving counseling or therapy from a health professional (psychiatrist, psychologist, social worker, or physician) for their mental or emotional health or if they had taken any psychotropic medications in the past year. Last, those who reported receiving no mental health services were asked if they had visited any medical provider for any reason in the past year.

Statistical Analysis

First, we calculated prevalence estimates of self-injury for the full population, by sex and for undergraduate and graduate students. To compare the proportions of self-injury across groups (eg, men vs women), we estimated bivariate logistic regression models with a dichotomous measure of *any self-injury* as the dependent variable and the group variable as the independent variable. To assess the associations between self-injury and all potential correlates, we estimated multivariate logistic regression models. We weighted all analyses with the nonresponse adjustment weights previously described. When we estimated statistics for the pooled sample of undergraduate and graduate students, we used a poststratification weight to reflect the mix of undergraduate and graduate students (approximately 2:1) of the student population. We calculated standard errors to reflect the sample design using survey functions in Stata 9.0 (StataCorp, College Station, TX).

RESULTS

Of the 5,021 students recruited, 2,843 completed the survey, yielding a 56.6% response rate. Graduate students and women were more likely to respond, and black students were less likely ($p < .05$). The results weighted for nonresponse reflect a combined undergraduate and graduate student population comprising 60.6% white, 6.3% black, 19.9% Asian or Asian American, 3.5% Hispanic, 5.4% multiracial, and 3.6% students who identified another race. Almost half (48%) were female, 11.8% were international students, and 33.9% were graduate students.

Table 1 displays the prevalence of any self-injury for undergraduate and graduate students, by sex. (In all findings described later, *any self-injury* is self-injury in the past 4 weeks.) Seven percent of all students reported any self-injury. Undergraduates (7.9%) were more likely than were graduate students (6.0%) to report self-injury ($p = .04$). We found no significant differences between the sexes in the prevalence of self-injury (6.7% for women, 7.7% for men; $p = .36$).

Among those who reported any self-injury, the most frequent behaviors reported were wound interference (36.7%), banging one's head or other body parts (35.8%), punching (20.7%), scratching (18.4%), and biting (17.5%). Only 11.1% reported cutting. Women were less likely to report banging their head or other body parts ($p = .003$) and punching themselves ($p = .001$) and more likely to report

TABLE 1. 4-Week Prevalence (%) of Self-Injury Among University Students

	All students			Undergraduates			Graduates		
Type of self-injury	Female	Male	All	Female	Male	All	Female	Male	All
n	1,469	1,319	2,788	663	487	1,150	806	832	1,638
Any	6.7	7.7	7.2	7.0	8.8	7.9	6.2	5.8	6.0
Cutting	1.0	0.6	0.8	1.2	0.8	1.0	0.5	0.5	0.5
Burning	0.1	0.4	0.3	0.1	0.6	0.4	0.1	0.1	0.1
Banged head or other body part	1.6	3.6	2.6	2.0	4.4	3.2	0.7	2.1	1.5
Scratching	1.2	1.5	1.3	1.2	1.9	1.5	1.1	0.8	0.9
Punching	0.6	2.3	1.5	0.8	2.3	1.5	0.1	2.5	1.4
Biting	1.4	1.2	1.3	1.7	1.3	1.5	0.8	1.0	0.9
Interfered with wound healing	3.4	1.9	2.7	3.2	2.3	2.7	4.0	1.3	2.5
Other (specify)	0.2	0.5	0.4	0.2	0.7	0.4	0.3	0.1	0.2

wound interference ($p = .03$). Among those who reported self-injury, 34.8% reported more than 1 type of behavior, although 65.2% reported only 1 type of behavior. Among those who reported more than 1 type of behavior, the 2 most common combinations were banging one's head or body parts and punching oneself, and scratching one's skin and wound interference.

Table 2 displays mental health conditions and health behaviors co-occurring with self-injury. Of those who reported any self-injury, 32.5% screened positive for a probable depressive disorder (15.0% major depression, 17.4% other depression), 16.6% for a probable anxiety disorder (7.5% panic disorder, 10.6% generalized anxiety disorder), and 25.9% for a probable eating disorder. These are all significantly higher estimates of mental disorders ($p < .01$) than among those who did not report any self-injury. Men's levels of eating disorder symptoms were particularly elevated when compared with the prevalence of symptoms among men reporting no self-injury. Eleven percent of students reporting any self-injury also reported suicidal thoughts during the past 4 weeks, a percentage significantly higher ($p < .001$) than the 1.6% of non-self-injuring students who reported suicidal thoughts. The prevalence of suicidal thoughts among those who reported self-injury was higher among men than women (15.6% vs 5.3%) and among undergraduate than graduate students (13.3% vs 5.1%). Among those who reported any self-injury, 43.9% screened negative for depression, anxiety, and eating disorders and did not report any suicidal thoughts. Those who reported self-injury were more likely to report daily cigarette smoking (18.4% vs 4.9%; odds ratio [OR] = 3.94, $p < .01$), marginally more likely to report marijuana use (18.0% vs 12.4%; OR = 1.53, $p = .058$), and no more likely to report binge drinking (48.1% vs 45.2%; OR = 1.19, $p = .793$) than were their peers who did not report self-injury.

TABLE 2. Prevalence (%) of Mental Health Problems and Substance Use, by Self-Injury Status and Sex

	Any self-injury			No self-injury		
Variable	Female	Male	All	Female	Male	All
Disorder (positive screen)						
Major depression	18.1	12.5	15.0	4.8	3.0	3.9
Other depression	9.3	24.1	17.4	7.4	7.0	7.2
Any depression	27.4	36.6	32.5	12.2	10.0	11.1
Panic disorder	10.2	5.3	7.5	1.8	0.5	1.1
Generalized anxiety disorder	15.2	6.9	10.6	3.5	1.3	2.4
Any anxiety	22.0	12.3	16.6	4.7	1.6	3.1
Both depression and anxiety	12.5	9.4	10.8	2.4	1.0	1.7
Eating disorders	30.3	22.5	25.9	24.8	6.9	15.6
Suicidal thoughts	5.3	15.6	11.0	1.6	1.5	1.6
None of the above conditions	43.4	44.3	43.9	65.5	83.5	74.8
Past 30-day activity						
Binge drinking	49.0	47.4	48.1	43.2	47.1	45.2
Cigarette smoking (at least 1–5/d)	14.1	21.9	18.4	3.7	6.1	4.9
Marijuana use	15.5	20.0	18.0	11.9	12.9	12.4

We estimated multivariate logistic regression models to identify the sociodemographic and mental health predictors of any self-injury, for the full population and for men and women separately (table not shown, but available from the authors). For the full student population (controlling for age, sex, race and ethnicity, international student status, sexual orientation, year in school, graduate student status, family's past financial status, relationship status, PHQ positive screens for depression and anxiety, and positive screens for eating disorders), women were less likely than were men to report self-injury (OR = 0.60, 95% confidence interval [CI] = 0.41–0.89, $p = .01$), and black students were less likely than were white students to report self-injury (OR = 0.27, CI = 0.09–0.78, $p = .02$). Those who reported that their family's financial status was poor when they were growing up (compared with "comfortable") were more likely to report self-injury (OR = 3.00, CI = 1.12–8.02, $p = .03$). Students who reported being in a relationship were more likely than were single students to report self-injury (OR = 1.66, CI = 1.13–2.44, $p = .009$). Respondents who screened positive for depression (OR = 3.19, CI = 2.03–5.00, $p < .001$), anxiety (OR = 6.44, CI = 3.11–6.44, $p < .001$), or both depression and anxiety (OR = 9.25, CI = 5.24–16.32, $p < .001$) were all more likely to report self-injury than were those who did not screen positive for a depressive or anxiety disorder. Those who screened positive for an eating disorder were more likely to report any self-injury (OR = 1.84, CI = 1.17–2.91, $p = .009$). For the full student population, we found no significant associations between self-injury and age, international student status, sexual orientation, graduate or undergraduate student status, or year in school, controlling for all covariates.

Logistic regression models, which we estimated separately for male and female students, revealed several notable differences in the predictors of self-injury. The associations between mental disorders and self-injury were greater for men than for women, as reflected by men's higher ORs associated with depressive disorders (OR = 4.15, CI = 2.19–7.18, $p < .001$ for men and OR = 1.92, CI = 0.97–3.80, $p = .06$ for women) and men's higher ORs for having both depressive and anxiety disorders (OR = 16.8, CI = 6.21–45.52, $p < .001$ for men and OR = 5.94, CI = 2.84–12.43, $p < .001$ for women). Among women, the presence of a probable eating disorder was not significantly related to self-injury (OR = 1.24, CI = 0.71–2.15, $p = .44$), whereas having a probable eating disorder was significantly related to self-injury for men (OR = 3.35, CI = 1.66–6.78, $p = .001$). No black women reported any self-injury, although we observed no racial differences in reporting self-injury among men. Bisexual men (OR = 4.75, CI = 0.98–23.01, $p = .053$) and lesbians (OR = 5.52, CI = 1.80–16.9, $p = .003$) were more likely to report self-injury than were heterosexual students, and women in their second year were less likely to report self-injury (OR = 0.49, CI = 0.26–0.93, $p = .028$). Although in the full student population there appeared to be significant associations between self-injury and poor financial status and between self-injury and being in a relationship, these covariates were significant predictors of self-injury only among male students: men in a relationship (OR = 2.07, CI = 1.15–3.72, $p = .015$) and reporting poor financial status when growing up (OR = 5.43, CI = 1.60–18.46, $p = .007$) were more likely to report self-injury.

Figure 1 illustrates students' perceived need for and use of mental health services. About half (50.9%) of those reporting self-injury perceived a need for help in the past year. Of those who reported any self-injury, 15.7% reported that they used any psychiatric medication in the past year, 19.9% reported past-year counseling or therapy visits, 26.4% reported using any medication or having any counseling visits, and 25.9% reported that they had ever been diagnosed with a mental health condition. More than 80% of those who reported self-injury had seen a health professional in the past year.

COMMENT

In a random sample of students at a large public university, 7% reported hurting themselves on purpose in the past 4 weeks without intending to kill themselves. This figure adds to growing evidence of a substantial prevalence of self-injury among university students.[18,19] The combination of a relatively high response rate for an Internet survey (56.6%),[34] the diversity of the sample, and the adjustments for nonresponse bias is unique in the literature to date and strengthens the validity of our estimates. Although other researchers[11,18,26] have identified cutting as the most commonly reported form of self-injury, this behavior was infrequent in the population we studied (less than 1% in the past 4 weeks); wound interference, banging one's body parts, and punching oneself were more common. In their Internet-based survey of college students, Whitlock et al[19] identified skin scratching as the most common form of self-injury, followed by banging or punching objects, cutting, and banging or punching oneself. In a recent study of a community sample of adolescents, Lloyd-Richardson et al[16] identified wound interference as the most common form of self-injury, and they questioned the clinical significance of this behavior. We agree with their suggestion that more work is needed to evaluate the clinical significance of the various types of self-injury among young adults.

In our study, we identified several sociodemographic associations with self-injury. We found no overall sex differences in the prevalence of self-injury, yet multivariate models accounting for mental health characteristics indicated that women were less likely to report self-injury than were men. Black students (particularly black women) were less likely to engage in self-injury than were white students—racial differences that are consistent with previous research.[11,15,35] Like other investigators,[19,35] we identified gay and bisexual students as having a higher likelihood of self-injury. In contrast to a prevailing assumption in the historical literature on self-injury that young adults who self-injure are of middle or high socioeconomic status,[20] we found that male students from a poor socioeconomic background were at highest risk of engaging in self-injury, even after controlling for mental health status. This finding, combined with our prior work showing that students

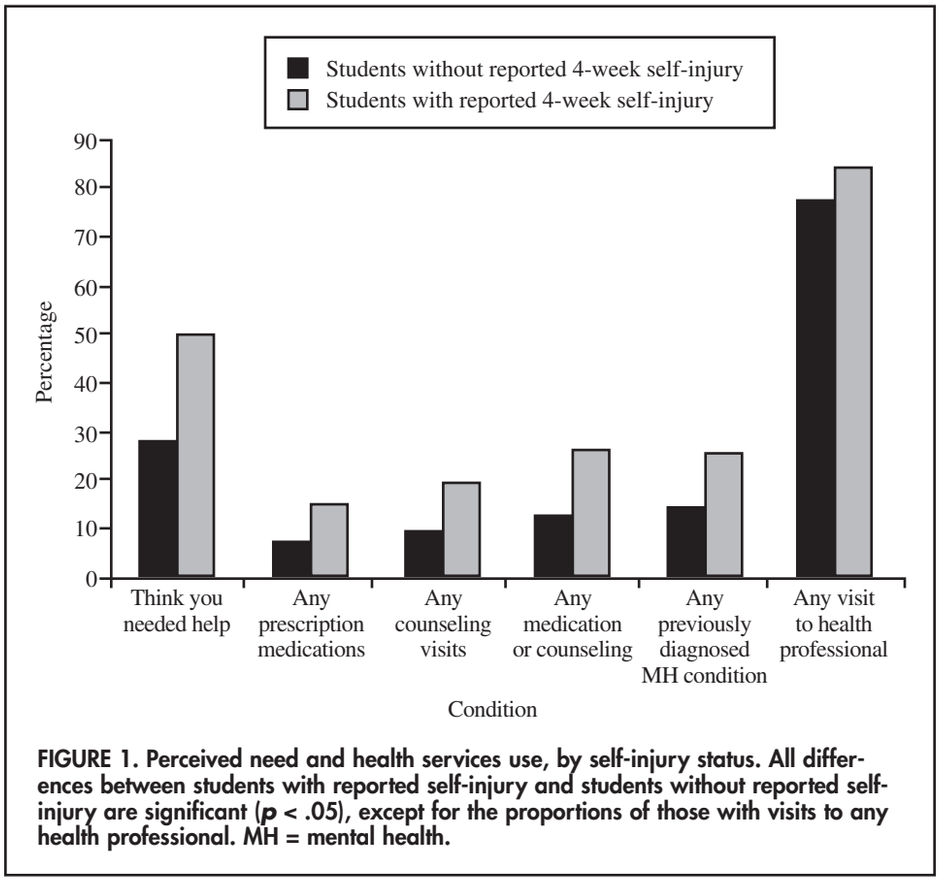

FIGURE 1. Perceived need and health services use, by self-injury status. All differences between students with reported self-injury and students without reported self-injury are significant ($p < .05$), except for the proportions of those with visits to any health professional. MH = mental health.

from poor backgrounds had higher rates of depression, anxiety, and suicidal ideation, suggests that students from lower socioeconomic status may require targeted support to ensure that their success in college is not compromised by mental health problems.[36]

Co-occurring mental health conditions (major or other depression, generalized anxiety disorder, and panic disorder) were all significantly related to self-injury, supporting previous research findings that suggest that feelings of depression and anxiety co-occur with self-injury.[14] About 11% of those who reported any self-injury also reported suicidal thoughts. The relationship between self-injury and suicidal ideation was especially strong for men, suggesting that young men who self-injure may be at particular risk for suicidal actions. Self-injury was unrelated to binge drinking but strongly related to cigarette smoking.

Our findings contribute to growing evidence of sex differences in the mental health correlates of self-injury.[12,18] The association between depression and self-injury was stronger for men than for women. Moreover, symptoms of eating disorders appeared to be associated with self-injury for men but not for women. Such a difference between the sexes in co-occurring eating disorders has not been identified, possibly because researchers in early studies who identified the association with eating disorders used convenience samples of women only.[17]

Like Whitlock et al,[19] we found that levels of mental health services use among those who self-injured were low. Although nearly half of those who self-injured perceived a need for mental health services—and in spite of significant associations between self-injury, depression, and anxiety—only one-fourth of students who injured themselves in the past 4 weeks had received any counseling or treatment in the prior year. These low use levels are consistent with our previous research, in which we found that fewer than half of students with major depression were receiving any therapy or counseling.[22]

Low use of mental health services among students who reported self-injury could reflect a variety of factors—failure of these students to perceive a need for help, lack of awareness about where to go for help, negative attitudes about the potential effectiveness of services, or feelings of shame about their behavior. Given that more than half of students who self-injured also screened positive for other common mental-health-related conditions (depression, anxiety, suicidal ideation, or eating disorders), on-campus educational campaigns to increase knowledge and awareness about the availability of mental health services could help reach those students who self-injure. Despite low levels of use of mental health help, the majority of students who self-injured reported visiting health professionals in the previous year. This finding suggests roles for campus primary care health service providers to screen for self-injury behaviors at presentation and to connect students who self-injure to specialty services that may help them learn more positive coping skills and manage underlying emotional or mental

health problems. Moreover, given that the frequency and forms of self-injury are only recently becoming characterized, our findings might be useful for educating providers on identifying self-injury. For instance, although many might associate self-injury exclusively with cutting skin, we found that other behaviors are, in fact, more common. Providers may screen for students' wound interference, banging their heads or body parts, and punching as signs of significant distress. Initiatives to educate students about self-injury also may be beneficial if such initiatives can increase recognition and help seeking.

In terms of research priorities, longitudinal analysis is needed to establish the temporal sequencing of self-injury with respect to other behaviors and symptoms. For instance, although we found that self-injury and suicidal ideation were correlated in this cross-sectional sample, longitudinal research might inform whether self-injury actually precedes suicidal ideation. Such a finding may have important implications for designing interventions to identify and manage students at risk for suicide. Additional research is needed to improve understanding of how self-injuring students view their behavior and of what motivates or impedes their willingness to seek help. Last, college health researchers should prioritize the design and evaluation of interventions to address self-injury among students.

Limitations

This study has several important limitations. First, we designed the single item used to measure self-injury to assess neither the frequency nor the severity of behaviors. Although we classified multiple types of self-injury together as *any self-injury*, this does not mean these behaviors are equivalent in their clinical implications. Because we did not assess the behaviors' frequency over the 4-week period—only whether students engaged in them at all—we cannot categorize students as meeting criteria for any putative diagnostic category of self-injury that has been proposed.[37] Second, we did not assess associations with certain risk factors that have been previously linked with self-injury, such as abuse or trauma.[35] Third, we based our findings on data from a single university. As noted earlier, the overall demographic characteristics of our sample are similar to the national population of students at 4-year colleges or universities, but the university is not necessarily representative in other respects, such as academic competitiveness.

Conclusions

This study highlights the importance of understanding and addressing self-injury among college students and young adults in general. Students who injure themselves are unlikely to seek help, yet they are at risk for experiencing significant anxiety, distress, and suicidal thoughts. Colleges, composing a unique constellation of potential supports including residential life, social networks, health services, and mental health services, could have an important role in the detection, prevention, and treatment of self-injury at a critical stage in young people's lives.

NOTE

For comments and further information, address correspondence to Sarah Elizabeth Gollust, University of Michigan School of Public Health, Health Management and Policy Dept, 109 Observatory, Ann Arbor, MI 48109-2029, USA (e-mail: sgollust@umich.edu).

REFERENCES

1. Gratz KL. Risk factors for and functions of deliberate self-harm: an empirical and conceptual review. *Clin Psychol Sci Pract.* 2003;10:192–205.

2. Favazza AR. *Bodies Under Siege: Self-Mutilation and Body Modification in Culture and Psychiatry*. 2nd ed. Baltimore, MD: Johns Hopkins University; 1996.

3. Muehlenkamp J. Self-injurious behavior as a separate clinical syndrome. *Am J Orthopsychiatry.* 2005;75:324–333.

4. Favazza AR. The coming of age of self-mutilation. *J Nerv Ment Dis.* 1998;186:259–268.

5. Klonsky E. The functions of self-injury: a review of the evidence. *Clin Psychol Rev.* 2007;27:226–239.

6. Nock MK, Prinstein MJ. A functional approach to the assessment of self-mutilative behavior. *J Consult Clin Psychol.* 2004;72:885–890.

7. Whitlock JL, Powers JL, Eckenrode J. The virtual cutting edge: the Internet and adolescent self-injury. *Dev Psychol*. 2006;42:407–417.

8. Solomon Y, Farrand J. "Why don't you do it properly?" Young women who self-injure. *J Adolesc.* 1996;19:111–119.

9. Briere J, Gil E. Self-mutilation in clinical and general population samples: prevalence, correlates, and functions. *Am J Orthopsychiatry.* 1998;68:609–620.

10. Nock MK, Joiner TE Jr, Gordon KH, Lloyd-Richardson E, Prinstein MJ. Nonsuicidal self-injury among adolescents: diagnostic correlates and relation to suicide attempts. *Psychiatry Res.* 2006;144:65–72.

11. Muehlenkamp JJ, Gutierrez PM. Risk for suicide attempts among adolescents who engage in nonsuicidal self-injury. *Arch Suicide Res.* 2007;11:69–82.

12. Klonsky E, Oltsmanns T, Turkheimer E. Deliberate self-harm in a nonclinical population: prevalence and psychological correlates. *Am J Psychiatry.* 2003;160:1501–1509.

13. Wiederman M, Sansone R, Sansone L. Bodily self-harm and its relationship to childhood abuse among women in a primary care setting. *Violence Against Women.* 1999;5:155–163.

14. Ross S, Heath N. A study of the frequency of self-mutilation in a community sample of adolescents. *J Youth Adolesc.* 2002;31:67–77.

15. Muehlenkamp J, Gutierrez PM. An investigation of differences between self-injurious behavior and suicide attempts in a sample of adolescents. *Suicide Life Threat Behav.* 2004;34:12–23.

16. Lloyd-Richardson EE, Perrine N, Dierker L, Kelley ML. Characteristics and functions of nonsuicidal self-injury in a community sample of adolescents. *Psychol Med.* 2007;37:1183–1192.

17. Favazza AR, DeRosear L, Conterio K. Self-mutilation and eating disorders. *Suicide Life Threat Behav.* 1989;19:352–361.

18. Gratz KL, Conrad SD, Roemer L. Risk factors for deliberate self-harm among college students. *Am J Orthopsychiatry.* 2002;72:128–140.

19. Whitlock J, Eckenrode J, Silverman D. Self-injurious behaviors in a college population. *Pediatrics.* 2006;117:1939–1948.

20. Favazza AR, Conterio K. Female habitual self-mutilators. *Acta Psychiatr Scand.* 1989;79:283–289.

21. US Dept of Education, National Center for Education Statistics. Integrated Postsecondary Education Data System (IPEDS), Fall Enrollment Survey [Tables 205 and 206]. Digest of Education Statistics Tables and Figures. http://nces.ed.gov/programs/digest/2005menu_tables.asp. Accessed February 12, 2008.

22. Eisenberg D, Golberstein E, Gollust SE. Help seeking and access to mental health care in a university student population. *Med Care.* 2007;45:594–601.
23. McCabe SE. Comparison of Web and mail surveys in collecting illicit drug use data: a randomized experiment. *J Drug Educ.* 2004;34:61–72.
24. Aday LA. *Designing and Conducting Health Surveys*. 2nd ed. San Francisco, CA: Jossey-Bass; 1996.
25. Couper M. Web surveys: a review of issues and approaches. *Pub Opin Q.* 2000;64:464–494.
26. Paivio S, McCulloch C. Alexithymia as a mediator between childhood trauma and self-injurious behaviors. *Child Abuse Negl.* 2004;28:339–354.
27. Spitzer RL, Kroenke K, Williams JBW. Validation and utility of a self-report version of PRIME-MD: the PHQ Primary Care Study. *JAMA.* 1999;282:1737–1744.
28. Morgan JF, Reid F, Lacey JH. The SCOFF questionnaire: assessment of a new screening tool for eating disorders. *BMJ.* 1999;319:1467–1468.
29. Parker SC, Lyons J, Bonner J. Eating disorders in graduate students: exploring the SCOFF questionnaire as a simple screening tool. *J Am Coll Health.* 2005;54:103–107.
30. Kessler R, Berglund P, Borges G, Nock M, Wang P. Trends in suicide ideation, plans, gestures, and attempts in the United States, 1990–1992 to 2001–2003. *JAMA.* 2005;293:2487–2495.
31. Wechsler H, Davenport A, Dowdall G, Moeykens B, Castillo S. Health and behavioral consequences of binge drinking: a national survey of students at 140 campuses. *JAMA.* 1994;272:1672–1677.
32. American College Health Association. American College Health Association National College Health Assessment (ACHA–NCHA), spring 2005 reference group data report. *J Am Coll Health.* 2006;55:5–16.
33. Wells KB, Sturm R, Burnam A. National survey of alcohol, drug, and mental health problems [*Healthcare for Communities*], 2000–2001 [Codebook]. 2004.
34. Cook C, Heath F, Thompson RL. A meta-analysis of response rates in Web- or Internet-based surveys. *Educ Psychol Meas.* 2000;60:821–836.
35. Gratz KL. Risk factors for deliberate self-harm among female college students: the role and interaction of childhood maltreatment, emotional inexpressivity, and affect intensity/reactivity. *Am J Orthopsychiatry.* 2006;76:238–250.
36. Eisenberg D, Golberstein E, Gollust SE, Hefner J. Prevalence and correlates of depression, anxiety and suicidality among university students. *Am J Orthopsychiatry*. 2007;77:534–542.
37. Favazza AR. Self-injurious behavior in college students. *Pediatrics.* 2006;117:2283–2284.