

Research Article

DEPRESSION, DESPERATION, AND SUICIDAL IDEATION IN COLLEGE STUDENTS: RESULTS FROM THE AMERICAN FOUNDATION FOR SUICIDE PREVENTION COLLEGE SCREENING PROJECT AT EMORY UNIVERSITY

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The objective of this investigation was to examine suicidal ideation and depression in undergraduate college students who participated in the American Foundation for Suicide Prevention-sponsored College Screening Project at Emory University. The principal measure of depressive symptoms was the nine-item depression module from the Patient Health Questionnaire (PHQ-9). Additional questions were focused on current suicidal ideation, past suicide attempts, and episodes of deliberate self-harm and on symptoms of anxiety and distress. Seven hundred and twenty-nine students participated over a 3-school-year interval (2002–2005). Most notably, 11.1% of the students endorsed current (past 4 weeks) suicidal ideation and 16.5% had a lifetime suicide attempt or self-injurious episode. Students with current suicidal ideation had significantly higher depression symptom severity than those without suicidal ideation ($t = -9.34$, $df = 706$, $P < .0001$, $d = 1.9$), and 28.5% of the students with PHQ-9 scores of 15 or higher reported suicidal ideation compared to 5.7% of those with lower scores ($\chi^2 = 56.29$, $df = 1$, $P < .0001$, two-tailed). Suicidal ideation was prominently associated with symptoms of desperation (odds ratio 2.6, 95% CI 1.5–4.6, $P < .001$). The vast majority of students with moderately severe to severe depression (85%) or current suicidal ideation (84%) were not receiving any psychiatric treatment at the time of assessment. These results suggest that there is a strong relationship between severity of depressive symptoms and suicidal ideation in college students, and that suicidal feelings and actions are relatively common in this group. This underscores the need to provide effective mental health outreach and treatment services to this vulnerable population. As this analysis was based on data collected at a single institution, the results may not be representative of all college students or young adults. Depression and Anxiety 25:482–488, 2008. © 2008 Wiley-Liss, Inc.

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INTRODUCTION

Suicide is the third leading cause of death for teenagers and young adults in the United States, behind accidents and homicides [Centers for Disease Control and Prevention, 2004; D'Orsi and Garlow, 2004]. The psychiatric condition most closely associated with teenage suicide is the presence of a mood disorder [Beautrais, 2003; Pfeffer, 2002]. Depression has been consistently identified as a risk factor for suicide in teens and young adults [Nemeroff et al., 2001]. Substance abuse has also been repeatedly noted to increase suicide risk in adolescents and young adults [Esposito-Smythers and Spirito, 2004; Fowler et al., 1986; Garlow, 2002; Garlow et al., 2005]. Other risk factors associated with youth suicide include adverse life events before death, contact with legal authorities and arrests, family history of mental illness and suicide, and a history of sexual abuse [Agerbo et al., 2002; Cooper et al., 2002; Gray et al., 2002; Juon and Ensminger, 1997]. A history of a past suicide attempt is a definite risk factor for subsequent attempts [D'Eramo et al., 2004].

The Big-10 Student Suicide Study conducted from 1980 to 1990 reported an annual overall suicide rate for college students of 7.5 suicides per 100,000, half the rate of 15 per 100,000 for age, gender and race matched individuals in the general population [Silverman et al., 1997]. The highest suicide rates were found among students over the age of 25 and those enrolled in graduate school. The rate per hundred thousand per year among undergraduate women 3.4/100,000/year was approximately a third that of undergraduate men 9.1/100,000/year, but among graduate students the rate for women 9.1/100,000/year approached that for men 11.6/100,000/year. Analysis of the National College Health Risk Behavior Survey (NCHRBS) revealed that 11.4% of college students seriously considered suicide in the preceding 12 months, 1.7% made an attempt, and 0.4% made a medically serious attempt [Barrios et al., 2000]. The American College Health Association-National College Health Assessment (ACHA-NCHA) survey reports similar results, with 11% of female and 9% of male respondents having "seriously considered suicide" in the past year [ACHA-NCHA, 2005].

We sought to further elucidate the relationship between symptoms of depression and other strong and distressing emotional states with suicide ideation in undergraduate college students by analyzing data gathered during a 3-year implementation of the College Screening Project at Emory University. The fundamental hypothesis underlying this analysis is that there is a significant, direct relationship between

severity of depressive symptoms and expressions of suicide ideation in college undergraduates. The second, complimentary hypothesis was that other intense emotional states (anxiety, irritability, rage, desperation, loss of control) would be associated with suicide ideation.

MATERIALS AND METHODS

THE COLLEGE SCREENING PROJECT

The American Foundation for Suicide Prevention (AFSP) developed the College Screening Project in conjunction with participating universities. This project is a suicide prevention outreach effort that utilizes the Internet to identify at-risk students and encourage them to enter into treatment. Once each academic year, all undergraduate students at Emory aged 18 and over (approximately 9,000 unique students over 3 years) were invited to participate through an email message from the Principal Investigator (Dr. Nemeroff) and the Director of Student Health. Students in all four grade levels are invited to participate. The email contains a link to a secure web server through which an automated assessment is conducted. The student submits the screening questionnaire using a self-assigned user name and password. The project clinician reviews the student's responses, and posts an assessment on the website where it may be retrieved by the student. Students are encouraged to communicate anonymously with the clinician through a Dialogue feature. Students whose questionnaire responses or other communications indicate significant depression or potential suicide risk are urged to come in for face-to-face evaluation.

DATA GATHERING INSTRUMENT

The screening questionnaire is based on the PRIME-MD Patient Health Questionnaire (Pfizer copyright, but freely distributed [www.pfizer.com/pfizer/phq-9/index.jsp]) [Spitzer et al., 1999]. The screening instrument consists of the PHQ-9, and questions on current suicidal ideation and past suicide attempts and deliberate self-harm, strong and distressing emotional states, alcohol use, drug use, and eating behaviors, global functional impairment, current pharmacotherapy and psychotherapy and basic demographic characteristics.

PHQ-9. This self-administered screening instrument is based on the DSM-IV criteria for major depression and includes the 9 "A" symptom domains that define depressive disorders [Kroenke et al., 2001]. The instrument is focused on the preceding 14 days

and asks, "How often have you been bothered by...". Each item is scored on a scale of 0–3, with 0 being not at all, 1 several days, 2 more than half the days and 3 nearly every day. The nine individual items include little interest or pleasure, feeling down or depressed, sleep disturbance, fatigue, appetitive disturbances, feelings of failure, and guilt, concentration difficulty, psychomotor retardation or agitation, and suicidal or self-destructive ideas. The scores of 5, 10, 15, and 20 correspond to mild, moderate, moderately severe, and severe levels of depression [Kroenke et al., 2001; Spitzer et al., 1999].

Suicide ideation and deliberate self-harm. The two queries, "Has there been any time in the last 4 weeks when you have seriously thought about killing yourself?" and "Have you ever deliberately hurt yourself or made a suicide attempt?" are answered categorically as yes or no.

Strong and distressing emotional states. These questions are focused on the preceding 4 weeks and each item is answered categorically as not at all, slightly, moderately, or extremely. The six emotional domains queried are "Feeling nervous, anxious, on edge, worrying a lot about different things"; "Becoming easily annoyed or irritable"; "Having an anxiety attack-suddenly feeling panic or fear"; "Feeling enraged"; "Feelings of desperation"; "Feeling out of control". During the analysis, the four possible responses were collapsed into high or low scores.

Alcohol and drug use. The questions, "Do you ever drink alcohol (including beer or wine)?" and "Do you ever use street drugs, or misuse drugs that are prescribed for medical reasons?" are answered categorically as yes or no.

Global functional impairment. Functional impairment is assessed through the question, "If you checked off any problems on this questionnaire, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?" This question is answered categorically: Not difficult at all, Somewhat difficult, Very difficult, and Extremely difficult. This question is from the original PHQ-9, where it follows the nine symptom domain items. During the analysis, the four possible responses were collapsed into high and low scores.

Current treatment. The questions, "Are you currently taking any medication for anxiety, stress or depression?" and "Are you currently getting counseling or therapy?" are answered categorically as yes or no.

Demographics. All demographic features including race, gender, and grade level were by self-report of the student.

DATA ACQUISITION AND STATISTICAL ANALYSIS

Student responses were automatically entered into a tabular database. All statistical analyses were conducted after all of the data for the 3-year interval had been

collected. All statistical analyses were by the JMP 5 (SAS Institute Inc.) statistical package, implemented on Macintosh G-4 computers [SAS Institute, 2002]. PHQ-9 scores are reported as mean and standard deviations. For categorical analyses, the PHQ-9 score was converted into a dichotomous variable at 15 and above ($\text{PHQ-9} \geq 15$), which corresponds to moderately severe to severe depression and 14 and below, which corresponds to mild to moderate symptom severity. The PHQ-9 score was also converted into five categories based on the predefined anchor points, with no depression (0–4), mild (5–9), moderate (10–14), moderately severe (15–19) and severe (20 and above). Categorical variables were analyzed with contingency tables (χ^2) and continuous variable with *t*-test and ANOVA. Effect sizes for *t*-tests were calculated by JMP as "raw effect size" (*d*) and reported with the test statistics. To test the strength of association between the presence of suicidal ideation and PHQ-9 score, suicide ideation was converted to "dummy" continuous variables (0 and 1) and subject to Pearson product moment analysis, which in the dichotomous case yields the point-biserial correlation.

This study was carried out in accordance with the principles of the Declaration of Helsinki. All of the data gathering and analytic procedures were reviewed and approved by the Emory University Institutional Review Board (IRB). As this study involved data gathering via anonymous survey, specific signed informed consent from participants was deemed not necessary by the IRB. The information provided at the web site where the screening is conducted does contain the key elements of informed consent, and consent is implied by the student's completion of the questionnaire.

RESULTS

Seven hundred and twenty-nine Emory students completed the screening questionnaire during the 3-year study interval, of whom 71.7% (520) were female and 28.3% (205) male. There was an excess of female respondents in comparison to the general student population, as 56% of the undergraduate population at Emory University is female. The 729 respondents represent 8.1% of all the students who received the original email invitation. The racial distribution was 67.3% (489) white, 13.6% (99) Asian, 9.1% (66) African American and 10% (73) all other groups, which is identical to the undergraduate population at Emory. Approximately equal proportions of the sample were contributed from each grade level. The mean PHQ-9 score (*SD*) for the entire cohort during the 3-year study interval was 10.44 (5.7) and the median score was 10 with the interquartile range (IQR) from 6 to 14. The distribution of respondents by depression severity category was 16.5% (117) with no depression, 29.6% (210) mild, 30.6% (217) moderate, 16.6% (118) moderately severe, and 6.6% (47) severely depressed.

Fully 11.1% of the entire cohort (81 students) reported current (past 4 weeks) suicide ideation. The mean depression score for students with suicidal ideation (15.8 (5.4)) was significantly higher than that of the students without this symptom (9.8 (5.36)) ($t = -9.34, df = 706, P < .0001, d = 1.9$). The ninth item in the PHQ-9 is suicidal ideation, but the maximum value that this item could contribute to the difference in scores between the two groups is three points. The difference between the subjects with suicidal ideation and those without is 6, suggesting that the students with suicidal ideation are substantially more depressed in all symptom domains. To confirm this, the calculation was repeated with the total of the first eight items of the PHQ-9 and the scores are still significantly higher for the students with suicidal ideation (14.2 (4.9)) compared to those without (9.5 (5.1)) ($t = -7.72, df = 706, P < .0001, d = 1.5$). Categorical comparison of depression severity as defined by PHQ-9 anchor-points, reveals a direct association of increasing symptom severity with the presence of suicidal ideation (Fig. 1), with no student in the no depression category, and 40% of those in the severe category (PHQ-9 ≥ 20) having this symptom. Point-biserial correlation of suicidal ideation to PHQ-9 score revealed a modest relationship with $r = .33$ ($P < .000$).

A larger proportion of male respondents 14.6% (30/205) reported current suicidal ideation than females 9.83% (51/519), although this difference did not reach statistical significance, but there was no difference between males (10.4 (5.4)) and females (10.47 (5.8)) in PHQ-9 scores. There was no difference between the ethnic groups in reported suicidal ideation or PHQ-9 scores. There was no difference in depression scores between the students who endorsed alcohol use (10.5 (5.7)) and those who did not (10.3 (5.3)). Students who acknowledged drug use (11.4 (5.8)) were more depressed than those who denied drug use (10.1 (5.6)) ($t = 2.78, df = 706, P < .006, d = .6$). Alcohol use was common in this group of students with 78% (571/729) responding affirmatively to this question, and drug use was more infrequently reported with 27.7% (202/729) acknowledging this activity. Surprisingly, there was no association of alcohol or drug use with current suicidal ideation.

There was a significant association between a number of measures of psychic distress and anxiety with suicidal ideation (Table 1). In particular, anxiety, irritability, rage, desperation, and feeling out of control were significantly more common in the students with suicidal ideation. These students also experienced higher levels of global functional impairment. Caution

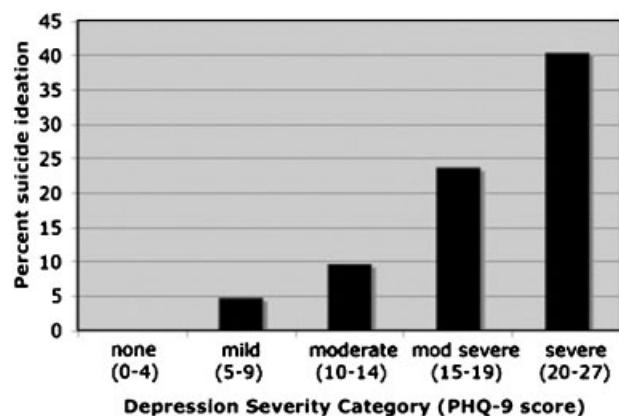


Figure 1. Proportion of students with suicide ideations by increasing depression severity in participants of the College Screening Project at Emory University ($\chi^2 = 84.15, df = 4, P < .0001$). The PHQ-9 anchor points defined the categories of depression severity.

TABLE 1. Percentages and (numbers) of students that rated "high" on measures of anxiety and distress

	Suicidal ideation ($n = 81$)	No suicidal ideation ($n = 646$)	Statistics ^a
Anxiety	92.6 (75)	75.35 (486)	($\chi^2 = 15.2, P < .0002$)
Irritability	74.1 (60)	56.8 (367)	($\chi^2 = 9.4, P < .003$)
Panic	39.5 (32)	25.0 (161)	($\chi^2 = 7.3, P < .007$)
Rage	50.6 (41)	26.5 (171)	($\chi^2 = 18.7, P < .0001$)
Desperation	71.6 (58)	35.1 (226)	($\chi^2 = 39.5, P < .0001$)
Out of control	63.75 (51)	32.3 (207)	($\chi^2 = 29.2, P < .0001$)
Functional impairment	53.75 (43)	24.0 (150)	($\chi^2 = 28.5, P < .0001$)

^aAll statistical tests with one degree of freedom and two-tailed, significance level with Bonferroni correction with all seven items at $P = .007$.

must be exercised in interpreting the results in Table 1, as many of these questions query the same emotional domains, so represent different facets of the same core feeling of emotional distress and turmoil. Bonferroni correction for multiple comparisons, including all seven items in Table 1, suggests that an appropriate significance level to interpret these results is $\alpha = .007$, and even at this more stringent level, the association between suicidal ideation and these strong emotional states persist.

Remarkably, 120 (16.5%) of the students who participated in this study, reported a past suicide attempt or episode of deliberate self-harm. Of these students, 19.2% (23/120) endorsed current suicidal ideation, but 28.4% (23/81) of those with current suicidal ideation reported a previous self-injurious act ($\chi^2 = 8.17$, $df = 1$, $P < .004$). A past suicide attempt or deliberate self-harm is associated with more prominent current symptoms of depression as the mean PHQ-9 score for this group (13.4 (5.2)) was significantly higher than that of the students without such a history (9.8 (5.6)) ($t = 6.45$, $df = 705$, $P < .0001$, $d = 1.3$). Alcohol use was not associated with a suicide attempt or deliberate self-harm history, but drug use was, with 35.8% (43/120) of the students with this history endorsing drug use compared to 26% (158/608) of those without this history ($\chi^2 = 4.62$, $df = 1$, $P < .03$). Similar proportions of male 12.6% (25/204) and female 17.1% (95/520) students reported a past suicide attempt or deliberate self-harm.

There were 80 students (10.9%) in some form of psychiatric treatment at the time of assessment, with 41 (5.6%) receiving only pharmacotherapy, 14 (1.9%) psychotherapy and 25 (3.4%) both modalities simultaneously. More students with current suicidal ideation 16.05% (13/81) were in psychiatric treatment than were those without this symptom 10.4% (67/647), although this difference was not statistically significant. A similar percentage of students with PHQ-9 scores of 15 or greater 14.5% (24/165) were in treatment versus those with lower scores 9.8% (53/544). Of the students with current suicidal ideation, 13.6% (11/81) were receiving pharmacotherapy compared to 8.5% (55/646) of those without this symptom. In contrast, 12.35% (10/81) of those with suicidal ideation were in psychotherapy compared to 4.5% (29/647) of those without ($\chi^2 = 6.82$, $df = 1$, $P < .007$), and 9.9% (8/81) of the students with suicidal ideation received both forms of treatment compared to only 2.6% (17/646) of the students without this symptom ($\chi^2 = 8.18$, $df = 1$, $P < .004$). Of the students with a suicide attempt or deliberate self-harm history, 15% (18/120) were currently receiving pharmacotherapy compared to 7.9% (48/607) of those without such a history ($\chi^2 = 5.36$, $df = 1$, $P < .02$), and only 5.8% (7/120) of those with this history were in psychotherapy, compared to 5.3% (32/608) of those without this history.

A logistic regression model was generated to test the contribution of the potential risk factors to the report

of current suicidal ideation. Those factors that had been the focus of the current analysis were included in the model. This model that included categorical PHQ-9 ≥ 15 , gender, past attempt, current treatment, alcohol use and desperation had an excellent fit to the data ($\chi^2 = 75.03$, $df = 6$, $P < .0001$). The three factors that differentiated students with suicidal ideation from those without were PHQ-9 ≥ 15 (OR 4.3, 95%CI 2.5–7.6, $P < .0001$), male gender (OR 2.0, 95%CI 1.1–3.3, $P < .01$) and high feelings of desperation (OR 2.6, 95%CI 1.5–4.6, $P < .001$).

DISCUSSION

Suicide ideation and a history of suicidal and self-injurious acts are remarkably common in college students. Moreover, there is a prominent association between depressive symptoms and suicide ideations in university undergraduates. Those students with the most severe symptoms of depression were more likely to experience current suicidal ideation and conversely those students with suicidal ideation had worse symptoms of depression. Consistent with results previously reported by AFSP, feelings of desperation were strongly associated with suicidal ideation [Hendin et al., 2004]. As described in our earlier work, this emotional state transcends formal diagnostic categories, but describes a core feeling of intense distress with an urgent need for relief. Other forms of uncomfortable emotional activation, anxiety, irritability, rage and feeling out of control, were associated with suicidal ideation, but all of these measures capture some element of the same state of internal distress. Psychic turmoil is a proximate risk factor for completed suicide, and therefore programs designed to identify potentially suicidal students should include specific assessments of this emotional domain [Busch et al., 1993; Fawcett, 1992].

The proportion of students in the Emory sample who reported current suicidal ideation was essentially identical to the NCHRBS and the ACHA-NCHA, although both of these surveys reported on past-year suicidal ideation [ACHA-NCHA, 2005; Barrios et al., 2000]. The NCHRBS also reported that 7.9% of college students had a suicide plan, 1.7% had made some form of suicide attempt and 0.4% a medically serious attempt in the past year. In contrast, 16.5% of the students in the Emory sample reported a past suicide attempt or deliberate self-harm, although the screening instrument did not include a measure of severity of attempt or a time frame. All three studies suggest that suicidal ideation and suicide attempts are remarkably common in college students. The ACHA-NCHA study also reveals that 11% of female and 8% of male participants report that they were "so depressed it was difficult to function" on nine or more occasions in the past year. Although the measurements are not identical between the ACHA-NCHA and

Emory studies, both point to a considerable burden of clinically significant depression in college students.

The results of the present investigation are very consistent with those previously reported for clinical factors that predict suicide risk [Brown et al., 2000]. In a large prospective analysis of psychiatric outpatients, severity of depression symptoms, hopelessness and a diagnosis of major depression were risk factors in those subjects that did commit suicide. History of suicide ideation was also predictive of eventual suicide death. Certainly, many of these risk factors are potentially modifiable, which may in turn reduce risk. Many of the participants in the College Screening Project had a very similar constellation of risk factors, including suicide ideation, history of suicide attempts and depression. The ultimate goal of this project is to reduce suicide risk by encouraging students in distress to enter into treatment. This may be a critical point in a person's life, at the juncture of adolescents into young adulthood where long-term suicide risk could be reduced by psychiatric and psychological interventions.

Despite the potential to reduce suicide risk through treatment, there is a disconcerting lack of utilization of treatment resources by those students with suicidal ideation and depression. Remarkably, 84% of the students with suicidal ideation and 85% of the moderately severe to severely depressed students were not receiving any form of psychiatric treatment. The lack of engagement of psychiatric treatment is most obvious for the students with more severe symptoms of depression. Almost one quarter (23%) of all respondents had PHQ-9 scores of 15 or greater, but only 14.5% of this group was in some form of treatment. We have no data on the nature or adequacy of the psychiatric treatment received by these students, and this important issue deserves subsequent study.

These results highlight the need for universities to engage in vigorous outreach efforts to educate students and their families about depression, suicide risk, and available treatment services. This also points to the responsibility of universities to ensure that the student-health and student-life staffs are very well educated in the signs and symptoms of psychiatric illnesses and risk factors for suicide. Obviously, universities must have an array of easily accessible psychiatric treatment services, tailored to the needs of college students.

There are several limitations to this study. The first is that the data are from a survey that relied solely on the voluntary responses of the students invited to participate. In this regard, it is not an accurate measure of the prevalence rates of depression or suicidal ideation in all Emory students or in college students or young adults in general. There was disproportionate response from female students, possibly as a result of the screening instrument's emphasis on depression. A different emphasis, such as anger or stress may have been better received by male students, which may have increased rates of participation. Overall, symptoms of depression were common in this cohort of college students,

though this should not be surprising, given that the focus of the screening instrument was to elicit the symptoms of depression. Approximately 8% of all students responded to the initial email, which may be a surrogate measure for the rates of depression in this group of undergraduates. The email solicitations were sent out to each undergraduate only once in each school year so the sample is cross-sectional in a limited time frame, although freshmen and sophomores in the first year of the study would have received the invitational email on three occasions, once in each school year. Another limitation is in the level of detail in the data collected. As the web-based interface was designed to be a convenient, broad-based screening tool, easy to access and complete, more detailed information about many aspects of the students experience, such as severity of past self-injurious acts and adequacy of psychiatric treatment were not collected.

In conclusion, we present data that highlights the relationship between severity of depression and feelings of desperation with suicidal ideation in college undergraduates. Students who are depressed are more likely to have suicidal ideation, as are students in a state of desperation. Surprisingly few of the students with depression or suicidal ideation were receiving any form of psychiatric treatment, which points to the need for enhanced efforts to encourage these students to utilize available treatment resources.

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