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Factors that distinguish college students with depressive symptoms with and without suicidal thoughts

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Abstract

BACKGROUND—Suicide among college students is a significant public health concern. Although suicidality is linked to depression, not all depressed college students experience suicidal ideation (SI). The primary aim of this study was to determine potential factors that may distinguish college students with depressive symptoms with and without SI.

METHODS—A total of 287 undergraduate college students with substantial depressive symptoms (Beck Depression Inventory [BDI] total score >13) with and without SI were compared across psychiatric and functional outcome variables. Independent sample *t* tests were conducted for each outcome variable using the suicide item of the BDI as a dichotomous (ie, zero vs nonzero score) grouping variable.

RESULTS—Relative to students with substantial depressive symptoms without SI, those with SI were more symptomatic overall, having significantly higher levels of depressive symptoms, hopelessness, and anxiety. However, contrary to our expectations, nonsuicidal and suicidal

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students did not differ on measures of everyday functioning (ie, cognitive and physical functioning and grade point average).

CONCLUSIONS—Our findings suggest that SI among college students is associated with increased subjective distress but may not adversely impact physical or cognitive functioning or academic performance.

Keywords

suicide; depression; college students; anxiety; undergraduate; hopelessness

INTRODUCTION

College students are at elevated risk of suicidal thoughts and behaviors, perhaps because of the numerous developmental challenges (internal) and psychosocial changes (external) they experience. These challenges include exploring or developing their identity (eg, making career choices), navigating the transition from a state of full dependence to a state of semidependence on their parents, creating social relationships in a different environment, managing the financial burden of increasingly high college tuition, and leaving their primary support system.[1] Although depressive symptoms are a well-known risk factor for suicidal thoughts and behaviors, most people with depressive symptoms do not go on to consider killing themselves.[2] Therefore, there is a need to identify what factors may predict suicidal ideation (SI) among those with elevated depressive symptoms.

We are aware of only 1 study comparing college students with and without current SI. The study, which was part of an American Foundation for Suicide Prevention–sponsored College Screening Project (n = 729), found that 11% of students endorsed current (past 4 weeks) SI and 16.5% had a lifetime suicide attempt or self-injurious episode.[3] Those with current SI had higher depressive symptom severity (based on Patient Health Questionnaire–9 [PHQ-9] scores) and anxiety, irritability, panic, rage, desperation, and functional impairment, and felt more out of control compared with those without SI. As a limitation, the study measured the strong and distressing emotional state items with single, nonvalidated items (ie, anxiety, irritability, panic, rage, desperation, and feeling out of control), not construct-specific instruments. This article represents an extension of that earlier study in that we examined similar domains with validated outcome measures.

The primary aim of this study was to examine whether college students with substantial depressive symptoms with and without SI differ across psychiatric and functional outcome domains. Our primary hypothesis was that students with substantial depressive symptoms and SI have greater symptom burden and functional impairment compared with students with substantial depressive symptoms without SI. Similar findings were demonstrated in youth age 7 to 17 in a previous study.[4]

METHODS

Participants

The 287 participants in this study represented a sub-sample of a larger study (N = 898) conducted by the Depression Clinical and Research Program at the Massachusetts General Hospital (MGH) Department of Psychiatry.[5] Undergraduate students interested in participating in a mental health screening signed consent forms approved by the institutional review board at MGH and filled out self-report measures. Students were given a $10 voucher to their university bookstore as a reimbursement for their time. The analyses reported here include only students endorsing substantial symptoms of depression[6] (Beck

Depression Inventory [BDI] ≥13). In brief, if students endorsed symptoms of depression and/or suicidality, they were interviewed by a PhD/MD level clinician. The clinician reviewed items and assessed students' risk for self-harm or harm to others. Appropriate referrals were provided, and if necessary, students were escorted to the mental health center if deemed to be at imminent risk. This study was conducted over many years, and different scales were used throughout the course of the study. As such, the total sample sizes for the scales are not the same.

Measures

Demographics—A 4-page questionnaire was used to assess participant demographics, including the demographic domains age, sex, school year, current grade point average (GPA), marital status, living situation, ethnicity, and family socioeconomic status. Other than age and GPA, the demographic information was collected categorically (see categorical options in **TABLE 1**).

Depressive symptoms—The BDI[6] is a 21-item measure of depression that includes questions about core symptoms of depression (eg, sadness, guilt, disappointment, irritability, suicidal thoughts, indecisiveness, insomnia, and loss of appetite). Each item is scored 0, 1, 2, or 3, with higher scores indicating greater severity. Depressive symptom severity was indexed based on the total score of the BDI without the BDI suicide item (BDI item 9), as this was used as the grouping variable (independent variable).

Suicidal ideation—Item 9 of the BDI was used to assess the presence of SI within the past week. The BDI suicide item includes 4 response choices, scored as follows: 0 = I don't have any thoughts of killing myself; 1 = I have thoughts of killing myself, but I would not carry them out; 2 = I would like to kill myself; and 3 = I would kill myself if I had the chance (see **TABLE 2** for frequencies).

Hopelessness—The Beck Hopelessness Scale[7] (BHS) was used to assess participant hopelessness. The BHS is a 20-item questionnaire that asks respondents to answer true or false statements. Each statement reflects a positive or negative attitude regarding the future. Higher scores indicate greater hopelessness.

Anxiety symptoms—Two measures were used to assess participant anxiety: the Anxiety Symptom Questionnaire[8,9] (ASQ) is a 17-item self-report questionnaire measuring the frequency and intensity of 17 symptoms of anxiety, including nervousness, worrying, irritability, trouble relaxing, insomnia, lack of energy, difficulty concentrating, somatic symptoms, and impairment in functioning due to anxiety. In a college population, the ASQ demonstrated high reliability (Cronbach $\alpha = 0.97$, subscale $\alpha = 0.94$) and discriminant validity (the scale discriminated between patients with and without anxiety and also depression, P values <.0001).[9] The Beck Anxiety Inventory[10] (BAI) is a 21-item scale measuring the severity of self-reported anxiety in adults and adolescents. It includes descriptive statements of anxiety symptoms rated on a 4-point scale as follows: 0 = Not at all; 1 = Mildly; it did not bother me much; 2 = Moderately; it was very unpleasant, but I could stand it; and 3 = Severely; I could barely stand it. Higher total scores indicate greater anxiety.

Quality of life—Quality of Life Enjoyment and Satisfaction Questionnaire—Short Form[11] (Q-LES-Q-Short Form): The Q-LES-Q-Short Form asks about physical health, general feelings of well-being, work satisfaction, leisure activities, social relationships, and life satisfaction over the past week. Participants are asked to rate their answers on a scale of 1 to 5, from "Very Poor" to "Very Good." Answers in the "Very Good" range indicate greater

satisfaction with life. A quality-of-life index score for the Q-LES-Q-Short Form is calculated by averaging the scores of all 16 items, with higher scores indicating higher quality of life.

Cognitive and physical functioning—The MGH Cognitive and Physical Functioning Questionnaire[12] (CPFQ) is a 7-item questionnaire for assessment of cognitive and physical functioning. Higher overall scores indicate greater cognitive and executive dysfunction.

Data analysis

The analysis included 287 students (mean age, 19.81 ± 1.87; 64% female) with a BDI total score >13. For all measures, descriptive statistics were calculated for the entire sample and then separately for students with and without SI. If differences were found between the 2 groups in any demographic variables, these variables would be included as covariates in the main analyses. The BDI suicide item was used in the independent samples *t* tests as the dichotomous, grouping/independent variable, indicating the presence or absence of SI (zero vs nonzero score). Previous studies have used the BDI suicide item in this manner.[5,13-15] In fact, Wenzel and colleagues demonstrated a relationship between a nonzero score on the BDI suicide item and actual eventual death by suicide in a sample of patients hospitalized for SI.[14] The dependent variables included the BDI total (minus BDI suicide item 9), BHS total, ASQ intensity total, ASQ frequency total, Q-LES-Q total, CPFQ total, and BAI total.

RESULTS

There were no differences between the 2 groups (with SI group: n = 124; without SI group: n = 163) in demographic characteristics (**TABLE 1**). Mean BDI scores for the full sample (N = 287) were 19.46 ± 6.67 (SD) for the BDI total score, and 18.98 ± 6.48 (SD) for the BDI total score minus the BDI suicide item (BDI item 9). **TABLE 2** shows the frequency of students' responses on the BDI suicide item.

TABLE 3 summarizes the results from the independent samples *t* tests comparing college students with substantial depressive symptoms with and without SI across psychiatric and functional outcome domains. The 2 groups differed in the expected direction across all psychiatric outcome variables. Students with SI endorsed higher levels of hopelessness ($P < .01$), more frequent anxiety ($P < .01$), more intense anxiety ($P < .01$), more intense general anxiety ($P < .01$), and greater depressive severity ($P < .01$) compared with students without SI. On the other hand, the 2 groups did not differ on functional domains, including quality of life and cognitive and physical functioning. Of note, no differences in GPA were found in students with and without SI.

Next we conducted post hoc analyses to further delineate the relationship between SI and functional status, in order to examine the possibility that our initial dichotomous categorization obscured differences between the 2 groups in these functional domains (**TABLE 4**). We categorized students into 3 groups based on their response to the BDI suicide item: no SI (score of 0), mild SI (score of 1), or moderate to severe SI (score of 2 or 3). Quality of life was significantly lower for those with moderate to severe SI vs those with either mild SI or no SI ($P < .05$). However, cognitive and physical functioning and GPA did not differ based on severity of SI.

DISCUSSION

The primary aim of this study was to determine potential factors that may distinguish college students with depressive symptoms who think about suicide from those who do not. Consistent with our hypotheses, those with SI had greater severity of psychiatric symptoms,

including severity of depression, anxiety, and hopelessness, compared with those without SI. Across our measures of functional domains (ie, cognitive and physical functioning, quality of life, and GPA), students with and without SI did not differ; however, post hoc analyses revealed that those with the highest levels of SI (moderate to severe SI) evidenced impairments in quality of life relative to students with mild SI and no SI, suggesting that suicidality in college students with substantial depressive symptoms may be associated with reduced life satisfaction. This finding is considered exploratory, as are all of our post hoc analyses, as our sample of students with the most severe level of SI was notably small. For the Q-LES-Q finding in particular, there were only 5 students who had the most severe level of suicidality. Our small sample may have also obscured potential findings in the opposite direction—ie, the current study did not have the power to detect, for example, GPA differences in the group with the most severe level of SI. The parent study examined some similar variables[5] within the entire population, whereas the present study examined only students with a BDI score >13. Similar to Farabaugh et al,[5] we found that hopelessness and depressive severity were related to suicidality. However, we did not find the functional deficits in this subsample.

Other studies of college populations do suggest an association between suicidality and functioning. Garlow and colleagues[3] found higher levels of self-reported global functional impairment (measured with a single item from the original PHQ-9) in college students with SI compared with those without SI. In a slightly older sample of medical students, quality of life was significantly associated with SI.[16] And in a sample of Korean college students, academic decrement was associated with SI.[17] Taken together, these results may suggest that a greater subjective sense of reduced functioning/life satisfaction is associated with SI, but measures of functioning that are less likely to be influenced by subjective distress, such as those measuring physical and cognitive functioning, may not be adversely affected by SI.

It also is surprising that our study did not find functional differences between the groups, given the established connection between depression and functional impairment/quality of life in the general adult population.[18] Perhaps the high stress of college makes SI more prevalent and also less *pathological*—ie, not associated with functional impairment—in the college student population. The present study may have captured the hypothesized differences between the groups if a measure of social functioning had been obtained, as constructs associated with social functioning have consistently been linked to suicidality in the college student population.[15,19-22] The association between social support and suicidality has also been established in college student samples outside the United States.[23]

It is possible that we found no differences between the groups on functional impairment due to the suicidal group underreporting their functional difficulty. In future studies, objective measures of cognitive, social, and academic functioning could be used to determine whether SI in college students with depressive symptoms is associated with impaired functioning across domains. We did examine 1 objective measure of functioning—GPA; however, we did not find a difference between the 2 groups. Although this finding must be considered preliminary, given the limited power of the analysis, it may suggest that objective measurements of functioning are relatively unaffected by the presence of SI in college students with depressive symptoms.

The finding that students with SI experienced more anxiety than their peers without SI is consistent with Wilcox and colleagues,[15] who found that college students with current SI had higher anxiety, irritability, and panic, and felt more out of control compared with those without SI. However, they used single-item questions to measure anxiety, irritability, panic, and feeling out of control. Here we replicate these findings within a college population using validated (BAI) and preliminarily validated (ASQ) measures of anxiety. Although a number

of studies have highlighted the importance of anxiety symptoms and risk for suicide,[24,25] we are unaware of any other studies examining the co-occurrence of symptoms of anxiety and depression in relation to SI specifically in the college student population.

Our finding that depressive symptoms were higher for students with SI is consistent with published literature on college populations. For example, in a study of SI in college students, Konick and Gutierrez[26] found that for 345 undergraduates, depressive symptoms (as measured by the BDI) exerted a stronger influence on SI than did hopelessness (as measured by the BHS). Garlow and colleagues[3] found that college students with SI have higher levels of depressive severity compared with those without SI. They utilized a different measure of depression (PHQ-9), indicating that these results hold across different measures. Different measures also were used to assess current SI in the 2 studies. Taken together, both studies seem to demonstrate the relationship between higher depressive symptoms and SI, despite varying methodologies.

Our finding that hopelessness is greater in students with SI is not surprising. Our study replicated the well-documented finding that hopelessness is significantly associated with SI in the general population.[27-29] Although the literature is sparse, this finding has been demonstrated in college populations as well.[26,30]

Forty-three percent of college students in our sample of students with substantial symptoms of depression had current SI, meaning they endorsed at least a score of 1 on the BDI suicide item (“I have thoughts of killing myself, but I would not carry them out”). Our rate is higher than rates of SI observed in college populations not specifically selected for depressive symptoms,[3,13,15,31,32] likely because of including only students with substantial depressive symptoms, making the presence of SI far more likely. Consistent with this hypothesis, and similar to our findings, Garlow and colleagues[3] found significantly higher rates of SI when comparing students with and without substantial depressive symptoms (29% vs 6%). Additionally, other studies may have used more stringent measures of SI.

Limitations

Our findings need to be interpreted within the context of the study's limitations. First, we cannot draw any causal conclusions from the present study because it is only cross-sectional. Second, our study used BDI suicide item 9 to assess current SI. This item is not a well-validated or in-depth assessment of suicidality. Further findings might have emerged had we conducted a more in-depth assessment of the 3 hypothesized domains of suicidality[33] (ie, cognitive, emotional, and behavioral). On the other hand, there is utility in using this nonintrusive, easily administered measure of SI in an initial screening.[5,15] Third, we relied mostly on self-report measures to assess functioning. Real-world indicators of functioning might have increased the validity and utility of the present results. Freshmen may have reported their high school vs college GPA and therefore their GPA may not have been a valid estimate of their current college-level academic functioning. Fourth, we also did not assess the persistence of SI over time. Students in this study may have been one-time ideators vs persistent ideators, and we were unable to examine this important characteristic.[15] Lastly, students who participated in the screenings of this study were self-referred; therefore, students who are struggling with the greatest burden of depressive symptoms may not have participated. As such, our findings may actually underestimate the current degree of depressive symptoms and suicidality on college campuses.

Future directions

Future studies are needed to address the relationship between SI, depression, and functional impairment in the college population. It is possible that specific symptoms of depression are

more closely related to functional impairment than an overall depression score. Follow-up studies also are needed to prospectively test for hypothesized links between psychiatric and functional domains and actual real-world measures, such as suicide attempts. Additional research also is needed to examine the added burden of anxiety symptoms (in addition to depressive symptoms) because they appear to play a role in SI in this population.

Additionally, it may be helpful to further characterize students with SI without substantial depressive symptoms. For example, Arria et al[19] found that a majority of college students with SI were not depressed. Moreover, future research could use in-depth suicide assessment measures, especially as a second step to initial screening measures, to assess more complex relationships among different aspects of suicidality. Lastly, future interventions may benefit from targeting comorbid symptoms of anxiety and depression to reduce SI and suicide attempts.

Clinically, we have 2 recommendations based on the findings of this study. First, suicidality may in fact be a marker of greater symptom severity. Specifically, clinicians may not consider comorbid symptoms of anxiety to be associated with suicidality. As such, clinicians may undervalue the importance of monitoring and treating comorbid symptoms of anxiety when students present with depressive symptoms. Second, SI often may go undetected in this population, due in part to a lack of major functional impairment. Therefore, it is important to ask about SI even when a student may not appear functionally impaired. Lack of functional impairment in students with SI may be one of the reasons why suicide of young people appears to occur unexpectedly.

CONCLUSIONS

The results of this study suggest that SI among college students with significant symptoms of depression is associated with increased subjective distress but may not adversely impact physical and cognitive functioning or academic performance.

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TABLE 1

Clinical and demographic variables

	Total sample N = 287		With SI n = 124		Without SI n = 163	
Variable	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Age (n = 269)	19.81	1.87	19.78	1.70	19.83	2.00
GPA (n = 242)	3.24	0.50	3.23	0.46	3.25	0.53
Sex (n = 276)	**n**	**%**	**n**	**%**	**n**	**%**
Female	184	64.1%	72	58.1%	112	68.7%
Male	92	32.1%	47	37.9%	45	27.6%
School year (n = 275)	**n**	**%**	**n**	**%**	**n**	**%**
Freshman	74	25.8%	35	28.2%	39	23.9%
Sophomore	73	25.4%	25	20.2%	48	29.4%
Junior	70	24.4%	32	25.8%	38	23.3%
Senior	49	17.1%	23	18.5%	26	16%
Other	9	3.1%	4	3.2%	5	3.1%
Marital status (n = 276)	**n**	**%**	**n**	**%**	**n**	**%**
Never married	273	95.1%	119	96%	154	94.5%
Other	3	0.9%	5	4%	3	1.8%
Living situation (n = 112)	**n**	**%**	**n**	**%**	**n**	**%**
On campus alone	33	11.5%	13	10.5%	20	12.3%
On campus with roommates	34	11.8%	12	9.7%	22	13.5%
Off campus alone	8	2.8%	3	2.4%	5	3.1%
Off campus with relatives	8	2.8%	4	3.2%	4	2.5%
Off campus with roommates	29	10.1%	13	10.5%	16	9.8%
Ethnicity (n = 249)	**n**	**%**	**n**	**%**	**n**	**%**
Black, not of Hispanic origin	22	7.7%	9	7.3%	13	8%
Hispanic	19	6.6%	4	3.2%	15	9.2%
White, not of Hispanic origin	157	54.7%	68	54.8%	89	54.6%
American Indian or Alaskan Native	1	0.3%	1	0.8%	0	0%
Asian or Pacific Islander	36	12.5%	21	16.9%	15	9.2%
Other	14	4.9%	5	4%	9	5.5%
Family socioeconomic status (n = 101)	**n**	**%**	**n**	**%**	**n**	**%**
Low income (<$24,999)	6	2.1%	3	2.4%	3	1.8%
Low-middle income ($25,000 to $49,000)	13	4.5%	6	4.8%	7	4.3%
Middle income ($50,000 to $79,999)	29	10.1%	14	11.3%	15	9.2%
Upper-middle income ($80,000 to $199,999)	41	14.3%	15	12.1%	26	16.0%
Upper income (≥$200,000)	12	4.2%	3	2.4%	9	5.5%

There were no significant differences between the groups across demographic variables.

GPA: grade point average; SD: standard deviation; SI: suicidal ideation.

TABLE 2

Frequency of responses to BDI suicide item 9 and level of depressive symptoms by response

BDI score	BDI response	N = 287	%	BDI score minus BDI suicide item 9, mean (SD)
0	I don't have any thoughts of killing myself.	163	56.8%	17.74 (4.88)
1	I have thoughts of killing myself, but I would not carry them out.	111	38.7%	19.94 (7.35)
2	I would like to kill myself.	11	3.8%	27.64 (9.28)
3	I would kill myself if I had the chance.	2	0.7%	19.50 (13.44)

BDI: Beck Depression Inventory; SD: standard deviation.

TABLE 3

Comparing students with and without suicidal ideation across outcome variables

	Total sample (N = 287)					
	With suicidal ideation		Without suicidal ideation			
	n	Mean (SD)	n	Mean (SD)	*t*	*df*
Psychiatric outcomes						
BDI total score (minus item 9)	124	20.61 (7.85)	163	17.74 (4.88)	–3.59[a,b]	193.28
ASQ intensity total score	66	77.62 (29.33)	79	64.05 (26.84)	–2.91[a]	143
ASQ frequency total score	66	74.45 (29.51)	77	60.77 (26.02)	–2.95[a]	141
BAI total score	29	22.83 (12.49)	26	11.23 (7.13)	–4.28[a,b]	45.34
BHS total score	37	7.89 (4.20)	58	5.12 (3.72)	–3.37[a]	93
Functional outcomes						
CPFQ total score	79	21.85 (5.30)	95	21.31 (5.79)	–0.65	172
Q-LES-Q total score	54	46.69 (9.67)	78	48.47 (8.45)	1.12	130
GPA	105	3.23 (0.46)	137	3.25 (0.53)	0.28	240

ASQ: Anxiety Symptom Questionnaire; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; BHS: Beck Hopelessness Scale; CPFQ: The Massachusetts General Hospital Cognitive and Physical Functioning Questionnaire; GPA: grade point average; Q-LES-Q: Quality of Life Enjoyment and Satisfaction Questionnaire–Short Form; SD: standard deviation.

[a] <.01.

[b] Equal variances not assumed.

TABLE 4

Students with moderate to severe SI, mild SI, and no SI across psychiatric and functional outcomes

	No SI (0 on BDI item 9)		Mild SI (1 on BDI item 9)		Moderate to severe SI (2 or 3 on BDI item 9)		ANOVA	
	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	*F*	*P*
Psychiatric outcomes								
BDI total score (minus item 9)	163	17.74 (4.88)	111	19.94 (7.35)	13	26.38 (9.80)	8.07[a]	.002[a,b]
ASQ intensity total score	79	64.05 (26.84)	58	75.34 (27.59)	8	94.13 (37.85)	5.90	.003[b]
ASQ frequency total score	77	60.77 (26.02)	58	71.98 (27.90)	8	92.38 (36.51)	6.38	.002[b]
BAI total score	26	11.23 (7.13)	23	21.35 (10.68)	6	28.50 (17.96)	8.80[a]	.004[a,b]
BHS total score	58	5.12 (3.72)	36	7.81 (4.23)	1	11.00 (n/a)	5.97	.004[b,c]
Functional outcomes								
CPFQ total score	95	21.3 (5.79)	68	21.93 (5.33)	11	21.36 (5.35)	0.26	.773
Q-LES-Q total score	78	48.47 (8.45)	49	47.56 (9.40)	5	38.20 (8.87)	3.20	.044[b]
GPA	137	3.25 (0.53)	95	3.21 (0.45)	10	3.44 (0.49)	0.99	.377

ANOVA: analysis of variance; ASQ: Anxiety Symptom Questionnaire; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; BHS: Beck Hopelessness Scale; CPFQ: The Massachusetts General Hospital Cognitive and Physical Functioning Questionnaire; GPA: grade point average; Q-LES-Q: Quality of Life Enjoyment and Satisfaction Questionnaire–Short Form; SD: standard deviation; SI: suicidal ideation.

[a]Violates homogeneity of variance. Welch statistic and associated *P* value reported.

[b]Post hoc analyses between the 3 groups for significant outcome variables were significant for all groups except: •Q-LES-Q: No SI and mild SI were not significantly different •ASQ intensity: Mild SI and moderate to severe SI demonstrated a trend toward significance ($P = .075$) •ASQ frequency: Mild SI and moderate to severe SI demonstrated a trend toward significance ($P = .05$) •BAI: Moderate to severe SI and mild SI were not significantly different.

[c]Post hoc could not be performed due to cell size.