

The Association between Depression Severity and Stigmatized Beliefs in Undergraduate Students at a Large Metropolitan University: A Cross-Sectional Study

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Abstract

Objective: The purpose of this study was to determine the prevalence of depression, predictors of depression and stigma, and the association between depression severity and personal and perceived stigmatized beliefs in a sample of American undergraduate students.

Methods: A survey containing a socio-demographic questionnaire, Patient Health Questionnaire-9 (PHQ-9), and Depression Stigma Scale (DSS) was disseminated online at a large metropolitan university in the USA. Prevalence of depression was determined using the PHQ-9 summed-item scoring method. Linear regression was used to identify predictors variables of depression and stigma. The *t*-test was used to describe the association between depression severity and scores on the personal and perceived subscales of the DSS.

Results: Of 1080 respondents, 36.3% were moderately to severely depressed. The students in this group were associated with lower average personal stigma scores ($p=0.023$) and higher average perceived stigma scores ($p=0.002$) on the respective DSS subscales. The variables associated with higher PHQ-9 scores were: female ($p<0.001$), LGBT ($p<0.001$), upperclassmen ($p<0.001$), and non-Christian or no religious affiliation ($p<0.001$). The variables associated with higher personal stigma included: male ($p<0.001$), heterosexuality ($p<0.001$), unemployment ($p<0.05$), Caucasian race ($p<0.001$), older age ($p<0.05$), and single-race ($p<0.05$).

Conclusions: Undergraduate students with moderate to severe depression exhibited greater perceived stigma compared to their counterparts. Efforts to reduce stigma in students most at risk for depression should therefore be aimed at reducing perceived stigma. Future research should be focused on creating and evaluating on-campus stigma reduction programs.

Keywords: Depression severity; Stigmatized beliefs; Undergraduate students

Introduction

The World Health Organization has projected major depression to be the second greatest contributor to global burden of disease in terms of disability-adjusted life years by the year 2020 [1]. Among American undergraduate students, depression remains a common mental illness, with reported prevalence as high as 12-33% [2-4]. Depression may impede academic performance and, at worst, even prompt suicidality [5-6]. Students may also be affected by varying degrees of social avoidance, denial, and discrimination [7-8]. Among college students, stigmatized attitudes have been negatively associated with treatment-seeking behavior [9]. Moreover, if depressed students exhibit more stigmatized beliefs regarding depression, on-campus efforts to manage the depression burden and combat depression stigma may need to compensate for these beliefs.

Generally, stigmatized beliefs can be classified into two broad categories: personal and perceived. An individual's personal beliefs are those that he or she holds regarding depression and those who experience it. When a student's beliefs become stigmatized, he or she is more likely to express

agreement for the following: "depression is a sign of personal weakness," "it is best to avoid people with depression," or "people with depression are dangerous" [10]. However, a student's perceived beliefs describe what a student thinks that others believe about depression. Perceived beliefs can become similarly stigmatized (e.g. "most people believe that depression is a sign of personal weakness," etc.) [10]. Previous studies that quantify depression-specific stigma have been limited by small sample sizes or did not survey undergraduate students exclusively [10-14].

Understanding how personal and perceived stigma relates to depression severity in universities may aid in developing novel stigma reduction campaigns, re-structuring prevention efforts, and improved allocation of existing resources. The primary objective of this study was to determine the prevalence of depression in undergraduate students and investigate whether depression severity was associated with personal or perceived stigmatized beliefs. The secondary aim was to detect socio-demographic predictors of depression severity, personal stigma, and perceived stigma in order to identify student groups that may benefit from depression screening or stigma reduction efforts.

Methods

Institutional Review Board approval was obtained prior to conducting this cross-sectional study in accordance with the Health Insurance Portability and Accountability Act (HIPAA) and the tenets of the Declaration of Helsinki. The three-part survey included a socio-demographic section and two standardized scales: PHQ-9 (Patient Health Questionnaire-9) and DSS (Depression Stigma Scale). The socio-demographic questionnaire included questions regarding sex, age, sexual orientation, religious affiliation, ethnicity and/or race, employment status, and student year. PHQ-9 consisted of 9 lifestyle questions that integrated the DSM-IV criteria with other symptoms of depression. DSS was developed by Dr. Kathleen Griffiths at the National Institute for Mental Health Research at Australian National University. It consisted of 18 questions divided equally into two subscales that measured personal and perceived stigma separately by asking respondents to indicate their agreement for depression-related statements.

The study was conducted at a large metropolitan university in the USA. Data were collected and stored online using Research Electronic Data Capture (REDCap) [15]. Participants included students attending the university between August 1, 2015 and December 31, 2015. Full-time undergraduate students were included; students those were part-time or under the age of 18 were excluded. Subjects were recruited through emails, flyers, newsletters and bulletins that provided a hyperlink to the electronic survey form. All responses were collected anonymously. Respondents were given the option to enter a lottery for Amazon® e-gift cards. If they chose to enter the lottery, their email addresses were recorded in a separate online form so as to not be associated with the survey responses, thereby preserving anonymity. The lottery occurred after the termination of data collection.

The following outcomes were studied: prevalence of depression, the association between depression severity and personal and perceived stigmatized belief, and predictors variables for both depression and stigmatized beliefs (personal and perceived). The prevalence of depression was determined based on the number of individuals that met the clinical cutoff for moderate to severe depression severity according to the PHQ-9 summed-item scoring method. Respondents with a score ≥ 10 exhibited moderate to severe depression; those with a score <10 exhibited mild to no depression. Respondents with scores ≥ 10 may be considered for treatment, counseling and/or pharmacotherapy [16]. The PHQ-9 summed-item scoring method has been validated in several populations with a pooled sensitivity of 0.77 and a pooled specificity of 0.85 in a recent meta-analysis of 27 studies [17]. Stigmatized belief was determined from continuous scores on the personal and perceived stigma DSS subscales separately with higher scores indicating more stigmatized beliefs. DSS has demonstrated test-retest reliability in college students [10]. Predictor variables for depression severity and stigmatized beliefs were determined by comparing socio-demographic groups in terms of PHQ-9 and DSS scores.

A total of 1,777 responses were obtained of which 697 responses based on one or more exclusion criteria: graduate student participant, incomplete response, or a later request to have data removed. Therefore, 1080 responses were incorporated into the analyses. The response rate was 60.77%. Microsoft® Excel Mac Version 15.11.2 and IBM® SPSS® Version 22 were used to conduct analyses. Descriptive statistics were applied to PHQ-9 scores and DSS scores for each respondent. After the PHQ-9 summed-item scoring method was used to divide participants into the more (score ≥ 10) and less (scores <10) depressed groups, the percentage of students that exhibited moderate to severe depression severity was calculated. Student's *t*-test, two-tailed and assuming unequal variances, was used to compare scores on the DSS subscales for personal and perceived stigma according to depression severity. A series of linear regressions were used to determine the relationship between the socio-demographic predictors to scores on PHQ-9 and the DSS subscales.

Results

A total of 1080 responses were incorporated into the analysis (Figure 1). Results indicate 36.3% of respondents met the PHQ-9 summed-item scoring criteria for moderate to severe depression. Specifically, $<1\%$ met criteria for severe depression (PHQ-9 score ≥ 20), 11.4% met criteria for moderately severe depression (PHQ-9 score <20 and ≥ 15), and 20% for moderate depression (PHQ-9 score <15 and ≥ 10) [16]. Socio-demographic characteristics of study participants and scores on the PHQ-9 and DSS scales can be found in table 1. Moderately to severely depressed students were associated with lower average personal stigma

Category	n	PHQ-9 Score $\bar{x} \pm s$	DSS personal $\bar{x} \pm s$	DSS perceived $\bar{x} \pm s$
Sex				
Male	336 (31%)	7.6 \pm 5.8	11.4 \pm 5.2	21.9 \pm 5.4
Female	729 (68%)	8.6 \pm 5.7	9.5 \pm 5.2	22.2 \pm 5.6
Other	15 (1%)	14.7 \pm 4.0	8.1 \pm 5.4	23.5 \pm 5.4
Age (years)				
18	264 (24%)	7.8 \pm 5.7	9.6 \pm 4.7	21.6 \pm 5.4
19	204 (19%)	9.2 \pm 5.9	9.8 \pm 5.1	21.9 \pm 4.6
20	161 (15%)	9.1 \pm 5.9	10.2 \pm 5.3	22.5 \pm 6.1
21	139 (13%)	8.5 \pm 6.0	10.2 \pm 5.6	22.6 \pm 5.6
22	76 (7%)	7.6 \pm 5.8	11.5 \pm 5.8	21.8 \pm 5.8
23 and over	236 (22%)	8.2 \pm 5.4	10.2 \pm 5.5	22.5 \pm 5.7
Sexual Orientation				
Heterosexual	905 (84%)	8.2 \pm 5.7	10.2 \pm 5.3	22.2 \pm 5.5
Gay	28 (3%)	8.4 \pm 5.1	9.9 \pm 5.2	22.5 \pm 5.0
Lesbian	10 (1%)	12.5 \pm 6.6	10.3 \pm 5.4	22.7 \pm 5.3
Bisexual	109 (10%)	9.4 \pm 6.3	9.3 \pm 4.9	21.8 \pm 6.0
Other/Transgender	28 (3%)	10.2 \pm 5.1	11.2 \pm 5.5	21.7 \pm 4.1
Religion				
Christianity	404 (37%)	7.6 \pm 5.2	10.4 \pm 3.0	22.2 \pm 5.4
Islam	22 (2%)	8.9 \pm 6.7	9.2 \pm 4.1	21.5 \pm 6.2
Judaism	52 (5%)	8.3 \pm 5.0	10.1 \pm 4.7	21.3 \pm 4.9
Hinduism	51 (5%)	8.0 \pm 6.0	14.6 \pm 5.1	22.8 \pm 5.8
Buddhism	22 (2%)	9.0 \pm 5.0	12.9 \pm 6.7	21.5 \pm 5.7
Other	64 (6%)	10.2 \pm 6.2	10.6 \pm 5.4	22.4 \pm 4.8
None	465 (43%)	8.9 \pm 6.1	9.1 \pm 5.1	22.2 \pm 5.7
Race or Ethnicity				
Caucasian	498 (46%)	8.2 \pm 5.7	11.1 \pm 5.2	22.4 \pm 5.4
African American	65 (6%)	7.5 \pm 6.7	10.3 \pm 4.6	22.8 \pm 5.1
Asian American	285 (26%)	8.3 \pm 5.5	10.6 \pm 5.4	22.4 \pm 5.5
Hispanic American	164 (15%)	7.8 \pm 5.6	10.4 \pm 4.8	22.4 \pm 5.7
Native American	11 (1%)	7.3 \pm 5.2	10.1 \pm 3.3	22.3 \pm 5.8
Pacific Islander	11 (1%)	6.9 \pm 4.9	9.9 \pm 5.8	24.6 \pm 3.2
Multi-racial	88 (8%)	9.4 \pm 6.6	9.5 \pm 4.3	21.4 \pm 5.9
None of the above	77 (7%)	8.6 \pm 6.3	13.8 \pm 5.1	22.6 \pm 5.2
Declined to state	15 (1%)	8.9 \pm 10.2	11.4 \pm 6.1	20.1 \pm 5.1
Employment Status				
Unemployed	544 (50%)	8.2 \pm 5.8	10.5 \pm 5.1	22.2 \pm 5.3
Full-time	62 (6%)	6.5 \pm 4.5	10.2 \pm 5.7	21.9 \pm 6.0
Part-time	444 (41%)	8.8 \pm 5.8	9.7 \pm 5.3	22.0 \pm 5.6
Unsalariated	30 (3%)	9.8 \pm 7.3	8.6 \pm 5.5	23.1 \pm 6.2
Student Year				
Freshman	307 (28%)	7.5 \pm 5.5	10.2 \pm 5.1	21.7 \pm 5.6
Sophomore	232 (21%)	9.2 \pm 6.2	10.0 \pm 5.0	22.4 \pm 4.8
Junior	199 (18%)	8.4 \pm 5.7	10.7 \pm 5.5	22.2 \pm 6.0
Senior	165 (15%)	9.6 \pm 6.1	9.1 \pm 5.3	22.0 \pm 5.7
5 th year or above	177 (16%)	7.7 \pm 5.2	10.1 \pm 5.3	22.6 \pm 5.6

Table 1: Socio-demographic characteristics, depression severity, and stigmatized beliefs.

n: Number of responses; \bar{x} : Mean; s: Standard deviation

scores [$t(1080)=-2.28, p=0.023$] and higher average perceived stigma scores [21.7 ± 5.5 [$t(1080)=3.12, p=0.002$]. The differences in depression-related stigma scores between groups based on their depression severity can be found in table 2.

A total of 1064 responses were incorporated into the linear regression analysis after 16 responses were excluded for choosing other sex identity (Table 3). The following variables were associated with greater PHQ-9

Depression severity (PHQ-9 score)	DSS personal			DSS perceived		
	$\bar{x} \pm s$	<i>t</i>	<i>p</i>	$\bar{x} \pm s$	<i>t</i>	<i>p</i>
Moderate to severe (10-27)	9.6 ± 5.1	-2.28	0.023	22.8 ± 5.5	3.12	0.002
Mild to none (0-9)	10.4 ± 5.3			21.7 ± 5.5		

Table 2: Differences in social stigma exhibited by students with varying depression severity.

x: Mean; s: Standard deviation; t: t-test statistic; p: p-value

scores: female (vs. male) [$\beta =0.92, t(1064)=2.46, p=0.01$], identifying as LGBT (vs. heterosexual) [$\beta =2.10, t(1064)=4.30, p<0.001$], upperclassman (vs. freshman) [$\beta =1.84, t(1064)=3.98, p<0.001$], and identifying as having a non-Christian or no religious affiliation (vs. Christian) [$\beta =0.98, t(1064)=2.68, p<0.001$]. All other variables did not attain statistical significance (all $ps>0.05$). The following variables were associated with greater scores on the personal stigma subscale, indicating greater personal stigma related to depression: male (vs. female) [$\beta =-1.72, t(1064)=-5.23, p<0.001$], identifying as straight (vs. LGBT) [$\beta =-2.91, t(1064)=-6.78, p<0.001$], unemployed (vs. employed) [$\beta =-0.67, t(1064)=-2.12, p<0.05$], Caucasian (vs. non-Caucasian race) [$\beta =-2.29, t(1064)=-5.85, p<0.001$], older age [$\beta =0.74, t(1064)=1.99, p<0.05$], and identifying as single race (vs. multiracial) [$\beta =-1.30, t(1064)=-2.29, p<0.05$]. All other variables did not attain statistical significance (all $ps>0.18$). None of the predictor variables were significantly associated with greater scores on the perceived stigma subscale, all $ps>0.10$.

Variable	PHQ-9			DSS personal			DSS perceived		
	<i>b</i>	<i>t</i>	<i>p</i>	<i>b</i>	<i>t</i>	<i>p</i>	<i>b</i>	<i>t</i>	<i>p</i>
Sex									
Male	0.921	2.460	0.014	-1.716	-5.232	<0.001	0.458	1.249	0.212
Female									
Age (years)									
18-19	-0.599	-1.409	0.159	0.743	1.993	0.047	0.532	1.275	0.203
20 and above									
Sexual Orientation									
Heterosexual	2.104	4.301	<0.001	-2.905	-6.777	<0.001	-0.530	-1.105	0.270
LGBT or other									
Religion									
Christian	0.980	2.676	0.008	-0.341	-1.061	0.289	0.082	0.228	0.820
Other or none									
Race or Ethnicity									
Caucasian	-0.090	-0.201	0.841	-2.292	-5.849	<0.001	-0.388	-0.886	0.376
African American	-0.904	-1.148	0.251	-0.343	-0.497	0.619	0.721	0.934	0.351
Asian American	-0.553	-1.083	0.279	-0.526	-1.174	0.240	0.355	0.709	0.478
Hispanic American	-0.792	-1.432	0.153	-0.419	-0.864	0.388	0.313	0.578	0.563
Native American	-0.733	-0.419	0.675	-0.065	-0.042	0.966	0.415	0.242	0.809
Pacific Islander	-0.800	-0.463	0.643	-2.015	-1.330	0.184	2.193	1.295	0.196
Multi-racial	1.227	1.890	0.059	-1.303	-2.290	0.022	-1.023	-1.607	0.108
Employment Status									
Unemployed	0.147	0.406	0.685	-0.671	-2.115	0.035	-0.463	-1.306	0.192
Employed									
Student Year									
Freshman	1.840	3.982	<0.001	-0.525	-1.297	0.195	0.364	0.804	0.422
Upperclassmen									

Table 3: Predictors of depression, personal stigma, and perceived stigma.

b: Unstandardized beta coefficients; t: t-statistic; p: p-value

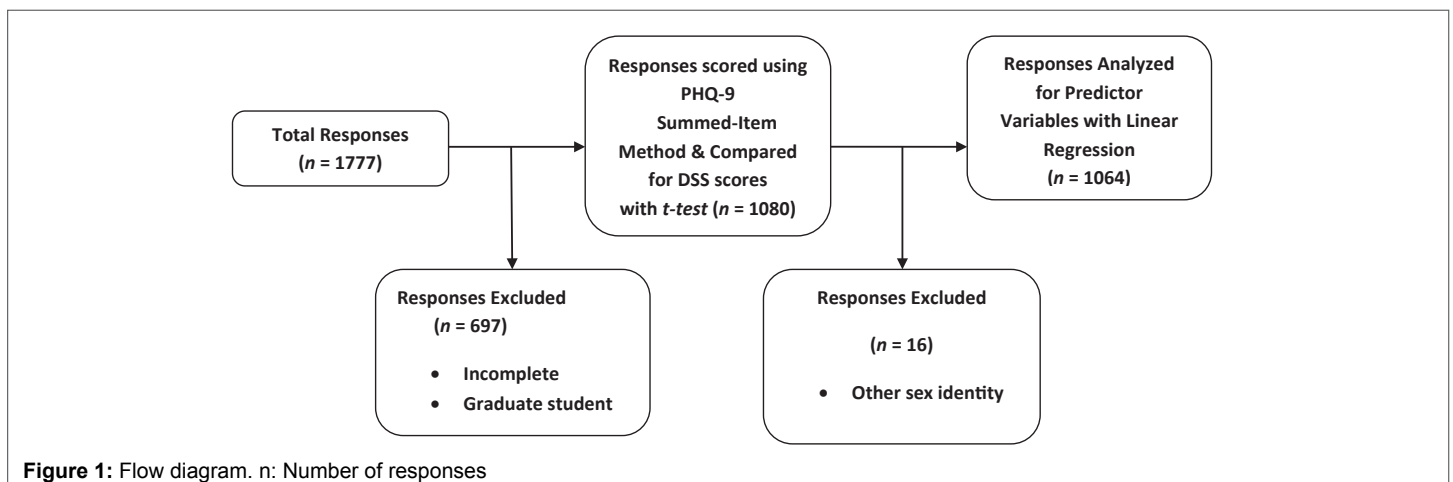


Figure 1: Flow diagram. n: Number of responses

Discussion

Notably, the undergraduate sample surveyed showed that 36.3% of individuals met the clinical cutoff for consideration of a depressive disorder, which was greater than previously reported percentages [2-4]. Additionally, 36.3% was much greater than the percentage reported by Eisenberg et al. [3], who also used the PHQ-9 summed-item scoring method. Our findings suggest the prevalence of depression on college campuses may be higher than previously indicated or, mirroring global trends, has increased over time. In fact, the World Health Organization expects the burden of major depression to become the second greatest contributor to the world's disease burden by the year 2020 [1].

Because female students, LGBT students, upper classmen, and students with non-Christian or no religious affiliation showed greater depression severity, these groups may constitute at-risk student sub-populations that may benefit from targeted screening and assessment endeavors. Prior studies have also identified several risk factors for elevated depression. For instance, Young et al. [18] reported more depression in female students among Caucasian and Asian-American undergraduates ($p=0.001$). Grant et al. [19] also reported LGBTQ identification among students was associated with greater depression severity compared to heterosexual students at a large mid-western university ($p=0.002$). Consequently, female and LGBT students may be at particularly high risk for depression and may benefit from re-focused assessment and prevention efforts. Furthermore, given that the protective effect of religious involvement with regards to depression symptoms has been documented in the literature, programs to involve students in university life in other ways to produce a similarly protected effect should be researched [20]. In contrast, Vankar et al. [11] reported greater depression in first-year students compared to upperclassmen, but these findings were in Indian undergraduate medical students. Because our results indicated that upperclassmen were associated with greater depression severity, initiatives to detect and treat depression must continue past the first year and remain consistent throughout a student's academic career.

De-stigmatizing campaigns may need to focus on student groups exhibiting more highly stigmatized beliefs to be most efficient. In our study, male, heterosexual, unemployed, Caucasian, elder, and single-race students exhibited a greater degree of personal stigma compared to other students. These findings were not surprising for males, as the association between males and higher personal stigma ($p<0.001$) has been well-established in the literature [21-26]. Moreover, because self-stigma has been observed as a mediator of treatment-seeking behavior in men, interventions such as male-sensitive brochures that describe counseling services are more likely to have the desired effect [27-28].

However, the relationship between age and race, respectively, to personal stigma contrasted with previous studies. For example, although identifying as Caucasian was associated with a greater degree of personal stigma ($p<0.001$) in our study, Conner et al. [29] found higher levels of personal stigma in African Americans compared to Caucasians, though admittedly in the geriatric population. In addition, Lally et al. [30] reported no difference in personal stigma between heterosexual and homosexual respondents or between older and younger students, although this study was conducted in Ireland and was not specific for depression-related stigma. The precise reasons for the observed personal stigma differences relating to race and age when compared to preceding studies are speculative. These differing results may be specific to the campuses and populations studied, underscoring the need for similar study in a larger cohort of undergraduate students.

Most importantly, our study revealed a significant association between depression level and degree of personal and perceived stigma. Although students with greater depression severity (PHQ-9 score ≥ 10) were associated with higher average perceived stigma scores ($p<0.002$),

they were surprisingly also associated with lower personal stigma scores ($p<0.023$). Among students with PHQ-9 scores ≥ 10 , lower personal stigma may be explained by several factors. It is possible that personal experience with symptoms of depression may reduce personal stigma. Self-reported history of depression, for example, has been associated with less personal stigma [23]. In addition, knowledge of someone with depression is characteristic of expression of less stigmatized opinions [31]. It has also been documented that in individuals that exhibited high depression severity, less stigmatized personal beliefs have been associated with depression [23]. Also, personal experience or employment-related exposure to individuals with depression have been associated with low personal stigma such as in the case of mental health service providers [23-32].

We found that more severely depressed students were associated with higher perceived stigma scores on average. Because students that scored ≥ 10 on the PHQ-9 scale met the criteria for potential diagnosis of a depressive disorder, interventions to change their perceived beliefs about how the public views depression are critical. This finding has particularly important healthcare utilization implications, as a prior study has revealed that among college students that were positively screened for a mental health issue, those that had higher perceived stigma have been associated with decreased probability of having sought treatment [33].

Given these results, reducing perceived stigma may encourage more severely depressed students to seek help. The optimal way to reduce perceived stigma is to remove the social stigma associated with depression on a societal scale, but this is idealistic and social change of this magnitude rarely proceeds efficiently [34]. Consequently, public service announcements, workshops, and other events may be necessary to discuss both depression stigma openly. Moreover, efforts to combat stigma must be engineered not only for the student, but for the faculty, administration, university employees and others in the community to effectively address stigma on a campus-wide level. For example, making counseling resources not only available but readily visible, instituting bystander training, and promoting wellness may alleviate perceived notions that the public does not accommodate depression. It has also been suggested that stigma reduction campaigns focus on aligning beliefs about public perceptions with personal beliefs because respondents have previously exhibited a much greater degree of depression-related perceived stigma compared to personal stigma, a finding corroborated by this study [35].

It should be noted that efforts to reduce social stigma must still account for the influence of personal stigma, which has been negatively associated with favorable attitudes toward receiving counseling [34]. In fact, online interventions for depression literacy and cognitive-behavioral therapy skills have been reported to be effective in reducing personal stigma [10]. Individuals have exhibited less personal stigma if they screened positive for depression literacy, showed agreement with health professionals about treatment options, and had personal contact with a family member or friend with depression [36].

Although this study reported a statistically significant difference in stigmatized belief between more and less depressed students, the cross-sectional design of this study makes it difficult to draw causal links between depression severity and degree of personal or perceived stigma. Despite a large sample size, this study was limited by responses from a voluntary sample. Accordingly, depression severity may have been influenced by selection bias toward students who are experiencing symptoms of depression. Additionally, results may not be generalizable to the entire student body or to student populations at other institutions. In terms of survey design, there no question(s) inquired about history of depression or previous diagnosis of a depressive disorder, which are conditions that may influence student attitudes. Also, the discrepancy between the number of complete and incomplete responses was likely the result of the sizable questionnaire burden. Accurate item responses from individuals

may also be limited by recall bias or social acceptance. Future studies should incorporate graduate students and international students in order to better generalize results to those communities. In addition, randomized trials are needed to determine the effectiveness of stigma reduction campaigns on reducing the personal and perceived stigma within student groups.

Conclusion

In conclusion, this study found the prevalence of depression in undergraduate students to be 36.3% and that more severely depressed students more stigmatized perceived beliefs but less stigmatized personal beliefs. Female gender, LGBT, upperclassmen, and identifying as non-Christian or non-religious were predictors of higher depression levels, indicating that these may be at-risk student populations that could benefit from more focused attempts to screen for and treat depression. Students that were male, heterosexual, unemployed, Caucasian, older, and single-race were associated with more stigmatized personal beliefs, suggesting that these groups of students should be targeted for stigma reduction campaigns. The percentage of undergraduate students exhibiting greater depression severity has increased, underscoring the necessity for targeted screening, prevention, and treatment efforts. Because stigma limits help-seeking behavior, college campuses must actively seek to reduce depression-associated stigma, particularly perceived stigma, which is greater on average in the more depressed students. Existing stigma reduction programs may need to be tailored to student sub-populations to be effective.

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