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Depression, fitness, and student willingness to pursue university counseling and alternative antidepressant options

Sharon Jalene, Jennifer Pharr¹, Manoj Sharma¹, Brach Poston

Abstract:

BACKGROUND: Depression prevalence in college students is three to six times higher than US adults. Counseling utilization increased by 30%–40% despite reports of student unwillingness to pursue therapy. Pursuance of alternative options, like exercise or meditation, is rarely reported. This study examined students' willingness to seek depression treatment through university mental health services (UMHS) and alternative options (AO).

MATERIALS AND METHODS: This was a cross-sectional study. Students ($n = 780$) completed a survey including validated depression and estimated cardiorespiratory fitness instruments. Yes/Maybe/No responses regarding willingness to seek UMHS and AO were analyzed for associations with demographics, depression status, and fitness level. Descriptive and inferential analyses were employed.

RESULTS: Students were more likely to select "Yes" for AO than UMHS ($\chi^2 = 104.145$, $P < 0.001$). Low-fit students ($\chi^2 = 8.35$, $P = 0.02$) and those in depression treatment ($\chi^2 = 15.182$, $P < 0.001$) selected "Yes" to UMHS more often than expected. Younger ($\chi^2 = 7.893$, $P = 0.02$), nondepressed ($\chi^2 = 7.355$, $P = 0.03$), and fit students ($\chi^2 = 10.617$, $P = 0.005$) chose "Yes" while males selected "No" ($\chi^2 = 8.99$, $P = 0.01$) more often than expected for AO. Approximately 31% of students reported having moderate-to-severe depression, 7.8% were in treatment, and 55% were classified as having low fitness levels.

CONCLUSIONS: The findings of this study should be considered when developing antidepressant programming on university campuses.

Keywords:

Cardiorespiratory fitness, college, meditation, therapy, treatment preference

Department of Kinesiology
and Nutrition Sciences,
University of Nevada,
Las Vegas, Nevada,
USA, ¹Department of
Environmental and
Occupational Health,
University of Nevada, Las
Vegas, Nevada, USA

Address for correspondence:

Dr. Sharon Jalene,
4505 S. Maryland
Parkway, Box 453034, Las
Vegas, NV, 89154-3034,
USA.

E-mail: sharonjalene@
unlv.edu

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Introduction

Depression is the leading cause of disability worldwide affecting an estimated 26 million American adults per year.^[1] The WHO World Mental Health (MH) Surveys International College Student Project (2014–2017) that surveyed 14,371 college students from eight high-income countries found the lifetime prevalence of depression was 21.2% (95% confidence interval [CI]: 20.2, 22.3) and

past 12-month prevalence was 18.5% (5% CI: 17.5, 19.5).^[2] Persistent low mood and inability to maintain normal activities characterize this pervasive illness, which is a serious chronic health condition in moderate-to-severe cases.^[1] Depression is also a demonstrable factor in suicide, the second leading cause of death for individuals aged 10 to 34 years.^[3] Of particular concern is young adults in higher education, whose incidence of depression is three^[4] to six times higher than the US adult population.^[5] MH disorders, including depression, can

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negatively impact academic performance^[6] and reduce persistence to graduate.^[7] Therefore, the pursuit of practical and effective antidepressant interventions for university students is a considerable priority.

Psychological counseling is most commonly recommended as a nonpharmaceutical depression intervention.^[4] Accordingly, most universities offer on-campus counseling^[8] which can provide effective relief of depressive symptoms and improve academic performance.^[8,9] The demand for university MH services (UMHS) rose 30%–40% between 2011 and 2015 resulting in significant burdens on university resources, low counselor-to-student ratios, and deficits in timely appointments for those in-crisis.^[8] Despite substantial increases in demand, only 31% of college students with major depression reported seeking clinical care and only half received those services on-campus.^[10] Students' reasons for not seeking counseling included structural barriers (e.g., time, money, and accessibility) and attitudinal barriers (e.g. stigma, distrust, and discomfort).^[10,11] Unsupportive social networks^[10] and the inherent competitiveness of university culture^[12] may contribute to a lack of willingness to seek MH treatment. The propensity of college students to seek clinical treatment differs between sexes, races, and ethnicities, which may compound existing health-care and social disparities.^[10,11] Taken together, these observations indicate the need for expanded inquiry regarding college students' willingness to seek help for depression.

Organized antidepressant programs including exercise or meditation (alternative options [AO]) could be readily implemented on college campuses using existing resources. A substantial body of evidence supports physical exercise^[13-16] and meditation^[17-20] for depression treatment. For instance, physical activity levels were associated with improved MH status in clinically depressed patients^[14] and 1st-year students enrolled in activity-based health education courses.^[15] The risk of reporting depression was 2.39 times higher in low-fit college students.^[16] Similarly, meditation practice reduced stress in medical and psychology students,^[18] undergraduates,^[19] and patients with chronic depression.^[20] Antidepressant physiological adaptations associated with regular exercise participation include neuroimmune modulations^[21] and increased production of β -endorphins.^[22] Furthermore, depressed individuals were shown to have reduced cortical volume in the prefrontal cortex and hippocampus^[23] as well as dysfunctional amygdala activity.^[24] A review of medical imaging studies determined that practiced meditators had increased cortical volume in the prefrontal cortex and hippocampus and decreased activity of the amygdala compared to nonmeditators.^[17]

Despite the evidence supporting the antidepressant implications of AO, counseling remains the primary treatment option offered on college campuses. Reports from the Center for Collegiate MH^[8] and relatively robust body of literature^[9-11] discuss student utilization and efficacy of counseling centers, however, nonpsychological student depression interventions are rarely evaluated in the literature.^[9] This lack of scholarship may represent a deficit of alternative depression treatment options on US campuses, despite abundant evidence regarding relationships with reductions in depression and physical activity^[13-16] as well as meditation.^[17-20] Inclusion of these alternatives with counseling could provide practical and cost-effective approaches for university stakeholders and depressed students. The first step, however, is to examine student willingness to pursue AO to alleviate depression symptoms. An investigation of nonstudent adults with chronic depression found that most participants were willing to engage in an antidepressant exercise program.^[25] However, to the knowledge of the authors, there are no investigations regarding college students' willingness to seek AO for depression relief. Therefore, the primary purpose of this study was to explore college students' willingness to seek treatment for depression through UMHS and AO. The secondary purpose was to identify associations between student characteristics (demographics, depression level and treatment status, and fitness level) and willingness to seek help. This study was novel for several reasons: (a) students were asked if they would be willing to seek help for depression through UMHS and AO; (b) depression estimated cardiorespiratory fitness (eCRF) values were obtained using validated instruments; and (c) participants attended an ethnically diverse campus.^[26]

Materials and Methods

Research method and its type

This descriptive, cross-sectional study occurred at a Southwestern public university during the last 3 weeks of the spring and fall semesters in 2018. The cross-sectional design is an appropriate design when one wants to collect data inexpensively and quickly. It provides a snapshot in time and was suited for the purpose of this study.

Community and sampling

Approximately 10,000 university students at the Southwestern University were informed of the opportunity to complete the survey. A convenience sample was employed in the study and consisted of students who responded to the survey. The spring data collection yielded 520 responses and 427 were added in the fall. Incomplete responses were removed (spring, $n = 84$; fall, $n = 65$). In addition, 18 duplicates were removed. The final number of participants included in analyses was $n = 780$.

Entry and exit criteria

There were no specific entry or exit criteria that were employed. All students were eligible.

Tools

Students completed an online survey that assessed depression and eCRF with validated instruments. Additional survey questions included demographic measures and choices for depression-related topics.

Questionnaire

A self-administered survey included questions regarding age, sex, race, ethnicity, height, weight, sexual orientation, and class standing. Participants were asked to indicate their willingness to seek depression treatment through UMHS (Yes/Maybe/No). The next question inquired about willingness to “seek alternative antidepressant treatments to therapy or medication, like exercise or meditation” (Yes/Maybe/No). Participants were asked if they were currently taking antidepressant medication or participating in counseling/psychotherapy for the treatment of depression (In-treatment, Yes/No). To determine depression, students were asked to complete the Patient Health Questionnaire (PHQ-9), a validated depression survey.^[27] To evaluate cardiorespiratory fitness level according to procedures outlined in a previous publication,^[28] participants reported resting heart rate after five minutes of quiet sitting and exercise habits related to frequency, intensity, and duration.

Patient health questionnaire

The PHQ-9 is a self-administered, validated, nine-question instrument to measure the presence and severity of depressive symptoms.^[27] Internal reliability (Cronbach’s α 0.89) and test-retest reliability (kappa of 0.84) of the PHQ-9 were assessed as excellent.^[27] Participants are asked to report a 2-week incidence of none depression symptoms. Responses are scored as: (a) 0= “Not at all;” (b) 1= “Several days;” (c) 2= “More than half the days;” and (d) 3= “Nearly every day” for each of the questions. The sum of answers is categorized as: (a) 0–4 = minimal symptoms; (b) 5–9 = mild depression; (c) 10–14 = moderate depression; (d) 15–19 = moderately severe depression; and (e) 20–27 = severe depression.^[27] Scores 10 have a sensitivity of 88% for major depression and an 88% specificity for accurate diagnosis.^[27] For this investigation, responses to the PHQ-9 were tallied accordingly and depression status was assigned as no or mild depression (NO_DEP; scores 0–9) or moderate-to-severe depression (MS_DEP; scores 10–27).

Fitness levels

Fitness levels were assessed using a validated nonexercise eCRF algorithm.^[28] A scientific statement from the American Heart Association^[29] included support for the

clinical use of the Nes *et al.* eCRF algorithm (2011) for an initial assessment of CRF as an indicator of overall physical health. The algorithm is comprised of variables that are known or easily measured for self-report and includes age, weight, and height (body mass index [BMI] = weight (kg)/[height (m)]²), resting heart rate, and a physical activity index (PA-I).^[28] To obtain the PA-I, answers regarding exercise frequency, duration, and intensity were scored and weighted according to previous publications.^[28] The original eCRF algorithm was cross-validated with laboratory measures of peak oxygen uptake levels from 2,067 healthy adult males ($R^2 = 0.59$, SEE = 5.8) and 2193 females ($R^2 = 0.57$, SEE = 5.1).^[28] For this study, individual BMI, the PA-I, and eCRF were calculated according to these procedures. For each participant, an age-predicted normative CRF value for healthy adults was subtracted from the eCRF value. The difference (FIT_DIFF) was divided into two categories: (a) Fit (FIT_DIFF at or above age-predicted CRF value); and (b) Low-Fit (FIT_DIFF below age-predicted CRF value).

Data analyses methods

Descriptive and inferential statistics were analyzed using IBM SPSS Statistics for Windows, Version 24.0, Armonk, NY: IBM Corp. Because the survey was anonymous, students could have submitted two entries. Therefore, statistical comparisons were performed for similar entries by sex, race, sexual orientation, and height. Suspected duplicates ($n = 22$) were verified on a case-by-case basis, and 18 submissions were removed from the secondary data collection. The final number of participants included in analyses was $n = 780$. Descriptive statistics of student characteristics and willingness to seek UMHS and AO were performed. Student characteristics included age group, sex, race, ethnicity, sexual orientation, and class standing, as well as depression, in-treatment, and fitness status. Chi-square analyses with Bonferroni corrected P values determined statistically significant differences in student characteristics and willingness to seek assistance from UMHS and AO. Significance was set at an alpha of 0.05.

Ethical considerations

Protocols for the web-based survey were in accordance with the (omitted for blind review) Office of Research Integrity – Human Subjects, Biomedical Institutional Review Board (IRB), and the Helsinki Declaration of 1975, as revised in 2000. Due to the low risk for participants, the IRB granted exempt status for this study. By selecting “I Agree” in the online survey, participants gave informed consent.

Results

Approximately 31% of students reported having moderate-to-severe depression, 7.8% were in treatment,

and 55% were classified as having low fitness levels. Chi-square analysis indicated significant associations between answers for the treatment options ($X^2 = 104.145$, $P < 0.001$). Overall, 2.5 times more students answered “Yes” for AO than UMHS. Descriptive characteristics of the sample and distributions of answers to both treatment options are presented in Table 1.

Chi-square analyses determined no significant differences in Yes/Maybe/No answers for UMHS and sex, age group, race, ethnicity, sexual and gender minority, class standing, or depression level. However, there was a significant difference between UMHS responses and fitness level ($X^2 = 8.35$, $P = 0.02$). *Post hoc* analyses indicated that Low-Fit students were more likely to answer “Yes” and less likely to answer “Maybe” to UMHS than those who were Fit. Furthermore, students’ in-treatment for depression was more likely to answer “Yes” and less likely to say “Maybe” to UMHS ($X^2 = 15.182$, $P < 0.001$).

There were no significant differences in race, ethnicity, sexual orientation, or in-treatment status and willingness to seek AO. However, males answered “No” to AO significantly more often than females ($X^2 = 8.99$,

$P = 0.01$). Students aged 23 years and younger were less likely to say “Yes” to AO ($X^2 = 7.893$, $P = 0.02$), and 1st-year students were less likely to answer “Yes” to AO ($X^2 = 21.16$, $P < 0.001$). Due to a significant association between the younger age group and being a 1st-year student ($X^2 = 39.69$, $P < 0.001$), class standing was excluded from further analyses to prevent multicollinearity. Those who reported MS_DEP were less likely to answer “Yes” to alternative depression treatment than individuals classified with NO_DEP depression ($X^2 = 7.355$, $P = 0.03$). Finally, Fit students were more likely to answer “Yes” and less likely to answer “Maybe” to AO than Low-Fit students ($X^2 = 10.617$, $P = 0.005$) [Table 2].

Discussion

Nearly one-third of students in this study reported moderate-to-severe depression and stated that they would be more than twice as likely to pursue AO than UMHS for relief of symptoms. The findings are higher than those at a large-scale global level study where lifetime prevalence of depression was 21.2% (95% CI: 20.2, 22.3) and past 12-month prevalence was 18.5% (5% CI: 17.5, 19.5).^[3] This may be indicative that US college

Table 1: Descriptive characteristics of the sample and willingness to seek depression treatments

Variable	University mental health services				Alternative options		
	Total, n (%)	Yes, n (%)	Maybe, n (%)	No, n (%)	Yes, n (%)	Maybe, n (%)	No, n (%)
	780 (100)	236 (30.3)	388 (49.7)	156 (20)	604 (77.4)	132 (16.9)	44 (5.6)
Sex							
Male	183 (23.5)	48 (26.2)	91 (49.7)	44 (24)	140 (76.5)	25 (13.7)	18 (9.8)
Female	597 (76.5)	188 (31.5)	297 (49.7)	112 (18.8)	464 (77.7)	107 (17.9)	26 (4.4)
Age group (years)							
≤23	577 (74)	163 (28.2)	296 (51.3)	118 (20.5)	433 (75)	106 (18.4)	38 (6.6)
≥24	203 (26)	73 (36)	92 (45.3)	38 (18.7)	171 (84.2)	26 (12.8)	6 (3)
Race							
White	276 (35)	74 (26.8)	153 (55.4)	49 (17.8)	211 (76.4)	54 (19.6)	11 (4)
Hispanic	163 (21)	54 (33.1)	77 (47.2)	32 (19.6)	123 (75.5)	27 (16.6)	13 (8)
Black	115 (14.7)	37 (32.2)	57 (49.6)	21 (18.3)	93 (80.9)	15 (13)	7 (6.1)
Asian/PI	110 (14.1)	34 (30.9)	53 (48.2)	23 (20.9)	82 (74.5)	18 (16.4)	10 (0.1)
Other	116 (14.9)	37 (31.9)	48 (41.4)	31 (26.7)	95 (81.9)	18 (15.5)	3 (2.6)
Ethnicity							
Hispanic	228 (29)	73 (32)	104 (45.6)	51 (22.4)	173 (75.9)	40 (17.5)	15 (6.6)
Not Hispanic	552 (71)	163 (29.5)	284 (51.4)	105 (19)	431 (78.1)	92 (16.7)	29 (5.3)
Sexual orientation							
Straight	666 (85)	193 (29)	338 (50.8)	135 (20.3)	521 (78.2)	107 (16.1)	38 (5.7)
SGM	114 (15)	43 (47.7)	50 (43.9)	21 (18.4)	83 (82.8)	25 (21.9)	6 (5.3)
In-treatment							
Yes	61 (7.8)	32 (52.5)	19 (31.1)	10 (16.4)	51 (83.6)	9 (14.8)	1 (1.6)
No	719 (92.2)	204 (28.4)	369 (51.3)	146 (20.3)	533 (76.9)	123 (17.1)	43 (6)
Moderate-to-severe depression							
Yes	241 (31)	71 (29.5)	114 (47.3)	56 (23.2)	172 (71.4)	52 (21.6)	17 (7.1)
No	539 (69)	165 (30.6)	274 (50.8)	100 (18.6)	432 (80.1)	80 (14.8)	27 (5)
Fitness							
Fit	354 (45)	90 (25.4)	194 (54.8)	70 (19.8)	293 (82.8)	45 (12.7)	16 (4.5)
Low fit	426 (55)	146 (34.4)	194 (45.5)	86 (20.2)	311 (73.0)	87 (20.4)	28 (6.6)

Asian/PI=Asian and Pacific Islander, Other=Two or more races and Native American, SGM=Sexual gender minority

Table 2: Results of post hoc analyses for willingness for depression treatment options.

Variables	Yes			Maybe			No		
	AR	χ^2	P	AR	χ^2	P	AR	χ^2	P
University mental health services									
Fitness status									
Fit	-2.7	7.29	0.03*	2.6	6.76	0.03*	-0.1	0	1
Low fit	2.7	7.29	0.03*	-2.6	6.76	0.03*	0.1	0	1
In-treatment									
Not in-treatment	-3.9	15.21	<0.001*	3.0	9	0.01*	0.7	0	1
In-treatment	3.9	15.21	<0.001*	-3.0	9	0.01*	-0.7	0	1
Alternative options									
Sex									
Male	-0.3	0	1	-1.3	1.69	0.43	2.8	7.84	0.02*
Female	0.3	0	1	1.3	1.69	0.43	-2.8	7.84	0.02*
Age group (years)									
23 or younger	-2.7	7.29	0.03*	1.8	3.24	0.2	1.9	3.61	0.16
24 or older	2.7	7.29	0.03*	-1.8	3.24	0.2	-1.9	3.61	0.16
Fitness status									
Fit	3.2	10.24	0.01*	-2.9	8.41	0.01*	-1.2	1.44	0.49
Low-fit	-3.2	10.24	0.01*	2.9	8.41	0.01*	1.2	1.44	0.49
Depression									
NO_DEP	2.7	7.29	0.03*	-2.3	5.29	0.07	-1.1	1.21	0.55
MS_DEP	-2.7	7.29	0.03*	2.3	5.29	0.07	1.1	1.21	0.55

*Indicates statistical significance. Survey questions for willingness: If you felt depressed, would you seek help through university mental health services (yes/maybe/no)? Alternatives=If you felt depressed, would you seek alternative treatments to therapy or medication (like exercise or meditation) (yes/maybe/no)? Abbreviations. Fit=At or above age-predicted cardiorespiratory fitness level. Low-fit=Below age-predicted cardiorespiratory fitness. NO_DEP=PHQ-9 score 0-9. MS_DEP=PHQ-9 score 10-27. In-treatment=Currently in depression treatment (counseling or medication). AR=Adjusted standardized residual, P=Statistical significance, NO_DEP=No or mild depression, MS_DEP: Moderate-to-severe depression, PHQ-9=Patient Health Questionnaire-9

students, especially in this sample, are experiencing higher depression when compared to other countries. The finding that the students indicated that they would be pursuing AO instead of UMHS is also concerning as a recent review reported a lack of evidence regarding AO as a primary depression intervention.^[13] There are numerous studies that support physical exercise^[13-16] and meditation^[17-20] for dealing with depression among college students. Hence, these modalities need to be supported. This concept has been supported in principle by health-promoting universities movement.^[30] Results from this survey indicate a strong preference for exercise or meditation to reduce symptoms of depression yet universities continue to focus primarily on therapy-based support systems. Although there is a lack of evidence regarding preferences for AO in college students, one study reported 61.8% of chronically depressed nonstudent adults (*n* = 102) expressed willingness to participate in an antidepressant exercise program.^[25] Conversely, more than three times as many students in this study said “No” to UMHS than to AO. Although UMHS has experienced 30%–40% increase in usage,^[8] resistance to seek therapy is not uncommon among college students, even for those who are suffering.^[9-11] Indeed, less than one-third of clinically depressed students sought treatment and only half of those through campus counseling.^[10] Previous investigations on preferences for counseling also described categories

of barriers to clinical treatment.^[10,11] Findings from Eisenberg *et al.*^[10] regarding barriers to seek counseling reported: (a) 54.9% of students preferred to deal with MH issues privately; (b) 47.3% believed high-stress was normal in college; and (c) 21.4% of respondents were concerned about the stigma associated with poor MH. Another investigation of barriers to MH treatment among social work students reported: (a) structural issues (time (22%), resources (17%), or knowledge of access (15.2%)); (b) distrust and fear (22.8%); and (c) and stigma or embarrassment (22.8%) as explanations for resistance to seek help through UMHS.^[11]

Only one-third of US adults with severe depression reported seeing a MH professional in the past year, and help-seeking behaviors also differed between sex and race in the population^[2] and college students.^[10,11] In the current study, a greater proportion of males (9.8%) than females (4.4%) said “No” to AO, but overall willingness remained consistent regardless of sex, race, or ethnicity. This was somewhat surprising due to previous findings that Caucasian and multiracial students utilize psychotherapy more frequently than others.^[10] Nonequivalent racial distributions between studies may explain the discrepancy. This research was conducted at a highly diverse university^[26] and the sample contained 35% white, and 14.9% multiracial individuals, while the Eisenberg *et al.* (2011) sample was comprised of 65.7%, and 4.7%, respectively.

Participants who were in treatment for depression said “Yes” more often to counseling on campus, however, no relation was found between MS_DEP and “Yes” answers to UMHS. Although these findings may seem contradictory, it is not unusual for depressed students to avoid clinical treatment.^[10] Indeed, nearly one-third of students in this study reported depression, but very few (7.8%) were currently in treatment. Unfortunately, those who might benefit the most, students with moderate-to-severe symptoms, were also less willing to pursue exercise or meditation for relief. Indeed, those with low-fitness were more likely than fit students to answer “Yes” to seeking help through UMHS. Evidence indicates that depression can result in low physical functioning and a lack of interest in physical activity.^[13] Conversely, fit students were more likely to answer “Yes” to AO. This evidence presents an opportunity for universities to further assist depressed students through educational campaigns on the antidepressant benefits of a physically active lifestyle.

Exercise and meditation may also help with test anxiety that may be associated with depression. A study by Bolbolian *et al.* among college students explored its relationship with academic procrastination.^[31] Physical activity and meditation programs may improve the concentration among students and help them overcome such test anxiety also.

Limitations

The current study had several possible limitations. Multiple alternative antidepressant modalities beyond exercise and meditation exist; however, suggestions were limited to only accessible, on-campus options. Investigators could consider including questions regarding socioeconomic status and other factors that may impact the willingness to seek depression treatment. Finally, this was a cross-sectional study design so temporal associations cannot be ascertained.

Implications for practice

The findings of this study are quite important for practitioners working in the area of college health. There is a definitive need to systematically build, consolidate, and expand AO programs such as regular exercise and meditation classes on campus. Almost every college campus has a student recreational center which should be leveraged to offer quality programming in these areas. So that students are motivated to take these classes and proactively participate in such efforts, these programs should be evidence-based or based on robust behavioral theories.^[32] The use of behavioral theories helps in identifying modifiable constructs and easy replicability, enhances chances of behavioral change success, and improves programmatic efficiency and efficacy. College faculty can also play an important role

in emphasizing the role of AO to their students. It is imperative that the faculty should be actively invited to play such a role. College leadership must also play a significant role in sending this message and developing policies in this regard on campuses. Both educational and organizational policy efforts will go a long way in actively addressing the problem of depression on campuses.

Conclusions

College students expressed substantially more willingness to seek AO than counseling. Unfortunately, little is known to substantiate these findings. Authors of a recent systematic review regarding the efficacy of university MH programs stated their exhaustive search for literature, unfortunately, yielded no evidence regarding nonpsychological MH interventions.^[13] The lack of original research may represent a deficit of noncounseling depression interventions on college campuses. Based on the rising prevalence of MH complaints, practical limitations of university offerings, and pervasive lack of student willingness to seek counseling, it is reasonable to argue that AO should be included in depression interventions. In addition to reducing symptoms, both AO may act to prevent depression onset. So that future antidepressant programming aligns with student needs, student willingness to pursue treatment options should be thoroughly explored. This undertaking would require an interdisciplinary effort including administration, UMHS, and experts in Psychology, Kinesiology, Education, and Public Health. To conclude, the crisis of college student depression requires a broadened evidence-based approach informed by the preferences of those who are suffering.

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Conflicts of interest

There are no conflicts of interest.

References

1. WHO.Int. International: World Health Organization. “Depression: Let’s Talk” Says WHO, as Depression Tops List of Causes of Ill Health; c2017. Available from: <https://www.who.int/news/item/30-03-2017--depression-let-s-talk-says-who-as-depression-tops-list-of-causes-of-ill-health>. [Last accessed on 2020 Oct 18; Last updated on 2017 Mar 30].

2. Auerbach RP, Mortier P, Bruffaerts R, Alonso J, Benjet C, Cuijpers P, *et al.* WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *J Abnorm Psychol* 2018;127:623-38.
3. Brody DJ, Pratt LA, Hughes JP. Prevalence of depression among adults aged 20 and over: United States, 2013-2016. *NCHS Data Brief* 2018;303:1-8.
4. Ibrahim AK, Kelly SJ, Adams CE, Glazebrook C. A systematic review of studies of depression prevalence in university students. *J Psychiatr Res* 2013;47:391-400.
5. Evans TM, Bira L, Gastelum JB, Weiss LT, Vanderford NL. Evidence for a mental health crisis in graduate education. *Nat Biotechnol* 2018;36:282-4.
6. Hysenbegasi A, Hass SL, Rowland CR. The impact of depression on the academic productivity of university students. *J Ment Health Policy Econ* 2005;8:145-51.
7. Thompson-Ebanks V. Leaving college prematurely. *J Coll Stud Ret* 2016;18:474-95.
8. Center for Collegiate Mental Health: 2019 Annual Report. University Park, PA: Penn State University; c2019-20. Available from: https://cmh.psu.edu/assets/docs/2019-CCMH-Annual-Report_3.17.20.pdf. [Last accessed on 2020 Oct 18].
9. Winzer R, Lindberg L, Guldbrandsson K, Sidorchuk A. Effects of mental health interventions for students in higher education are sustainable over time: A systematic review and meta-analysis of randomized controlled trials. *PeerJ* 2018;6:e4598.
10. Eisenberg D, Hunt J, Speer N, Zivin K. Mental health service utilization among college students in the United States. *J Nerv Ment* 2011;199:301-8.
11. Ting L. Depressive symptoms in a sample of Social Work students and reasons preventing students from using mental health services: An exploratory study. *J Soc Work Educ* 2011;47:253-68.
12. Wynaden D, McAllister M, Tohotoa J, Al Omari O, Heslop K, Duggan R, *et al.* The silence of mental health issues within university environments: A quantitative study. *Arch Psychiatr Nurs* 2014;28:339-44.
13. Schuch FB, Vancampfort D, Richards J, Rosenbaum S, Ward PB, Stubbs B. Exercise as a treatment for depression: A meta-analysis adjusting for publication bias. *J Psychiatr Res* 2016;77:42-51.
14. White K, Kendrick T, Yardley L. Change in self-esteem, self-efficacy and the mood dimensions of depression as potential mediators of the physical activity and depression relationship: Exploring the temporal relation of change. *Ment Health Phys Act* 2009;2:44-52.
15. Melnyk B, Kelly S, Jacobson D, Arcoletto K, Shaibi G. Improving physical activity, mental health outcomes, and academic retention in college students with Freshman 5 to Thrive: COPE/healthy lifestyles. *J Am Assoc Nurse Pract* 2014;26:314-22.
16. Jalene S, Pharr J, Shan G, Poston B. Estimated cardiorespiratory fitness is associated with reported depression in college students. *Front Physiol* 2019;10:1191.
17. Annells S, Kho K, Bridge P. Meditate don't medicate: How medical imaging evidence supports the role of meditation in the treatment of depression. *Radiography* 2016;22:e54-8.
18. de Vibe M, Solhaug I, Tyssen R, Friberg O, Rosenvinge JH, Sørli T, *et al.* Mindfulness training for stress management: A randomised controlled study of medical and psychology students. *BMC Med Educ* 2013;13:107.
19. Galante J, Dufour G, Vainre M, Wagner AP, Stochl J, Benton A, *et al.* A mindfulness-based intervention to increase resilience to stress in university students (the mindful student study): A pragmatic randomised controlled trial. *Lancet Public Health* 2018;3:e72-81.
20. Winnebeck E, Fissler M, Gärtner M, Chadwick P, Barnhofer T. Brief training in mindfulness meditation reduces symptoms in patients with a chronic or recurrent lifetime history of depression: A randomized controlled study. *Behav Res Ther* 2017;99:124-30.
21. Eyre H, Baune BT. Neuroimmunological effects of physical exercise in depression. *Brain Behav Immun* 2012;26:251-66.
22. Dinas PC, Koutedakis Y, Flouris AD. Effects of exercise and physical activity on depression. *Ir J Med Sci* 2011;180:319-25.
23. Lener MS, Kundu P, Wong E, Dewilde KE, Tang CY, Balchandani P, *et al.* Cortical abnormalities and association with symptom dimensions across the depressive spectrum. *J Affect Disord* 2016;190:529-36.
24. Connolly CG, Ho TC, Blom EH, LeWinn KZ, Sacchet MD, Tymofiyeva O, *et al.* Resting-state functional connectivity of the amygdala and longitudinal changes in depression severity in adolescent depression. *J Affect Disord* 2017;207:86-94.
25. Busch AM, Ciccolo JT, Puspitasari AJ, Nosrat S, Whitworth JW, Stults-Kolehmainen M. Preferences for exercise as a treatment for depression. *Ment Health Phys Act* 2016;10:68-72.
26. U.S. News. Campus Ethnic Diversity National Universities. Higher Education/Colleges; c2017-2020. Available from: <https://www.usnews.com/best-colleges/rankings/national-universities/campus-ethnic-diversity>. [Last accessed on 2020 Oct 18].
27. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med* 2001;16:606-13.
28. Nes BM, Janszky I, Vatten LJ, Nilsen TI, Aspenes ST, Wisløff U. Estimating V·O₂ peak from a nonexercise prediction model: The HUNT study, Norway. *Med Sci Sports Exerc* 2011;43:2024-30.
29. Ross R, Blair SN, Arena R, Church TS, Després JP, Franklin BA, *et al.* Importance of assessing cardiorespiratory fitness in clinical practice: A case for fitness as a clinical vital sign: A scientific statement from the American Heart Association. *Circulation* 2016;134:e653-99.
30. de Araujo Faria MG, Fernandes RC, Gallasch CH, Alves LV. Contributions of the health-promoting universities' movement: An integrative literature review. *J Educ Health Promot* 2021;10:114.
31. Bolbolian M, Asgari S, Sefidi F, Zadeh AS. The relationship between test anxiety and academic procrastination among the dental students. *J Educ Health Promot* 2021;10:67.
32. Sharma M. Theoretical Foundations of Health Education and Health Promotion. 3rd ed. Burlington, MA: Jones and Bartlett Learning; 2017.