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# Depression and Awareness of Mental Health Resources Among Minority and Non-Minority College Students

Henry David Browne
*Walden University*

# Walden University

College of Health Sciences

This is to certify that the doctoral study by

Henry Browne

has been found to be complete and satisfactory in all respects,
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the review committee have been made.

Review Committee
Dr. Mary Lou Gutierrez, Committee Chairperson, Public Health Faculty
Dr. Patrick Dunn, Committee Member, Public Health Faculty
Dr. Hebatullah Tawfik, University Reviewer, Public Health Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
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Abstract

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Henry D. Browne

MA, San Diego State University, 1990

BS, University of California, Los Angeles, 1987

Doctoral Study Submitted in Partial Fulfillment

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Doctor of Public Health

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May 2020

## Abstract

Minority college students experience higher levels of psychological stress and depression, and lower utilization of mental health resources (MHR) compared to the general student population. The purpose of this quantitative study was to examine the association between self-reported depressive symptoms and awareness of mental health services among college undergraduate minority and non-minority students, controlling for sex, interest in MHR information, and history of mental illness. The self-determination theory guided the study. The study utilized a cross-sectional research design using secondary survey data from the National College Health Assessment (NCHA). The NCHA dataset included 354,262 respondents from 52 self-selected U.S. colleges and universities. Descriptive statistics indicated that 58.5% of students reported symptoms for depression and 20.6% reported receiving no information on MHR from their institution. A multivariate logistic regression analysis was performed to examine minority status and presence of depressive symptoms as predictors of awareness of MHR, controlling for the covariates. The association between presence of depressive symptoms and awareness of MHR was statistically significant ($p$>.01), with respondents reporting depressive symptoms more likely to report a lower level of awareness (β=.847, .796, .882). The association between minority status and awareness of MHR was significant, but not consistently higher or lower than the referent level. The social change implications from this study may include benefits to both minority and non-minority college students, parents, administrators, and mental health professionals interested in increasing awareness of MHR.

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# Dedication

I would like to dedicate this research to my mother. She has provided me with inspiration and support throughout this process. My mother has been a role model in public health service through her many years in the California State Department of Health. I would also like to acknowledge my departed father for his many years of support and guidance. The support of my children and wife has helped to sustain me though this program, as well as my co-workers and Dean Shumaker at San Diego Mesa College.

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Section 1: Foundation of the Study and Literature Review

## Introduction

A wide range of factors influence the risk for depression, and depression contributes to serious negative health outcomes (Beiter et al., 2015; Ibrahim, Kelly, Adams, & Glazebrook, 2013; Sawatzky et al., 2012). The risk factors for depression include personal or family history of depression, major life changes, sexual orientation, gender, and certain physical illnesses and medications (Villatte, Marcotte, & Potvin, 2017). Depression is more common among the college student population than the general population (Beiter et al., 2015; Eisenberg, Hunt, & Speer, 2013; Ibrahim et al., 2013). Self-reported prevalence of depression from survey studies range from 11 to 15.5% across different methodologies (Beiter et al., 2015; Eisenberg et al., 2013; Ibrahim et al., 2013) as compared to 8.1% of U.S. adults aged 20 and over (Brody, Pratt, & Hughes, 2018). Among the risk factors for depression, college students are likely to be experiencing a major life change, as well as elevated levels of psychosocial stress.

College is potentially a high stress environment, and stress load is associated with an increased prevalence of depression and other mental illnesses (Day, McGrath, & Wojtowicz, 2013). Individuals reporting higher levels of psychological stress are at increased risk for depression (Beiter et al., 2015; Coiro, Bettis, & Compas, 2017; Ibrahim et al., 2013; Sawatzky et al., 2012). Interpersonal stress and coping strategies are likely contributing factors to the increase in depression and anxiety, among college students. Stress load is related to stress coping strategies utilized by students, with students experiencing higher stress load more likely to utilize disengagement from social and

academics as a coping strategy (Coiro et al., 2017). High levels of psychosocial stress and depressive symptoms are each correlated with higher student attrition (Charlton, Barrow, & Hornby-Atkinson, 2006; Shapiro et al., 2017; Thompson-Ebanks, 2017). Student attrition is a major concern among colleges and universities, many of which have attrition rates in excess of 50% admitted students (Shapiro et al., 2017). Improvements in interest and awareness of mental health services among all students, including minority students, may improve student retention.

## Problem Statement

Minority college students experience higher levels of psychological stress, depression, and lower utilization rate for mental health services than the general student population, which may contribute negatively to a disparity in mental health status for minority students (Barry, Jackson, Watkins, Goodwill, & Hunte, 2016; Cokley, Smith, Bernard, Hurst, & Jackson, 2017; Eisenberg et al., 2013). Barry et al. (2016) reported that African American students experienced significantly more depression and alcohol issues than non-African American peers. Cokley et al. (2017) reported African American and Asian American students having higher depressive symptoms and psychological stress compared to Caucasian students, the difference being correlated to perceived discrimination. However, Eisenberg, Golberstein, and Gollust (2007) found that African American and Asian American college students were more likely to experience depression than Caucasian students, however Latino/a students were less likely to experience depression than Caucasian students. Undergraduate students from under-represented ethnic groups report higher prevalence of depression when minority students

are aggregated as a single group (Arbona & Jimenez, 2014; Cokley et al., 2017) and higher psychological stress (Arbona & Jiminez, 2014; Ault-Brutus & Alegria, 2018) compared to the overall student population. Psychological stress and prevalence of depression have been extensively studied among university student populations. However, U.S. university populations are skewed to include disproportionately more European American students and more students from moderate to high socioeconomic status backgrounds (Barr, 2014; Beiter et al., 2015; Eagan et al., 2014; Ibrahim et al., 2013; Sawatzky et al., 2012). High stress load and depression are more prevalent among minority students, including African American and Latino students, although there is less research examining depression and stress in minority students (Ault-Brutus & Alegria, 2018; Conley, Shapiro, Kirsch, & Durlak, 2017).

## Purpose of the Study

The purpose of this study was to examine the association between self-reported depressive symptoms and awareness of mental health resources, among college undergraduate minority and non-minority students, controlling for sex, interest in mental health resource information, and history of mental illness. Higher education provides an important pathway for low socioeconomic and minority students to improve their economic and social circumstances and decreasing attrition overall and among vulnerable student populations furthers the mission of higher education (Noden, Shiner, & Madood, 2014).

## Research Questions and Hypotheses

Research Question 1: Is there an association between awareness of mental health resources and minority status among U.S. college students, controlling for sex, interest in mental health resource information, and history of mental illness?

$H_0$1: There is no association between awareness of mental health resources and minority status among U.S. college students, controlling for confounding variables.

$H_a$1: There is an association between awareness of mental health resources and minority status among U.S. college students, controlling for confounding variables.

Research Question 2: Is there an association between awareness of mental health resources and self-reported depressive symptoms among U.S. minority and non-minority student groups, controlling for sex, and interest in mental health resource information, and history of mental illness?

$H_0$2: There is no association between awareness of mental health resources and self-reported depressive symptoms among minority and non-minority student groups, controlling for confounding variables.

$H_a$2: There is an association between awareness of mental health resources and self-reported depressive symptoms among minority and non-minority student groups, controlling for confounding variables.

## Theoretical Foundation for the Study

The theoretical framework in this study was self-determination theory. Edward L. Deci and Richard M. Ryan developed the self-determination theory to describe the intrinsic nature of motivation and behavior (Deci & Ryan, 2008; Sommet & Elliot, 2017).

Social determination theory describes the social conditions that influence behavior motivation as a function of an individual's feelings of competence to execute a target behavior, feelings of autonomy in behavioral determination, and psychologically relatedness of the target behavior (Sommet & Elliot, 2017). According to Ault-Brutus and Alegria (2018), minority students do not experience the same social environment as the general, predominantly European American, college student population. If the target behavior is utilization of mental health resources, self-determination theory can be used to describe motivation to use services as a factor of having the feelings about the capability of seeking mental healthcare, feelings of control over using the services, and feelings that the services relate to their needs (Sommet & Elliot, 2017). To feel intrinsically motivated to utilize services, students must be aware that the services are available, aware that the services are affordable and accessible, and are cultural relevant to their psychological needs.

## Nature of the Study

The nature of the study was a quantitative cross-sectional research design with secondary data analyses as the approach. Large surveys are available for secondary analyses including the National College Health Assessment (NCHA). Minority college students were classified by ethnic origin with African American and Latino students designated as minority students and compared to the general, non-minority student population. The variables from the NCHA included questions that assessed awareness of mental health resources available to students, interest in information about available mental health resources, and questions that assess depressive symptoms. Descriptive and

inferential analyses were conducted to compare the distribution between independent variables (minority status and presence of depressive symptoms) and the dependent variable (awareness of mental health resources), while controlling for sex, interest in mental health resource information, and history of mental illness. A multivariate regression analysis was performed to analyze the relationship between self-reported depressive symptoms and awareness of mental health resources, and between minority status and awareness of mental health resources.

## Literature Search Strategy

The literature search was conducted using databases *Academic Search Complete, Eric and Education Source Combined Search, MEDLINE with full text, ProQuest Central, PubMed, SAGE Journals,* and *Science Direct.* Peer-reviewed journal articles, books, and government-generated websites were included in the literature review. The time parameter used for the searches was 2013 and newer. The databases were searched using the key words and phrases, *mental depression, mental depression risk factors, universities and colleges, mental health services, student attitudes, access to mental health care, perceived need for mental health care, counseling in higher education, awareness mental healthcare, racial disparities, minorities, African American Black college students, Hispanic Latino Laninx college students, Asian American college students, Native American Alaska Native, Pacific Islander,* and *self-determination theory.*

The search engine Google Scholar was also searched to identify peer-reviewed articles from 2015 to present that did not appear in any of the databases searched. In addition, the seminal articles, “A Systematic Review of Studies of Depression Prevalence

in University Students" (Ibrahim et al., 2013), "Correlates and Predictors of Depression in College Students: Results from the Spring 2000 National College Health Assessment" (2005), and "Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being" (Ryan & Deci, 2000) were utilized to search for articles that referenced these studies. The literature management software program Zotero was used to organize and review the literature.

## Literature Review Related to Key Variables/Concepts

An increase in the prevalence of depression in the general college student population as well as at-risk student populations is a key barrier to student success. Ibrahim et al. (2013) performed a systematic review of the literature and reported that university students experience rates of depression that are substantially higher than those found in the general population. The prevalence of depression ranged across studies from 10% to 85% with a mean of 30.6%, depending on methodology and student demographics. The majority of studies reviewed reported a higher prevalence of depression among female students. There was an inverse relationship between socioeconomic status and depression among college students in seven of the 24 studies. Only four of the studies evaluated by Ibrahim et al. (2013), published between 1990 and 2009, were found to evaluate depression and treatment protocols on U.S. college campuses, with those studies being inconclusive regarding the efficacy of on-campus treatment.

The prevalence of depression in college student populations varies by ethnicity. Barry et al. (2016) reported that African American students attending predominantly

Caucasian universities experienced significantly more mental health and alcohol issues than non-African American peers. Additionally, depression was the most commonly reported mental health issue among both African American and non-African American students (Barry et al., 2016). Minority students and students with financial stressors have been reported to have higher risks for symptoms of anxiety and depression (Eisenberg et al., 2013; Said, Kypri, & Bowman, 2013; Winzer, Lindberg, Gulbrandsson, & Sidorchuk, 2018). The disproportionate representation of minority groups among low socioeconomic status populations may contribute to minority status as a factor in the prevalence of depression.

Perceived discrimination has been suggested as a contributing factor to the increase in the prevalence of depression among minority students. Cokley et al. (2017) examined the associations between perceived discrimination and impostor feelings on mental health status among minority college students. African American and Asian American students with higher perceived discrimination reported higher depressive symptoms, but that relationship was moderated by increased imposter feelings. Latino students with lower levels of imposter feelings moderated the relationship between perceived discrimination and depression. Social support has been indicated as a mediating factor between depressive symptoms and suicidal ideation (Lamis, Ballard, & Dvorak, 2016). The absence of social support in college environments that foment feelings of perceived discriminations may contribute to depressive symptoms and increase the severity of depressive symptoms.

The costs of depression in the college student population include personal, financial, and academic issues. Thompson-Ebanks (2017) conducted a qualitative interview study to examine the experiences of nontraditional-age college students with depression that have left college prematurely. The interviews indicated eight factors common across experiences; recurring thoughts of failure, disability stigma, personalized stigma, faculty willingness to help and lack of disability knowledge, difficulty identifying formal accommodations, nontraditional-age students' needs, feeling alienated like an outsider, rural considerations, and professional programs. All but the age-related factors may also apply to many depressed students of all ages.

Interest in, awareness of, and utilization of student mental health services by college students are also factors in the ability of colleges to identify and treat students with mental health issues. Ault-Brutus and Alegria (2018) reported that among those with a mood or anxiety disorder, African Americans and Latinos differed significantly from Caucasians in terms of use of mental health care but did not differ in perceived need for care. This disparity in the use of care among those with a perceived need for care is suggested to be a function of personal and cultural beliefs about perceived access and efficacy of mental health treatment. Cho, Kim, and Velez-Ortiz (2014) reported a disparity between the prevalence of mental illness and the utilization of mental health services for Latino and Asian Americans. The behavioral model of health was utilized to examine the association of predisposing, enabling, and need factors in mental health service usage. Need factors were significantly associated with increased mental health service usage for both Latino and Asian Americans. The predisposing factors age,

gender, and education predicted mental health service use for Latino, but not Asian American subjects. Bonar, Bohnert, Walters, Ganoczy, and Valenstein (2015) compared the mental health symptoms (depression, anxiety, and post-traumatic stress disorder) and mental health resource utilization of veterans in and out of college and found that student and non-student veterans did not differ in mental health symptoms but did differ in utilization of services. Veteran college students' utilization of the veteran's administration (VA) or civilian mental health care was low, with only 46.9% of veteran students that screened as positive for mental health symptoms receiving any mental health care. The reported barriers to receiving care for the veteran student group were, not wanting treatment to appear on military records, embarrassment, harm to career, concerns about confidentiality, scheduling difficulties, and being seen as weak (Bonar et al., 2015).

Student interest in, and awareness of, mental health resources impacts the ability of college mental health services to provide effective services. Conley et al. (2017) performed a meta-analysis of college mental health prevention programs. The analysis indicated that at-risk students are served by a variety of mental health services for clinical and sub-clinical depression, anxiety, and interpersonal problems. A limitation identified for many on campus mental health centers is the limited utilization of services. Only 35.6% of students reporting perceived need for mental health services sought treatment for clinical or sub-clinical problems.

## Definition of Terms

*Depression:* A clinical diagnosis of depression by a licensed mental health practitioner is indicated when an individual experiences five or more of the following

symptoms for a period of two or more weeks: (a) persistent depressed mood, (b) diminished interest or pleasure in most activities, (c) significant weight loss and/or loss of appetite, (d) slowing of thought process or physical movement, (e) persistent feelings of restlessness, (f) persistent fatigue or loss of energy, (g) feelings of worthlessness and/or inappropriate guilt, (h) diminished ability to think or concentrate, or (i) recurrent thoughts of death or suicidal ideation (American Psychiatric Association, 2013).

*Mental health resources:* Clinical, counseling, disability, and medical mental health student support services provided to students at a permanent, on-campus facility (Goodman, 2017).

*NCHA:* The National College Health Assessment (NCHA) is a large sample instrument measuring health data on U.S. colleges and university students at 52 participating institutions. The survey is administered, and the data managed by the American College Health Association. The NCHA has been administered biannually since 2000, beginning with 26,437 students at 28 colleges and universities 2000, and growing to 94,960 in 2017 (American College Health Association [ACHA], 2018).

## Assumptions

The NCHA data is assumed to be both reliable and valid. The NCHA data sets have been compared to other national collegiate data sets for evaluation of reliability and validity, including the National College Health Risk Behavior Survey, Harvard School of Public Health 1999 College Alcohol Study, and the Harvard School of Public Health 1999 College Alcohol Study. In addition, the NCHA data was evaluated for internal validity in 1998, 1999, and 2000 (ACHA, 2018).

## Scope and Delimitations

Whereas the NCHA data cannot be assumed to be generalizable to all college students, it has been demonstrated to be representative of the 52 self-selected colleges and universities participating in the NCHA survey. The NCHA data set includes only participating institutions that surveyed students in randomly selected classrooms (ACHA, 2018). The NCHA contains data representative of colleges and universities across the United States, including small and large enrollments, and both public and private institutions, but may not be representative of institutions that did not participate in the survey.

## Significance

This study can have public health significance in that U.S. minority college students have higher prevalence of depression and stress, and these factors directly affect academic performance and retention (Thompson-Ebanks, 2017). This study may add to the understanding of barriers to higher education success related to awareness of availability of mental health resources for vulnerable student populations. The prevalence of depression among undergraduate college students ranges widely from 10 to 85% with a mean of 30.6%; the variation in prevalence is attributed to differences in methodology and sample demographics (Beiter et al., 2015; Villatte et al., 2017). The prevalence of stress among higher education students is less variable than depression and ranges between 29.2 and 47% (Charlton et al., 2006; Shapiro et al., 2017; Thompson-Ebanks, 2017). Examination of vulnerable and high-risk populations, such as low socioeconomic and ethnic minority groups, may contribute to public health program development of

more effective prevention and intervention programs (Watson, 2013). Mental health issues contribute to academic, social, and physical health problems, as well as student attrition (Shapiro et al. 2017). Mental health resources on college campuses vary greatly among institutions (Watson, 2013). In addition to providing mental health resources, the resources must be known and accessible to the wide range of student ethnic diversity, gender identity, sexual orientation, and age ranges (Watson, 2013).

The social change implications of this study may include improved understanding of mental health resource awareness relative to stress and depression. The findings may suggest improved approaches for mental health resource promotion for underserved student groups including minority students. Efforts to decrease the prevalence of depression among college students may benefit from improvements in mental health resource awareness, utilization, and effectiveness. Evidence in the literature indicates disparities in both the prevalence of depression and in the utilization of mental health resources for minority college students. Gaining knowledge about the awareness of available mental health resources among both minority and non-minority students has social change implications to direct programs to improve awareness and utilization. Improvements in mental healthcare delivery and de-stigmatization of mental illness can lead to positive social changes and improvements in quality of life for all students. Culturally sensitive mental health resources can help to close the gap between minority students and the rest of the student population with respect to the prevalence of high stress level and depression. In addition, answering questions about potential associations regarding awareness of mental health resources among minority students may indicate

that the disparity in resource usage is a function of awareness, or if no association with awareness is indicated other factors should be examined.

## Summary and Conclusions

The purpose of this study was to examine the association between self-reported depressive symptoms and awareness of mental health services, among college undergraduate minority and non-minority students, controlling for sex, interest in mental health resource information, and history of mental illness. Minority students have a higher prevalence of depression and psychosocial stress, coupled with lower utilization of mental health resources (Ault-Brutus and Alegria, 2018). In addition, the portion of students with depressive symptoms receiving treatment on campus is low among students of all ethnicities, with less than half of students reporting a perceived need for mental health services seeking treatment on campus (Conley et al., 2017). These factors beg the question: Is the dissemination of information about mental health resources occurring as effectively for minority as well as non-minority students? Additionally, are students with symptoms of a mental health condition, such as depression, getting the information about available mental health resources that they need? The potential for social change impact includes additional understanding of barriers to higher education success related to awareness of availability of mental health resources for vulnerable student populations.

Section 2: Research Design and Data Collection

## Introduction

The purpose of this study was to examine the association between self-reported depressive symptoms and awareness of mental health services, among college undergraduate minority and non-minority students, controlling for sex, interest in mental health resource information, and history of mental illness. Colleges and universities face a challenge in meeting the mental health needs of the student population. Vulnerable populations, such as minority students, students with a history of mental illness, and students with an undiagnosed mental illness such as depression, are groups that are critical to reach with mental health outreach efforts. Minority college students experience a higher prevalence of depression, as well as lower utilization of mental health resources compared to the general student population (Beiter et al., 2015; Eisenberg et al., 2007; Ibrahim et al., 2013). Student subgroups with higher risk for depression and other mental illnesses are critical groups for mental health awareness campaigns to target. In this section, I address the quantitative cross-sectional research design, statistical analyses, and data collection methods. The research questions examined the association between minority status and awareness of mental health resources, and between self reported depressive symptoms and awareness of mental health resources.

## Research Design and Rationale

This study was a cross-sectional examination the association between the independent variables for minority status and self-reported depressive symptoms, and the dependent variable awareness of mental health resources. Minority status was defined

from ethnicity data on the NCHA, with student respondents that self-identified as Black, Hispanic/Latino/a, American Indian/Alaska native/native Hawaiian, Biracial/Multiracial, or Other, were coded as minority. Respondents that self-identified as White or Asian/Pacific Islander were coded as non-minority. Student respondents were considered to be positive for self-reported depressive symptoms by answering yes to five or more of the 11 questions that assess depressive symptoms on the NCHA. Student respondents who answered yes to four or fewer of these questions were classified as negative for depressive symptoms.

The confounding variables were that were controlled for were (a) sex, (b) interest in mental health resource information, and (c) history of mental illness. Sex was defined as male, female, or non-binary on the NCHA. Interest in mental health resource information was a binomial categorical variable determined as positive by answering yes to any of three questions assessing interest in MHR on the NCHA, with no answers to all three questions classified as negative for interest. History of mental illness was a binomial categorical variable determine as positive by answering yes to any of the seven questions assessing history of mental illness on the NCHA and answering no to all seven questions classified as negative for history of mental illness.

Awareness of mental health resources was an ordinal variable. Awareness of mental health resources was defined as answering “Yes, I have received information from my college regarding depression/anxiety, stress reduction, and suicide prevention. Answering yes to none, one, two, or three of the categories were coded as 0, 1, 2, or 3, respectively. The literature suggests that the mental health needs of minority students are

not being met (Miranda, Soffer, Polanco-Roman, Wheeler, & Moore, 2015; Eisenberg et al., 2013). Additionally, the literature suggests that the mental health needs are not being met of a potentially large population of college students with undiagnosed depression (Francis & Horn, 2017; Goodman, 2017). In order for colleges to be able meet the mental health needs of these groups, these students must be made aware of the resources that are available. The data in the literature examining student awareness of mental health resources is limited (Hyun, Quinn, Madon, & Lustig, 2007) and does not include ethnicity or undiagnosed depression as factors.

## Methodology

### Population

The target population was undergraduate college students throughout the United States attending public and private institutions on campus. Existing data from the NCHA survey was used for this study. A total of 354,262 students participated in the NCHA survey between the fall 2015 and fall 2018 semesters.

### Sampling and Sampling Procedures

No participants were recruited for this study. The data were accessed from archived NCHA data. The NCHA is a large national data set available to academic institutions that participate in the survey and for research purposes. Data were requested based on access requirements of the American College Health Association that administrates the data sets (ACHA, 2019).

The NCHA has been surveying data on college students biannually since 1998. The NCHA surveys self-reported health indicators on a variety of physical and mental

health topics. The 2017 sample includes students from 52 institutions. The surveyed colleges and universities include 26 public and 26 private, 47 four-year and 5 two-year, 13 religious affiliated and 39 non-religious affiliated institutions. The enrollments of the surveyed institutions ranged from less than 2,500 students to more than 20,000 students, from all geographic U.S. regions. Fifty-one of the 52 institutions collected survey data via web survey administration, and one institution collected survey data in classrooms via paper surveys. The variables of interest within the NCHA are (a) awareness of on-campus mental health resources, (b) interest in information about mental health resources, (c) depressive symptoms, (d) minority status, (e) sex, and (f) history of mental illness.

The sample reference group from the NCHA data set consists of 354,262 students, 65% female, 32.3% male, and 2.7% non-binary. The 2015-2018 NCHA survey consisted of 320 variables assessing physical and mental health, as well as behavioral and demographic data. Thirty-five variables were selected as relevant for this study and were requested from the data set of the 320 variables in the 2015-2018 NCHA. The variables analyzed were aggregates of NCHA variables, with awareness of MHR being an ordinal composite of 3 NCHA question, and depressive symptoms being a binary, categorical variable composite of 10 questions on the NCHA. Fifty-one of the 52 institutions participating in the NCHA administered the survey to students online. One institution administered the survey in classrooms on paper surveys. The mean response proportion for the online administration of the survey in 2015-2018 was 18% and the median response proportion was 16%. The response proportion for the one institution that

employed paper survey administration was 77%. The population sampled in the NCHA is appropriate for the research questions and the gaps identified in the literature.

The data set represents data collected from 354,262 students across the United States at 52 large and small colleges and universities (ACHA, 2019). The reference group that is sampled for the NCHA is not generalizable to all college students in the United States (ACHA, 2019). However, the reference group sampled is representative of the colleges and universities that self-selected to participate in the NCHA survey. All participating institutions randomly selected students to participate in the study for web administration of the survey (51 institutions), or randomly selected class sections to participate for the paper administration of the survey (one institution). A power level of 0.9 was used to ensure high power, with an effect size of 0.02 for small effect size, and $p < 0.01$, with two predictor variables the calculation for power gives a sample size of 629 or more subjects (Cohen, 1988).

**Instrumentation and Operationalization of Constructs**

The NCHA is a national assessment tool developed in the year 1998 by a panel of experts within the ACHA for member institutions to assess the physical, mental, and behavioral health of their student bodies. The survey included 320 questions to assess physical health, mental health, substance use, sexual behavior, and the effects on academic performance and attrition (ACHA, 2019). The NCHA dataset was appropriate for this study because it contains survey questions related to the research questions. Details of the operationalization of the conceptual factors with respect to self-determination theory are described in Table 1.

Table 1

*Self-Determination Theory Constructs and Corresponding Study Measures*

| Self-determination constructs and variable | Survey question |
|---|---|
| Competence factors and depressive symptoms | NQ30 "Have you ever: (A) Felt thing were hopeless (B) Felt overwhelmed by all you had to do, (C) Felt exhausted (not from physical activity), (D) Felt very lonely, (E) Felt very sad, (F) Felt so depressed it was difficult to function, (G) Felt overwhelming anxiety, (H) Felt overwhelmed by anger, (I) Intentionally injured yourself, (J) Seriously considered suicide, (K) Attempted suicide" |
| Autonomy factors and interest in mental health resource information | NQ2A(3) "Have you received information on the following topics from your college or university: Depression/Anxiety."<br>NQ2B(6) "Have you received information on the following topics from your college or university: Stress reduction?"<br>NQ2B(7) "Have you received information on the following topics from your college or university: Suicide prevention?" |
| Psychological relatedness and minority status and history of mental illness | NQ54 "How do you usually describe yourself?"<br>NQ31A "Within the last 12 months have you been diagnosed or treated by a professional for any of the following: (2) Anxiety, (4) Bipolar disorder, (6) Depression."<br>NQ34 "Have you ever received psychological or mental health services from any of the following? (A) Counselor/therapist/psychologist, (B) Psychiatrist, (C) Other medical provider, (D) Minister/Priest/Rabbi/other clergy" |

*Note.* The questions are from the National College Health Assessment 2015-2018.

**Operational measures**. Table 2 includes a description of the questions from the NCHA that was adapted for independent, dependent, and control variables. The independent variables were minority status and depressive symptoms. Both of these variables were combined into binomial variables from categorical variables on the

NCHA. Minority status was combined from the NCHA variable NQ54, "How do you describe yourself?" Respondents that self-identified as Black, Hispanic/Latino/a, American Indian/Alaska native/native Hawaiian, Biracial/Multiracial, or Other, were coded as minority. Respondents that self-identified as White, or Asian/Pacific Islander were coded as non-minority.

The variable Depressive Symptoms was combined from the NCHA variable NQ30. Respondents that answered yes to five or more of the following questions were coded as positive for depressive symptoms; "Have you ever (in the last two weeks/last 30 days/last 12 months): Felt things were hopeless, felt overwhelmed by all you had to do, felt exhausted (not from physical activity), felt very lonely, felt very sad, felt so depressed it was difficult to function, felt overwhelming anxiety, felt overwhelmed by anger, intentionally injured yourself, seriously considered suicide, and attempted suicide?"

The dependent variable was awareness of MHR. Awareness of MHR was an ordinal variable coded as 0 to 3. Awareness of MHR was coded from questions NQ2A and NQ2B, "Have you received information on the following topics from your college or university: Depression/anxiety, Stress reduction, or Suicide prevention?" Students were assessed for awareness of college or university mental health resources and coded for the number of yes answers from 0 to 3.

The control variables were sex, interest in mental health resource information, and history of mental illness. Sex was coded from NCHA question RNQ47. Question RNQ47 was a composite created by the survey developers to categorize gender into female, male,

and non-binary categories. The responses on questions RNQ47A gender at birth, RNQ47B identify as transgender, and RNQ47C gender identity are combined. Respondents who identified as transgender, or that the gender at birth was not consistent with the response for gender identity, the respondent is categorized as non-binary (acha.org, 2019). Respondents were considered to be positive for interest in mental health resource information by answering yes to any of the following questions: “Are you interested in receiving information on the following topics from your college or university: Depression/anxiety, Stress reduction, or Suicide prevention?” A yes response to any of the three categories was coded as positive for interest in mental health resource information, and no responses to all three categories was coded as negative for interest. Respondents were considered to be positive for self-reported history of mental illness by answering yes to any of the options on question NQ31A. The question asks, “Within the last 12 months, have you been diagnosed or treated by a professional for any of the following, depression, anxiety, or bipolar disorder.” Yes, responses include “yes, treated with medication; yes, treated with psychotherapy; yes, treated with medication and psychotherapy; and yes, treated with other treatment.” Details of the description of operationalization measures are represented in Table 2.

Table 2

*Operational Measures for Independent and Dependent Variables*

| Variables | Survey questions | Variable type and response categories |
|---|---|---|
| Awareness of mental health resources | NQ2A(3) "Have you received information on the following topics from your college or university: Depression/Anxiety."<br>NQ2B(6) "Have you received information on the following topics from your college or university: Stress reduction?"<br>NQ2B(7) "Have you received information on the following topics from your college or university: Suicide prevention?" | Ordinal dependent variable<br><br>Answering Yes to 0, 1, 2, or 3 questions coded as<br>0=No to all 3<br>1=Yes to one of three<br>2=Yes to two of three<br>3=Yes to all three |
| Depressive symptoms | NQ30 "Have you ever: (A) Felt things were hopeless, (B) Felt overwhelmed by all you had to do, (C) Felt exhausted (not from physical activity), (D) Felt very lonely, (E) Felt very sad, (F) Felt so depressed it was difficult to function, (G) Felt overwhelming anxiety, (H) Felt overwhelmed by anger, (I) Intentionally injured yourself, (J) Seriously considered suicide, (K) Attempted suicide" | Binomial dependent variable<br><br>0=Yes to 4 or fewer of A-K<br>1=Yes to 5 or more of A-K<br>"No, never"<br>"No, not in the last 12 months"<br>"Yes, in the last 2 weeks"<br>"Yes, in the last 30 days"<br>"Yes, in the last 12 months"<br><br>Will be coded as 1=Yes if (J) or (K) are answered Yes, even if less than 5 |
| Minority status | NQ54 "How would you describe yourself (Mark all that apply): (A) White, (B) Black, (C) Hispanic or Latino/a, (D) Asian or Pacific Islander, (E) American Indian, Alaska native, or native Hawaiian, (F) Biracial or Multiracial, (G) Other" | Binomial independent variable<br><br>1=Minority (B, C, E, F, G or combinations including)<br>0=Non-minority (A, D only) |

(*continued*)

| | | |
|---|---|---|
| Sex | RNQ47 Composite of NQ47a, NQ47b, and NQ47c Sex and Gender | Nominal<br>confounding variable<br><br>1=Female<br>2=Male<br>3=Non-binary |
| Interest in mental health resource information | NQ3A(3) "Are you interested in receiving information on the following topics from your college or university: Depression/anxiety?"<br>NQ3B(6) "Are you interested in receiving information on the following topics from your college or university: Stress reduction?"<br>NQ3B(7) "Are you interested in receiving information on the following topics from your college or university: Suicide prevention?" | Binomial<br>confounding variable<br><br>1=Yes<br>0=No<br>A yes answer to ANY of the three questions will be categorized as Yes |
| History of mental illness | NQ31A "Within the last 12 months have you been diagnosed or treated by a professional for any of the following:<br>(2) Anxiety<br>(4) Bipolar disorder<br>(6) Depression"<br>NQ34 "Have you ever received psychological or mental health services from any of the following?<br>(A)Counselor/therapist/psychologist<br>(B) Psychiatrist<br>(C) Other medical provider<br>(D) Minister/Priest/Rabbi/other clergy" | Binomial<br>confounding variable<br><br>1=Yes to ANY of the seven<br>0=No to all seven |

*Note.* The questions are from the National College Health Assessment, 2015-2018.

**Data Analysis Plan**

Data was obtained from the 2017 NCHA survey. Statistical analyses of the selected variables were conducted to describe the relationships between variables relative

to the research questions. The independent variables for this study were minority status and the presence of depressive symptoms. The dependent variable for this study was awareness of mental health resources. SPSS software was used for data analysis. The logistic model has a linear form $\text{logit}[\pi(x)] = \log(\pi(x)/1 - \pi(x)) = \alpha + \beta x$, where $\pi(x)$ denotes the success probability at value x (Agresti, 2018). The multivariate logistic analysis examined the probability ($p$) that a dependent variable has been affected by the independent variables, $p = P(a + bx$; Agresti, 2018). The equation for the logistic regression is $z = b_0 + b_1x_1 + b_2x_2 \ldots + b_kx_k$, where $z$ is the odds of the dependent variable (awareness of MHR), $b_0$ is the constant, $x$ is the independent variables (minority status and presence of depressive symptoms), $k$ is the number of independent variables, and b is the slope or coefficient (Agresti, 2018).

**Multivariate Logistic Regression Analyses and the Odds Ratio**

This study used multivariate logistic regression to describe the relationship between awareness of mental health resources for minority vs. non-minority students, as well as the relationship between awareness of mental health resources and students reporting depressive symptoms. In addition, odds ratios were calculated to estimate the measure of association between minority students and awareness of mental health resources at their institution, and the measure of association between depressive symptoms and awareness of mental health resources. For a probability of a positive association, $\pi$, the odds of success can be defined as, odds = $\pi / (1 - \pi)$. The likelihood ratio test was used to test for significance ($p < 0.01$). The likelihood ratio test indicates the probability that the measurements of the dependent variable can be predicted from the

measures of the independent variables (Agresti, 2018). A *p* value of less than 0.01 was used to indicate statistical significance and justify rejecting the null hypothesis.

**Research Questions and Hypotheses**

The research questions and hypotheses were developed with respect to the review and analysis of the literature, including the gaps in the literature as to the role of awareness of mental health resources as a contributor to disparities in depressive symptoms and resource utilization in minority student groups. The purpose of this study was to examine the association between self-reported depressive symptoms and awareness of mental health services, among college undergraduate minority and non-minority students, controlling for sex, interest in mental health resource information, and history of mental illness.

Research Question 1: Is there an association between awareness of mental health resources and minority status among U.S. college students, controlling for sex, interest in mental health resource information, and history of mental illness?

$H_0$1: There is no association between awareness of mental health resources and minority status among U.S. college students, controlling for confounding variables.

$H_a$1: There is an association between awareness of mental health resources and minority status among U.S. college students, controlling for confounding variables.

The statistical plan tested the hypothesis for research question 1 using multivariate logistic regression. Multivariate logistic regression was used rather than ordinal regression because the association between the independent and dependent variables did not pass the test of parallel lines assumption necessary for ordinal

regression analysis. The independent variable was minority status (1 = minority, 0 = non-minority) and the dependent variable was awareness of mental health resources (ordinal = 0, 1, 2, or 3). The control variables were sex, interest in mental health resource information, and history of mental illness. The null hypothesis would be rejected if the level of precision, is alpha [α] < .01.

Research Question 2: Is there an association between awareness of mental health resources and self-reported depressive symptoms among U.S. minority and non-minority student groups, controlling for sex, interest in mental health resource information, and history of mental illness?

$H_0$2: There is no association between awareness of mental health resources and self-reported depressive symptoms among minority and non-minority student groups, controlling for confounding variables.

$H_a$2: There is an association between awareness of mental health resources and self-reported depressive symptoms among minority and non-minority student groups, controlling for confounding variables.

The statistical plan tested the hypothesis for research question 2 using multivariate logistic regression. The independent variable was self-reported depressive symptoms (1=yes, 0=no) and the dependent variable will be awareness of mental health resources (ordinal = 0, 1, 2, or 3). The control variables were sex, interest in mental health resource information, and history of mental illness. The null hypothesis would be rejected if the level of precision, is alpha [α] < .01.

The confounding variables were sex, interest in mental health resource information, and history of mental illness. Sex is a well-established factor in the prevalence in depression (Beiter et al., 2015; Brody et al., 2018, Eisenberg et al. 2013), and in mental healthcare usage (Bonar et al., 2015; Cho et al., 2014). Controlling for sex reduced the likelihood of rejecting the null hypothesis based on sex proportion associations among the independent variable groups. Controlling for interest in mental health resource information goes to the autonomy factor in self-determination theory (Deci & Ryan, 2008). Respondents that did not have an interest in receiving information concerning MHR may report not having received information not because it was not readily available, but because they did not feel it applied to their lives. History of mental illness will be controlled for as a function of the psychological relatedness factor in self-determination theory (Deci & Ryan, 2008). Respondents with a history of mental illness may be more likely to seek out information on MHR, rather than reflecting the institutional effectiveness of information dissemination.

## Threats to Validity

The NCHA was developed in 1998 as a pilot study to assess physical, mental, substance abuse, and behavioral health issues in U.S. college and university students as a research arm of the American College Health Association (ACHA, 2019). The 1998 through 2000 pilot NCHA data sets were evaluated for reliability and validity against three established surveys, the National College Health Risk Behavior 1995 Survey, the Harvard School of Public Health 1999 College Alcohol Study, and the U.S. Department of Justice 2000 National College Women Sexual Victimization Study (ACHA, 2019). In

addition, item reliability analyses, construct validity, and measuring validity analyses were performed (ACHA, 2019). The self-selected sample of 52 colleges and universities is intended to be a reference group to which data can be compared, with analysis of the NCHA data set not generalizable to the wider population of U.S. college students (ACHA, 2019).

The ACHA has administered the NCHA twice annually at participating colleges and universities since 1998. For the fall 2015 through fall 2018 survey period sampled, 51 of the 52 participating institutions opted to administer the survey online (ACHA, 2019). Participating colleges and universities were required to randomly select students to be surveyed for web administration, or to randomly select class sections for paper administration of the survey (ACHA, 2019). The ACHA has taken extensive steps to ensure the reliability and internal validity of NCHA data. Internal validity is challenged by the variability of respondent experience that may lead to inaccurate interpretation of the relationship between variables (Agresti, 2018). The mean response proportion for the web administration of the survey was 17% (ACHA, 2019). The response proportion for paper administration of the survey was 77% (ACHA, 2019). Lower response rate among specific student groups may introduce selection bias into data patterns (Agresti, 2019). The personal nature of questions on the NCHA may contribute to lower response rates and may introduce response bias (Agresti, 2019).

## Ethical Procedures

Data were requested from the NCHA to conduct this study. De-identified NCHA data were provided by the ACHA for the current study to ensure safety and

confidentiality of all respondents. The Institutional Review Board of Walden University was petitioned and approved this study (06-21-19-0609561). Secondary analysis of the data was conducted on only the thirty specific questions requested from the NCHA. Only de-identified data and only the survey questions that addressed the research questions were requested from the NCHA dataset. Electronic data were stored on a password protected private laptop accessible only by the principle investigator until publication of the manuscript.

## Summary

In this study, I examined the associations of awareness of mental health resources with minority status and the presence of depressive symptoms. I utilized relevant de-identified NCHA data to answer the research questions to accept or reject the null hypotheses. Multivariate logistic ordinal regression was performed to describe the association between the independent variables, minority status and depressive symptoms, with the dependent variable, awareness of mental health resources. The NCHA data set was a large sample survey that sampled a wide range of colleges and universities from across the United States Self-determination theory was used to guide the selection of variables, describing competence factors, autonomy factors, and psychological reliability factors. The independent variable, depressive symptoms, served as a competence factor describing the respondent's feelings of self-efficacy for addressing mental health status. The independent variable, minority status, served as a psychological relatedness factor indicating a potential cultural disconnect from the majority culture of higher education.

This quantitative cross sectional analysis of a secondary data set was appropriate to answer the research questions.

Section 3: Presentation of the Results and Findings

## Introduction

The purpose of this study was to examine the association between self-reported depressive symptoms and awareness of mental health resources, among college undergraduate minority and non-minority students, controlling for sex, interest in mental health resource information, and history of mental illness. The independent variables in this study were minority status and presence of depressive symptoms, while the dependent variable in this study was awareness of mental health resources. The covariates in this study were sex, interest in mental health resource information, and history of mental illness. I conducted descriptive statistical analysis, ordinal regression analysis, and multivariate regression analysis to test the hypotheses of the study. The following research questions and hypotheses were tested in the analysis:

Research Question 1: Is there an association between awareness of mental health resources and minority status among U.S. college students, controlling for sex, interest in mental health resource information, and history of mental illness?

$H_0$1: There is no association between awareness of mental health resources and minority status among U.S. college students, controlling for confounding variables.

$H_a$1: There is an association between awareness of mental health resources and minority status among U.S. college students, controlling for confounding variables.

Research Question 2: Is there an association between awareness of mental health resources and self-reported depressive symptoms among U.S. minority and non-minority

student groups, controlling for sex, interest in mental health resource information, and history of mental illness?

$H_0$2: There is no association between awareness of mental health resources and self-reported depressive symptoms among minority and non-minority student groups, controlling for confounding variables.

$H_a$2: There is an association between awareness of mental health resources and self-reported depressive symptoms among minority and non-minority student groups, controlling for confounding variables.

## Data Collection

The population sampled in the secondary dataset utilized for this study was undergraduate and graduate students at U.S. colleges and universities. The secondary dataset utilized for this study was collected and provided by the ACHA. The ACHA administers the National College Health Assessment (NCHA) survey biannually by the ACHA at 52 self-selected colleges and universities in the U.S. The NCHA dataset obtained from the ACHA were collected each semester from the fall 2015 to the fall 2018 semester at each of the 52 self-selected colleges and universities participating in the NCHA. The colleges and universities that participated in the NCHA survey in this dataset included public and private institutions (64.1 vs. 35.9%, respectively), and religious-affiliated and secular institutions (14.6 vs. 85.4%, respectively). The institutions were distributed throughout the U.S with 20.2% in the Northeast, 19.3% in the Midwest, 23.4% in the South, and 37.2% in the West. 39.8% of respondents were enrolled at an institution with an enrollment of 20,000 or more, 21.7% at an institution with between

10,000 and 19,999, 18.3% at an institution with between 5,000 and 9,999, 9.6% at an institution with between 2,500 and 4,999, and 10.6% at an institution of less than 2500 student enrollment. Fifty-one of the 52 participating institutions randomly selected participants for web-based administration of the survey, and one institution randomly selected class sections to administer the paper survey (ACHA, 2019).

For this study, the results of a power analysis indicated that the minimum required number of sample participants was 629 (see Cohen, 1988). Initially, I obtained a total of 358,453 samples but listwise removed 4,191 samples, or 1.2% of the total. Therefore, the number of subjects used for the analysis was 354,262. Those excluded from the final data set were missing 10 or more of the 35 raw variables being utilized to generate the variables to be analyzed. 329,270 respondents (91.9%) had no missing raw variables. The remaining 24,992 respondents (7.1%) with 9 or fewer missing raw variables were imputed with the series median. The power analysis with a large effect size and $p < .01$ yielded a sample size of a minimum of 629 participants.

## Descriptive Statistics

### Demographic Information

Among demographic data, only sex was used as a covariate in this study. The demographic information included age, enrollment status, and year in school. Table 3 displays the demographic information of the sample population. The mean age of the student respondents was 22.5 years ($SD = 6.12$). The NCHA categorized the respondent's sex using multiple questions to produce a composite variable, NQ47 (NCHA, 2019). The respondents were largely female (66.8%), enrolled full-time at their college or university

(90.8%), undergraduate (84%), and 18 to 22 years of age (71.9%).

Table 3

*Demographic Characteristics of Sample*

| Variable | % |
|---|---|
| Sex | |
| Female | 66.8 |
| Male | 30.4 |
| Non-binary | 2.8 |
| Enrollment status | |
| Full-time | 90.8 |
| Part-time | 7.3 |
| Year in school | |
| First year | 22.6 |
| Second year | 18.3 |
| Third year | 19.6 |
| Fourth year | 16.1 |
| Fifth or more undergraduate | 5.3 |
| | 16.0 |
| Age | |
| 18-22 years | 71.9 |
| 23-29 years | 19.3 |
| 30 years and older | 8.8 |

*Note:* Due to rounding errors, percentages may not equal 100%; *N*=354,262

**Awareness of Mental Health Resources**

The dependent variable was awareness of mental health resources. Awareness was measured as a categorical variable, created as a composite of the responses to three questions on the NCHA. The following three yes or no questions were used to assess awareness of mental health resources. “Have you received information on the following topics from your college or university: Depression/anxiety? Stress reduction? Suicide prevention?” From the raw, binary responses an ordinal variable was created ranging

from 0 (no answers to all three questions) to 3 (yes answers to all three questions). The mean score for awareness of mental health resources was 1.8 (*SD* = 1.09). More than one out of five respondents (20.6%) reported receiving no information on mental health resources from their institutions. Comparing interest in information to receiving information about mental health resources, more than three out of four respondents (76.6%) had some interest (1 to 3 yes answers) in information. 20.6% of respondents reported receiving no information on mental health resources from their institution, with 23.4% of respondents reporting no interest in information.

Individual types of information received about mental health resources varied across the three questions. 62.7% of respondents reported having received information on depression and/or anxiety from their college or university, 62.9% having received information on stress reduction, and 50.6% having received information on suicide prevention. This indicates that more than one third of students reported receiving no information on depression, anxiety, or stress reduction, and that nearly half of respondents reported receiving no information on suicide prevention.

Table 4

*Frequency Data for Dependent and Independent Variables*

| Variable | % |
|---|---|
| Awareness of mental health resources | |
| High awareness (3 yes responses) | 38.3 |
| Moderate awareness (2 yes responses) | 22.6 |
| Low awareness (1 yes response) | 18.5 |
| No awareness (0 yes responses) | 20.6 |
| Minority status | |
| Minority | 26.1 |
| Non-minority (White, Asian) | 73.9 |
| Presence of depressive symptoms | |
| Positive (5 or more symptoms within 12 months) | 58.5 |
| Negative (4 or fewer symptoms within 12 months) | 41.5 |

*Note*. NCHA, N=354,262

**Minority Status**

Minority status was used as a binary independent variable. The variable Minority status was created from the seven questions on the NCHA assessing race/ethnicity. The binary independent variable Minority Status was created from the following seven questions on the NCHA assessing race. See the Appendix for the text of the questions assessing race.

Respondents that self-identified as Black, Latino/a, American Indian/Alaska Native, Biracial, or Other were coded as minority. Respondents that self-identified as White or Asian/Pacific Islander were coded as non-minority. The majority of respondents were non-minority, with the largest individual racial group being White (56.6%). The next largest individual racial groups were Asian/Pacific Islander (14.4%) and Hispanic/Latino/a (14.0%). The remaining racial categories were all under 6% of the

respondents (Black 5.8%, Biracial/multiracial 4.6%, Other 2.7%, and American Indian/Alaska Native/Native Hawaiian 1.9%).

**Presence of Depressive Symptoms**

The binary variable Presence of Depressive Symptoms was used as an independent variable. The variable Presence of Depressive Symptoms was created from the following eleven questions on the NCHA used to assess mental health. See Appendix A for the text of the questions assessing the symptoms of depression.

Respondents that answered, Yes, in the last two weeks; Yes, in the last 30 days; or Yes, in the last 12 months to five or more of the questions assessing the symptoms of depression were coded as positive for Presence of Depressive Symptoms. Respondents that answered, Yes, in the last two weeks; Yes, in the last 30 days; or Yes, in the last 12 months to four or fewer questions assessing the symptoms of depression were coded as negative for Presence of Depressive Symptoms.

More than half (58.5%) of respondents reported the presence of depressive symptoms by answering yes to five or more of the eleven questions. The responses to individual questions assessing depressive symptoms varied from 83.3% of respondents answering yes to feeling exhausted (not from physical activity) in the last 12 months, to 3.2% of respondents answering yes to having attempted suicide in the last 12 months. That 22.2% of respondents answered yes to having seriously considering suicide in the last 12 months is noteworthy, as is 8.4% answering yes to having intentionally harmed oneself, and 3.2% having attempted suicide in the last 12 months.

**Covariate Variables**

The covariate variables were sex, interest in mental health resource information, and history of mental illness. The NCHA assessed the variable sex with three questions. See the Appendix for the text of the survey questions. If a respondent's gender identity is consistent with their sex at birth and selects no for transgender, then the respondent is categorized as either female or male. If a respondent selects yes for transgender, or the sex at birth response is not consistent with their gender identity, then the respondent is categorized as non-binary (ACHA, 2019). More than two of three respondents (66.8%) identified as female.

The covariate binary variable, interest in mental health resource information, was created from three of the questions on the NCHA to assess interest in information on a variety of topics. See Appendix A for the test of the questions. The mean number of yes responses for the three questions assessing interest in information on mental health resources was 1.9 (*SD* = 1.12). 48.6% of respondents were interested in in information on all three topics, depression/anxiety, stress reduction, and suicide prevention. 16% of the respondents were interested in two of the three topics, 12.0% of respondents were interested in one of the three topics, and 23.4% of respondents were no interested in information on any of the three topics.

Table 5

*Frequency Distribution for Covariate Variables*

| Variable | % |
|---|---|
| Sex | |
| Female | 66.8 |
| Male | 30.4 |
| Non-binary | 2.8 |
| Interest in mental health resource information | |
| Some interest in MHR | 76.6 |
| No interest in MHR | 23.4 |
| History of Mental Illness | |
| Yes to 1 or more history of mental illness | 45.6 |
| No to all history of mental illness | 54.4 |

## Results: Multivariate Logistic Regression

Multivariate logistic regression analysis was conducted to model the association between awareness of mental health resources and the predictor variables minority status and presence of depressive symptoms. The logistic regression analysis was controlled for sex, interest in mental health resource information, and history of mental health. Ordinal logistic regression analysis was initially conducted to model the association; however, the proportional odds assumption of ordinal regression was not met. The proportional odds assumption states that the relationship between each pair of dependent variable outcomes is the same (Agresti, 2018). This assumption of ordinal regression was tested using SPSS and the test of parallel lines. The null hypothesis of the test of parallel lines is when the location parameters or slope coefficients are the same across the four response categories of the ordinal dependent variable (Ranganathan, Pramesh, & Aggarwal, 2017). In order for the test of parallel lines to be successful the results should not be significant; therefore, the null hypothesis was rejected. The results of the test of parallel lines in this

ordinal regression analysis was significant, therefore the location parameters or slope coefficients were different between each pair of outcome categories of the variable awareness of mental health resources. Subsequently, the data were analyzed using a multivariate regression analysis. Multivariate logistic regression analysis employs a separate model for each pair of outcome categories of the ordinal dependent variable (Ranganathan et al., 2017).

Multivariate logistic regression analysis was conducted to model the association between the predictor variables minority status and presence of depressive symptoms and awareness of mental health resources. A level of significance of 0.01 was used in the multivariate logistic regression analysis. The 99% confidence level was chosen due to the large sample size and the increased likelihood of rejecting the null hypothesis with a small effect size (Cohen, 1988).

The results of the logistic multivariate regression models indicated that both minority status and the presence of depressive symptoms are significantly associated with student awareness of mental health resources ($p < .01$). The final model presented in Table 6 is a significant ($p < .01$) improvement over the intercept only model. This indicates that the addition of the predictor variables minority status and presence of depressive symptoms in the model improves the -2 log-likelihood values associated with the models. The log odds of the models indicate the independent variables' regression coefficients in tests of nested models (Ranganathan et al., 2017).

Table 6

*Model Fitting Information*

| Model | Model fitting criteria -2 Log likelihood | Likelihood ratio tests | | |
|---|---|---|---|---|
| | | Chi-Square | df | Sig. |
| Intercept only | 10612.236 | | | |
| Final | 2288.246 | 8323.990 | 15 | .000 |
| Intercept | 2288.246[a] | .000 | 0 | |
| Covariates | | | | |
| -----Sex | 2669.228 | 380.982 | 3 | .000 |
| -----Interest in mental health resources | 9134.650 | 6846.404 | 3 | .000 |
| -----History of mental illness | 2410.479 | 122.234 | 3 | .000 |
| Independent variables | | | | |
| -----Minority status | 2336.355 | 48.109 | 3 | .000 |
| -----Presence depression symptoms | 2897.621 | 609.375 | 3 | .000 |

*Note.* a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

The Cox and Snell, Naglekerke, and McFadden $R^2$ measures are indicators of effect size. Each of the $R^2$ measures indicates a low effect size. The independent variables of minority status and presence of depressive symptoms explained a variance of only 2.3%, 2.5% and 0.9%, respectively, of the variance awareness of mental health resources after controlling for sex, interest in mental health resource information, and history of mental illness (see Table 7). The models show a significant effect for the association between the independent variables, minority status and presence of depressive symptoms despite the low effect size due to the large sample size.

**Results of Multivariate Regression Analysis for Research Question 1**

Research Question 1: Is there an association between awareness of mental health resources and minority status among U.S. college students, controlling for sex, interest in mental health resource information, and history of mental illness?

Multivariate regression analysis calculates a separate model for each pair of dependent variable outcomes for the association of each independent variable (Ranganathan, et al., 2017). The association between minority status and awareness of mental health resources increasing from "Not Aware status" (0) to "High Awareness status" (3) and from the "Moderate Awareness" (2) to "High Awareness status" was significant ($p > .01$), but not from the "Low Awareness" (1) to "High Awareness" (3) condition.

The dependent variable, Awareness of Mental Health Resources, is significantly associated with minority status ($p < .01$), controlling for the covariates, in all of the models except for the low awareness outcome relative to the high awareness outcome (Table 7). Therefore, the null hypothesis is rejected; there is no association between awareness of mental health resources and minority status for respondents reporting no awareness and for moderate awareness vs. high awareness of mental health resources. The null hypothesis is not rejected; there is no association between minority status and awareness of mental health resources for respondents reporting low awareness vs. high awareness.

Beta (β) is the multinomial logit estimate for a change in predictor variable for each level of the dependent variable, Awareness of Mental Health Resources, vs. the reference level of High Awareness, given the other variables in the model are held constant (Ranganathan, et al., 2017). The multinomial log-odds estimate for Not Aware relative to High Awareness would decrease by .045 for non-minority respondents. The multinomial log-odds for no awareness of MHR relative to high awareness of

MHR would be expected to decrease by 0.045 units for non-minority students, while holding all other variables in the model constant. The multinomial log-odds estimate for Moderate Awareness relative to High Awareness would increase by .033 for non-minority respondents (see Table 7). The change in multinomial log-odds estimate for Low Awareness relative to High Awareness was not significant. The log-log odds of change in the outcome level are relative to a unit change in the predictor variable, minority status, with respect to the reference level, high awareness of mental health resources.

The Exp(β) are the odds ratios for the predictor variables. The odds ratio indicates the risk of the outcome falling in each of the levels of awareness of mental health resources relative to the referent condition, high awareness. An odds ratio of less than one indicates that the risk of falling in a given awareness outcome is less likely than the high awareness condition (referent condition) for non-minority students vs. minority students. An odds ratio of more than one indicates that the risk of falling in a given awareness outcome is more likely than the high awareness condition (referent condition) for non-minority students vs. minority students.

The odds ratio, being less than one (.956), indicates that non-minority students were less likely to report the non-aware condition than the referent (high awareness) condition, relative to minority students. However, the odds ratio for moderate awareness condition was greater than one (1.018), indicating that non-minority students were more likely to report the moderate awareness condition than the referent (high awareness) condition, relative to minority students (see Table 7). The odds for the low awareness vs.

high awareness condition were not significant. The results are mixed for minority status as a predictor variable for awareness of mental health services. Minority students had greater odds of reporting non-awareness vs. high awareness than non-minority students, but lesser odds of reporting moderate awareness vs. high awareness, relative to non-minority students. The association for low-awareness relative to high awareness was not significant for minority status. Therefore, the association between minority status and awareness of mental health resources is significant ($p < 0.01$) in two of three conditions, but unclear.

**Results of Multivariate Regression Analysis for Research Question 2**

Research Question 2: Is there an association between awareness of mental health resources and self-reported depressive symptoms among U.S. minority and non-minority student groups, controlling for sex, interest in mental health resource information, and history of mental illness?

The association between presence of depressive symptoms and awareness of mental health resources were significant for each level of awareness relative to the High Awareness condition ($p > .01$). Therefore, the null hypothesis is rejected that there is no association between awareness of mental health resources and the presence of depressive symptoms for respondents reporting no awareness, low awareness, and moderate awareness vs. high awareness of mental health resources.

The β, or multinomial log-odd estimate, indicates that students without the presence of depressive symptoms would decrease by 0.14 the log-odds of reporting non-awareness than high awareness. The multinomial log-odds estimate for low awareness

relative to high awareness would decrease by .228 for respondents that did not report depressive symptoms relative to those that did report depressive symptoms. The multinomial log-odds estimate for moderate awareness relative to high awareness would decrease by .16 for respondents that did not report depressive symptoms relative to those that did report depressive symptoms (see Table 7). The results for the multivariate regression modeling the association between self-reported depressive symptoms and awareness of mental health resources indicate that students that reported depressive symptoms are more likely to have a higher awareness of mental health resources than students that did not report depressive symptoms.

The odds ratios, Exp(β), were less than one for non (.847), low (.796), and moderate (.852) level of awareness of mental health services vs. the high level of awareness condition (see Table 7). These odds ratios indicate that students that are negative for depressive symptoms are more likely to report a high awareness of mental health services (referent condition). Therefore, students that report symptoms of depression are more likely to report being in one of the lower levels of awareness of mental health services.

Table 7

*Predictor Odd Ratios and 99% C.I. for Level of Awareness of Mental Health Resources*

| Awareness of mental health resources [a] | | β | Std. Error | Wald | df | Sig. | Exp(β) | 99% Confidence Interval for Exp(β) Lower, Upper Bounds |
|---|---|---|---|---|---|---|---|---|
| Not aware | **Intercept** | .223 | .019 | 139.510 | 1 | .000 | --- | --- |
| | Sex | -.109 | .009 | 156.754 | 1 | .000 | .897 | [0.877,0.917] |
| | Interest in MHR | -.774 | .011 | 5365.371 | 1 | .000 | .461 | [0.449,0.474] |
| | History of mental illness | -.090 | .010 | 85.013 | 1 | .000 | .914 | [0.891,0.937] |
| | Non-minority | -.045 | .011 | 18.083 | 1 | .000 | .956 | [0.930,0.982] |
| | Minority | 0[b] | --- | --- | 0 | --- | --- | --- |
| | Negative depression symptoms | -.140 | -.010 | 199.248 | 1 | .000 | .847 | [0.847,0.892] |
| | Positive depression symptoms | 0[b] | --- | --- | 0 | --- | --- | --- |
| Low awareness | **Intercept** | -.340 | .020 | 285.772 | 1 | .000 | --- | --- |
| | Sex | -.146 | .009 | 258.730 | 1 | .000 | .864 | [0.845,0.885] |
| | Interest in MHR | -.112 | .012 | 88.639 | 1 | .000 | .894 | [0.867,0.922] |
| | History of mental illness | -.042 | .010 | 17.502 | 1 | .000 | .959 | [0.935,.0984] |
| | Non-minority | .018 | .011 | 2.673 | 1 | .102 | 1.018 | [0.990,1.047] |
| | Minority | 0[b] | --- | --- | 0 | --- | --- | --- |
| | Negative depression symptoms | -.228 | .010 | 492.757 | 1 | .000 | .796 | [0.775,.0817] |
| | Positive depression symptoms | 0[b] | --- | --- | 0 | --- | --- | --- |
| Moderate awareness | **Intercept** | -.406 | .019 | 449.631 | 1 | .000 | --- | --- |
| | Sex | -.122 | .008 | 209.458 | 1 | .000 | .885 | [0.866,0.904] |
| | Interest in MHR | .095 | .012 | 67.349 | 1 | .000 | 1.100 | [1.067,1.133] |
| | History of mental illness | .017 | .009 | 3.376 | 1 | .066 | 1.017 | [0.933,1.133] |
| | Non-minority | .033 | .010 | 10.745 | 1 | .001 | 1.034 | [1.007,1.062] |
| | Minority | 0[b] | --- | --- | 0 | --- | --- | --- |
| | Negative depression symptoms | -.160 | .010 | 277.738 | 1 | .000 | .852 | [0.831,0.873] |
| | Positive depression symptoms | 0[b] | --- | --- | 0 | --- | --- | --- |

*Note.* [a.] The reference category is High Awareness of mental health resources.
[b.] This parameter is set to zero because it is redundant.

## Summary

The purpose of this quantitative study was to examine the association between minority status and awareness of mental health resources, and between the presence of depressive symptoms and awareness of mental health services. Sex, interest in mental

health resource information, and history of mental illness were used as control variables in the multivariate regression analysis used to examine the association.

Descriptive statistics and multivariate regression analysis were used to statistically describe the data. The sample of U.S. college and university students was largely white (56.6%), female (66.8%), and enrolled full-time (90.8%). One in five respondents (20.6%) reported having not received any information about depression/anxiety, stress reduction, or suicide prevention from their institution. The type of information received varied by topic with more respondents having received information on depression/anxiety (62.7%) and stress reduction (62.9%), than suicide prevention (50.6). This is noteworthy, in that nearly one in four respondents (22.2%) reported seriously considering suicide in the last 12 months, and 3.2% of respondents reported having attempted suicide in the last 12 months. In addition, of note is that more than half of the respondents (58.3%) reported the symptoms of depression, and more than one third reported having not received information on depression (37.3%) or stress reduction (37.1%).

The results of the multivariate regression analysis indicated a significant association for research question 2 between the presence of depressive symptoms and each level of the ordinal dependent variable awareness of mental health resources ($p <$ .01) with the referent level, high awareness of mental health resources. The odds ratios for the models indicate that students reporting the symptoms of depression are more likely to report being in one of the lower levels of awareness of mental health services than the high awareness level.

The results of the multivariate regression analysis of the association between minority status and awareness of mental health resources was not consistently higher or lower relative to the referent level. The association between minority status and were significant for the non-aware condition and the moderately aware condition vs. the referent high awareness condition. However, the odds ratios indicated that minority students were more likely to report being in the non-aware condition than the high awareness condition, and less likely to report moderate awareness than the high awareness condition. The low awareness condition was not significantly different than the high awareness condition for minority versus non-minority students. Additionally, the effect size was small for the model for both presence of depressive symptoms and minority status.

Section 4: Application to Professional Practice and Implications for Social Change

## Introduction

The literature indicates that minority college students have a higher prevalence of depression than the general student population (Beiter et al., 2015; Eisenberg et al., 2013; Ibrahim et al., 2013). The literature also includes study of the utilization of mental health services, showing a lower utilization by minority students (Barry et al., 2016; Cokley et al., 2017; Eisenberg et al., 2013). However, there is a gap in the research in examining the association of awareness of mental health resources as a potential factor in these differences. Therefore, the purpose of this quantitative cross-sectional study was to examine the association between self-reported depressive symptoms and awareness of mental health resources, among college undergraduate minority and non-minority students, controlling for sex, interest in mental health resource information, and history of mental illness. In this study, minority status and presence of depressive symptoms were the binary independent variables, and awareness of mental health resources was the ordinal dependent variable. The statistical analysis of the association between depressive symptoms and awareness of mental health resources for minority and non-minority students, controlling for the covariates, was multivariate regression of the 354,262 respondents to the NCHA between fall 2015 and fall 2018.

## Summary and Interpretation of the Findings

### Summary of Findings

The first research question tested the association between awareness of mental health resources and minority status among U.S. college students, controlling for sex,

interest in mental health resource information, and history of mental illness. The association between awareness of mental health resources and minority status was statistically significant ($p > .01$) for two of three levels of awareness relative to the referent (high awareness) level. The results of the multivariate regression analysis were that minority students were significantly less likely to report a high level of awareness than a non-aware level ($p > .01$), relative to non-minority students. However, minority students were significantly more likely to report a high level of awareness than a moderate level of awareness ($p > .01$), relative to non-minority students. Therefore, the statistically significant association did not demonstrate a consistent relationship between awareness of mental health resources and minority status, making it difficult to draw conclusions from the analysis. In addition, the odds ratios indicated that the effect size of minority status on awareness of mental health services was small.

The second research question tested the association between awareness of mental health resources and self-reported depressive symptoms among U.S. minority and non-minority student groups, controlling for sex, interest in mental health resource information, and history of mental illness. The multivariate regression analysis showed a significant association ($p > .01$) between depressive symptoms and each of the three levels of awareness of mental health resources relative to the referent (high awareness) level. Students reporting the symptoms of depression were more likely to report a lower level of awareness of mental health resources than students that were negative for the symptoms of depression. The association between awareness of mental health resources and depressive symptoms was significant and consistent, but the effect size was small.

Lower level of reported awareness among students reporting the symptoms of depression indicates a key disconnect between institutions and this important group of students that is being underserved by the available mental health resources.

**Interpretation of Findings**

The association between minority status and depression has been well studied in the literature (Beiter et al., 2015; Eisenberg et al., 2013; Ibrahim et al., 2013), and between minority status and mental healthcare utilization (Barry et al., 2016; Cokley et al., 2017; Eisenberg et al., 2013). However, there is a gap in the research in examining the association of awareness of mental health resources as a potential factor in these differences. The literature indicates that minority college students have a higher prevalence of depression than the general student population (Beiter et al., 2015; Eisenberg et al., 2013; Ibrahim et al., 2013). The findings of this analysis are consistent with the literature in finding a high prevalence in depressive symptoms among U.S. college and university students, with 58.5% of respondents answering "yes, in the last 12 months" to five or more of eleven standard questions to assess the symptoms of depression (American Psychological Association, 2013). This is seven times the prevalence of depression (8.1%) in the general population of U.S. adults aged 20 and over (Brody et al., 2018). In addition, 20.6% of respondents reported having received no information from their institution on depression, anxiety, stress reduction, or suicide prevention. This finding is likely a function of the level of interest, with 23.4% of respondents reporting no interest in receiving information on these subjects from their institution. Further study is needed to explore why students do or do not have interest in

mental health resource information, and how to promote interest. However, more than three of four respondents (76.6%) reported interest in at least one of the subject areas. The information that was received varied by subject area. Information on stress reduction (62.9%) and depression/anxiety (62.7%) were the most commonly reported subjects for having received information. Only half of respondents (50.6%) reported having received information on suicide prevention from their institution. This finding is particularly concerning with respect to the 22.2% of respondents that reported having seriously considered suicide in the last 12 months, and the 3.2% that reported having attempted suicide in the last 12 months. Information dissemination is lacking in that nearly all students will know students with suicide ideation. Additionally, information that addresses depression, anxiety, and stress reduction is also likely to have benefit for students with thoughts of suicide and peers that might provide support. The literature also includes study of the utilization of mental health services, showing a lower utilization by minority students (Barry et al., 2016; Cokley et al., 2017; Eisenberg et al., 2013). However, the role of awareness of mental health resources as a potential factor in lower utilization rates warrants further study.

## Application of Self-Determination Theory

The theoretical framework that was employed in this study was self-determination theory. Self-determination theory was used to describe the intrinsic nature of an individual's feelings of competence to execute a target behavior, feelings of autonomy in behavioral determination, and psychologically relatedness of the target behavior (Deci & Ryan, 2008, Sommet & Elliot, 2017). Awareness of mental health resources, including

information on depression, anxiety, stress reduction, suicide prevention, and the availability and cost of services, is a key factor contributing to the feelings of competence, autonomy, and psychological relatedness. Students must feel competent that they are able to seek help with mental health issues (Where do I go? How do I set up an appointment?). Students also must feel that they have some control and are autonomously able to seek help (Do I qualify for services? Is it affordable?). Additionally, students must feel that the resources available are psychologically relatable (Are these resources relevant to my life and my needs?). The results of this study, that students reporting symptoms of depression are more likely to report having received less information about mental health resources from their institution, indicates that these students do not feel that their institution has equipped them with the information needed to feel competent and autonomous, to seek help. Additionally, students reporting symptoms of depression are less likely to feel that their institution has provided them with information to feel that the mental health resources are psychologically relatable to their needs. The association between minority status and awareness of mental health resources is less clear. Minority students did not consistently report greater or lesser awareness of mental health resources across each of the levels of awareness relative to the referent level (high awareness). Despite this mixed result, it is still critical for institutions to pursue providing more culturally relevant promotional efforts to increase awareness of mental health resources.

## Limitations of the Study

The limitations of the study include that the self-selected college and university population cannot be generalized to the greater student population at other institutions.

Selection bias applies to the non-experimental selection of institutions, although the institutions did randomly select participants within their institution. Selection bias also applies to the handling of missing data for this analysis. Respondents that were missing 10 or more of the 35 raw variables selected from the NCHA for analysis were listwise removed, representing 1.2% of the total number of respondents. These respondents may have disproportionately represented one or more of the associations that were analyzed. Additionally, 7.1% of the respondents had 1 to 9 variables imputed with the series mean, before the final variables were calculated from the raw variables.

A threat to the internal validity, or whether there is sufficient evidence to support the conclusions of the statistical analysis, is the online administration of the survey (Creswell, 2009). Online administration of the survey by 51 of the 52 institutions is a potential threat to internal validity. The mean response proportion for the institutions administering the survey online was 17% (ACHA, 2019). Respondents with less online access, or with more challenges with technology may be disproportionately excluded from the sample. The response proportion for the one institution that administered the survey on paper in classroom sections was 77% (ACHA, 2019). Another limitation of the study is the small effect size of the associations between the presence of depressive symptoms and awareness of mental health resources among minority and non-minority college students, controlling for the covariates. The very large sample size enabled finding significant associations despite small effect sizes of 0.9% to 2.5% of the variation in the dependent variable being explained by the independent variables.

Combining ethnic categories into the binary independent variable, minority status may have had a limiting effect on the analysis of ethnicity on awareness of mental health resources. Although the association between minority status and awareness of mental health resources was significant for two of the three levels of awareness relevant to the referent (high awareness) level, minority students were less likely to report to report high awareness than non-awareness, and conversely minority students were more likely to report a high level of awareness than a moderate level of awareness. Combining white and Asian students into one category (non-minority) and combining all other students into another category (minority) may have played a role in the mixed result.

## Recommendations

Further study is needed to examine the effect of specific interventions to increase awareness of mental health resources. Additionally, study is needed to examine if information is reaching target populations. Are students with a history of suicidal ideation receiving information on suicide prevention, as well as other mental health resources? Are students that report symptoms of depression and or anxiety receiving information on depression and anxiety, as well as information on other mental health resources? Are students that report high levels of stress receiving information on stress reduction, as well as information on other mental health resources? The efficacy and cultural relevance of campaigns to increase awareness of mental health resources should be studied, as well the impact on utilization of on campus mental health services. Additionally, the association between ethnicity and awareness of mental health resources by should be examined for

each ethnic category. Examining each ethnic category relative to the others may allow the associations unique to each ethnicity to be studied.

## Implications for Professional Practice and Social Change

Mental health resources are important services for college and university mental healthcare providers, counselors, administrators, and faculty to provide to students. It is critically important to provide a level of mental healthcare that matches the level of need, as well as making the access to those services universal. Access requires that all students be made aware of the services, and that the services are affordable, convenient, and culturally relevant. Campus campaigns to increase awareness of mental health resources should consider the scope of mental illness on their campus and consider that increasing awareness may also involve increasing interest in mental health and mental healthcare. The results of this study indicate that more than half (58.5%) of college and university students report that they have the symptoms of depression, yet the capacity for providing mental health resources likely falls well short at many institutions.

The results of this study indicate that there are very real shortcomings in the awareness of mental health resources for at least 20% of students that report having received no information from their institution. Additionally, 20% of students also had no interest in information on mental health resources. Lack of interest is troubling considering the likelihood that more than half of their peers have the symptoms of depression. Increasing interest may necessitate destigmatizing mental illness and mental healthcare. Increasing awareness of services is critical to improving the professional practice of mental healthcare providers, counselors, administrators, and faculty with their

communication with students and parents. The results of this study indicate that students positive for the presence of depressive symptoms are less aware of mental health resources on their campus. This is a large, but hidden population that institutions must be able to better promote the support services to address depression among college students.

## Conclusion

Greater than half of the 354,262 respondents reported the symptoms of depression, which is consistent with the literature (Beiter et al., 2015; Eisenberg et al., 2013; Ibrahim et al., 2013). Students reporting depressive symptoms were more likely to report having received less information about mental health resources than students that did not report depressive symptoms. Although the association between reported symptoms of depression and awareness of mental health resources was significant, the effect size was small. The association between minority status and awareness of mental health resources was less clear. Although awareness of mental health resources was significantly different for minority vs. non-minority students in two of the three levels of awareness as compared to the referent level (high awareness), the odds were greater for minority students reporting less information at one level and more information at the other level that was significantly different. Clearly there are shortcomings in the communication of information on available mental health resources to college and university students. 20.6% of students reported not having received any information from their institution on depression, anxiety, stress reduction, or suicide prevention. More students received information from their institution on stress reduction (62.9%) and depression or anxiety (62.7%), than about suicide prevention (50.6%). The finding that

only half of students reported having received information on suicide prevention is cause for concern. 22.2% of students reported having seriously considered suicide in the last 12 months, and 3.2% of students reported having attempted suicide in the last 12 months. There is a clear need for increased dissemination of information on suicide prevention, as well as other mental health resources.

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# Appendix: National College Health Assessment (NCHA) Survey Question Text

**Dependent Variable**

Questions to assess Awareness of Mental Health Resources:

NQ2A) Have you received information on the following topics from your college or university? (Please mark the appropriate column for each row)

(3) Depression/Anxiety No Yes

NQ2B) Have you received information on the following topics from your college or university? (Please mark the appropriate column for each row)

(6) Stress Reduction No Yes

(7) Suicide Prevention No Yes

**Independent Variables**

Questions to assess Minority Status:

NQ54) How do you usually describe yourself? (Mark all that apply):

(A) White

(B) Black

(C) Hispanic or Latino/a

(D) Asian or Pacific Islander

(E) American Indian, Alaska Native, or Native Hawaiian

(F) Biracial or Multiracial

(G) Other

Questions to assess Presence of Depressive Symptoms:

NQ30) Have you ever: (No, never; No, not in the last 12 months; Yes, in the last 2 weeks; Yes, in the last 30 days; Yes, in the last 12 months):

(A) Felt things were hopeless

(B) Felt overwhelmed by all you had to do

(C) Felt exhausted (not from physical activity)

(D) Felt very lonely

(E) Felt very sad

(F) Felt so depressed that it was difficult to function

(G) Felt overwhelming anxiety

(H) Felt overwhelming anger

(I) Intentionally cut, burned, bruised, or otherwise injured yourself

(J) Seriously considered suicide

(K) Attempted suicide

**Control Variables**

Question to assess sex:

RNQ47 uses the responses from three questions to assess sex. If the respondent's gender identity (NQ47C) is consistent with their sex at birth (NQ47A) and the response to the transgender question (NQ47B) is no, then the respondent is categorized as either female or male. If the respondent selects yes for transgender, or their sex at birth is not consistent with their gender identity, then the respondent is categorized as non-binary.

NQ47A) What sex were you assigned at birth, such as on an official birth certificate?

(1) Female

(2) Male

NQ47B) Do you identify as transgender?

(1) Female

(2) Male

NQ47C) Which term do you use to describe your gender identity?

(1) Woman

(2) Man

(3) Trans woman

(4) Trans man

(5) Genderqueer

(6) Another identity (please specify)

Questions to assess interest in mental health resource information:

NQ3A) Are you interested in receiving information on the following topics from your college or university? (Please mark the appropriate column for each row)

(3) Depression/Anxiety No Yes

NQ3B) Are you interested in receiving information on the following topics from your college or university? (Please mark the appropriate column for each row)

(6) Stress Reduction No Yes

(7) Suicide Prevention No Yes

Questions to Assess History of Mental Illness:

NQ34) Have you ever received psychological or mental health services from any of the following? (Please mark the appropriate column for each row)

(A) Counselor/Therapist/Psychologist No Yes

(B) Psychiatrist No Yes

(C) Other medical provider (e.g., physician, nurse practitioner) No Yes

(D) Minister/Priest/Rabbi/Other clergy No Yes

NQ65) Do you have any of the following? (Please mark the appropriate column for each row)

(G) Psychiatric condition No Yes