Examining the Relationship Between Loneliness and Mental Health

Among College Students

by

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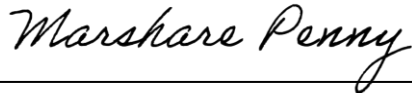The College of Health Science

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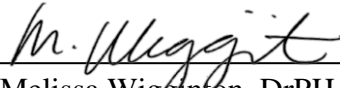for the degree of
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Abstract

In the United States (U.S.) in 2019, 51.5 million or nearly one in five U.S. adults were estimated to live with a mental illness. Mental health among college students is a growing concern as it can pose a major threat to public health (WHO, 2021). Nearly half of college-aged people in the United States have a mental condition. The purpose of this study was to explore the relationship of loneliness and mental health among university students, the drivers of loneliness such as educational status and one's sex, and the association of psychological or mental services among college students. This cross sectional study used secondary data from the fall 2019 American College Health Association National College Assessment III (ACHA-NCHA III). A Chi-square test of independence was used to evaluate the relationship between mental health status and educational status and loneliness. Also examined was the association between the mental health status and sex. Lastly, the difference between utilization of psychological or mental health services between sex was evaluated using aa Chi-square test. A significant relationship was found, $X^2(1, N= 3697)= 10.117, p = .001$) between educational status and mental health status as well as between loneliness and mental health status, ($X^2(1) = 375.767, p =.001$). A significant association was found, ($X^2(1) = 15.926, p = .001$) between mental health status and sex. A significant difference was found ($X^2(1) = 117.016, p = .001$) suggesting a difference between the use of phycological or mental health services and sex.

Key Words: loneliness, mental health, sex, educational status, college students

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Introduction

Overview of the Literature

Mental health illness is a leading cause of disability worldwide (World Health Organization[WHO], 2021). In the United States (U.S.) in 2019, 51.5 million or nearly one in five U.S. adults were estimated to live with mental illness (U.S. Department of Health and Human Services, 2021). There has been a 13% rise in mental health conditions over the last decade (WHO, 2021). According to the Centers for Disease Control and Prevention (CDC) (2018), mental health illnesses are conditions that affect a person's thinking, feeling, mood, or behavior, such as depression, anxiety, bipolar disorder, or schizophrenia. Such conditions may be occasional or long-lasting (chronic) and affect someone's ability to relate to others and function daily (CDC, 2018).

Mental Health among College Students

Mental health among college students is a growing concern (WHO, 2021). Almost half of university students report moderate levels of stress-related mental health issues, such as anxiety and depression (Regehr et al., 2013). Nearly half of college-aged people in the United States have a mental condition (Blanco et al., 2008). Results from the 2019 National Survey on Drug Use and Health found young adults aged 18-25 years had the highest prevalence of any mental health illness (29.4%) compared to adults aged 26-49 years (25.0%) and aged 50 and older (14.1%). Any mental illness (AMI) is defined as a mental, behavioral, or emotional disorder. AMI can vary in impact, ranging from no impairment to mild, moderate, and even severe impairment. Approximately 75% of all individuals with lifetime

mental health disorders have their first onset before the age of twenty-four (Pedrelli et al., 2015). On average, college students begin their college experience between the ages of 18 to26 years old. This means college students are in the age range with the highest prevalence of mental health disorders. College students face many challenges as this is the time they transition from adolescence to adulthood. Students in college are required to balance challenging academic workloads with the development of peer relationships and the formation of new social networks (Moellera & Seehuus, 2019). As college students gain freedom and individualization, various changes affect relationships, routines, and roles. This transition can lead to loneliness making college students' mental health vulnerable.

Loneliness and Mental Health

Loneliness has a variety of negative impacts on one's health. Loneliness is described as an emotional state in which a person is conscious of being separated from another or others and the experience of a vague desire for independence (Bekhet, Zausziewski, & Nakhla, 2008). There are two types of loneliness: lack of personal and personal relationships, which leads to emotional loneliness, and a lack of a network of social contacts, leading to social loneliness. A recent study conducted by Diehl, Jansen, Ishchanova, and Hilger-Kolb, (2018) found determinates of emotional and social loneliness among students related to morbidity. The experience of emotional loneliness exceeded social loneliness (severe loneliness: 7.7 percent vs. 3.2 percent). Both were shown to be positively related to emotions of depression and anxiety, which in turn can lead to increased risk of mortality and morbidity.

A limited amount of literature has investigated the relationship between loneliness and mental health concerns among college students. Research suggests a strong connection between students' experiences of loneliness and depression and anxiety (Richard et al., 2017). Studies have shown loneliness is prevalent among university students, with 32.4% feeling moderately lonely and 3.2% feeling severely lonely (Diehl et al., 2018). Emotional loneliness was more common than social loneliness, but both were positively associated with feelings of depression and anxiety.

Sex and Mental Health

Female college students tend to have a higher prevalence of mental health conditions compared to males. In a study done by Raza, Abbasi, Khurshid, and Ansari (2018), females scored slightly higher on depression, anxiety, and stress compared to males. Other studies have found a gender-dependent impact of isolation and loneliness on depressive symptoms. Liu et al. (2020) found that higher levels of both social isolation and loneliness were found to be associated with increased depressive symptoms for female students. However, for male students, only social isolation was positively associated with increased depressive symptoms. Females and males respond to stress differently as a consequence of their differential sensitivity to events (Afifi, 2007). Females were more vulnerable to psychological stress and emotional pain than males, so they might experience greater sadness and anxiety (Chaplin et al., 2008).

Considering the rise of mental health illness among college students, colleges have provided ways for students to cope with mental health on campus. For example, colleges have offered free mental health counseling for students. Seehuus, Moeller, and Peisch (2021) found approximately 35% of the students in their study received mental health treatment during college, with almost half of fourth-year students receiving mental health treatment while in college. Women and participants identifying as a gender category different than men and women were significantly more likely to report receiving treatment (Seehuus, Moeller, & Peisch, 2021).

Educational Status and Mental Health

There are few studies highlighting mental health among college students across differing academic years. The results of a study by Fauziyyah and Ampuni (2018) concluded depression tendencies, social skills, and loneliness did not differ between males and females. Based on the college year, there were differences in levels of depression tendencies ($F = 2.462$, $p < 0.05$), social skills ($F = 3.2\,29$, $p < 0.05$), as well as loneliness ($F = 2.840$, $p < 0.05$). Depression tendencies and loneliness were highest in the fifth year of college. The lowest level of social skills was revealed among participants in the second and fifth year. Students in the fifth year onwards showed the highest tendencies of depression and loneliness, as well as low-level social skills, which were measured using the Social Skills Scale. Therefore, low social skills lead to increased loneliness and, in turn, increased depression tendencies among college students. The findings of this study support our prediction that educational status among college students increases mental health.

Conclusion

Loneliness is associated with an increased risk of certain mental health problems such as depression, anxiety, and low self-esteem. People who experience loneliness are more likely to experience a range of negative mental health outcomes, including increased symptoms of depression and anxiety (Cacioppo, Grippo, London, Goossens, & Cacioppo, 2015). According to Cacioppo, Hawkley, and Thisted (2010), depression prediction and individual feelings of loneliness and social isolation may have a linear relationship. Exploring the relationship between loneliness, sex, educational status, and mental health among college students and the use of mental health services among sex is essential to enhance the research that is known about mental health and loneliness among college students.

Purpose of the Study

There have been minimal studies on health and health-related behaviors among university students in their feelings of loneliness. Hence the importance of examining the relationship between loneliness and mental health among college students. This study can help researchers understand the potential influence loneliness has on mental health among college students. As a result, this study aims to explore the relationship of loneliness and mental health among university students, the drivers of loneliness such as educational status and one's sex, and the association of psychological or mental services among college students. This study can help bring awareness to the subject and help address the prevalence of mental health among

college students. It will also examine the predictors of loneliness and mental health to support ways to improve student's quality of life.

Research Questions

1.   Is there a relationship between educational status and mental health status among college students?

2.   Among college students, is there an association between mental health status and sex?

3.   Is there a relationship between loneliness and mental health status among college students?

4.   Is there a significant difference between the self-reported use of psychological or mental health services between sex?

Hypotheses

It is hypothesized that there is a relationship between loneliness and mental health among college students. It is further hypothesized that the relationship between mental health status and loneliness may be influenced by sex, educational status, and self-report use of mental health services. The relationship between mental health status and loneliness is expected to be higher for fourth year, female students who do not utilize mental health services.

Method

Design

A cross-sectional design was used in this study. This study used data from the fall 2019 American College Health Association (ACHA) National College Health Assessment III (ACHA-NCHA III). The ACHA-National College Health Assessment III is a national research data set organized by the American College Health Association (ACHA) that collects data about college students' habits, behaviors, and perceptions on the most prevalent health topics. In the year 2000 the National College Health Assessment (NCHA) was unveiled as the first comprehensive population level health status assessment tool for college students. The target population in this study are typical college students. The NCHA is used by two-year and four-year public and private institutions from varied geographical regions, Carnegie Foundation Classifications, and campus settings.

Procedures

The ACHA-NCHA is conducted annually during the fall and spring college semesters. The Fall 2019 ACHA-NCHA III data was collected during the fall 2019 semester. The data collection method for the fall 2019 ACHA-NCHA III consisted of a web-based survey administered via Qualtrics. Fifty-eight postsecondary schools in the United States self-selected to participate in the fall 2019 ACHA National College Health Assessment, and students on these campuses completed 38,679 web questionnaires. Universities provide ACHA with students email addresses. ACHA contacts students to participate in the ACHA-NCHA through a letter of invitation sent via email. ACHA will email each student their own unique URL for the survey. The

ACHA-NCHA III takes about 20-30 minutes to complete. Students can begin the survey, take a break, and pick up where they left off if they leave the survey. Students are able to take the ACHA-NCHA III on a mobile device such as a mobile phone or tablet. The data collection includes a variety of college age groups 18-20 years, 21-24 years, 25-29 years, and 30+ years, and all student academic year 1st year undergraduate, 2nd year undergraduate, 3rd year undergraduate, 4th year undergraduate, 5th year or more undergraduate, masters, doctorate, not seeking a degree, and other. Permission to use ACHA-NCHA III was attained from The American College Association (see Appendix B).

Participants

The fall 2019 ACHA-NCHA III surveyed a total of 38,679 participants. In this study there were 61.9% female, 34.4% male, and 2.9% non-binary. The ethnicities which were represented in the fall 2019 ACHA-NCHA III were 61.3% white, 18.3% Hispanic, 12.3% Asian, 9.7% African American, 2.1% American Indian, 1.4% Middle Eastern, 0.6% Native Hawaiian, and 4.0% two or more races. The ages represented in the fall 2019 ACHA-NCHA III were 50.8% 18-20 year, 28.5% 21-24 years, 11.1% 25-29 years, 9.6% 30+ years. 23.0% were 1st year undergraduates, 19.1% were 2nd year undergraduates, 17.8% were 3rd year undergraduates, 14.5% were 4th year undergraduates, 3.9% were 5th year or more undergraduates, 11.0% were master's (MA, MS, MFA, MBA, etc.), 9.2% were doctoral (PhD, EdD, MD, J D, etc.), 0.6% were not seeking degree, and 0.9% identified as other.

Using G*Power Software, Version 3.1.9.2, a medium effect size of 0.30, an alpha level of 0.50, and a power of 80% was selected to estimate the minimum required sample size of 96 participants. In order to ensure a large enough sample, we

randomly selected 10% of the participants, and after removing any missing values, the final sample size was 3,717, which met the minimum required sample.

Independent Variable and Dependent Variable

This study was used to answer four research questions, using data from the ACHA-NCHA III survey. The independent variable for the first research question is educational status. This was measured by the question, *"What is your year in school?"* followed by the options of: "1st year undergraduate", "2nd year undergraduate", "3rd year undergraduate", "4th year undergraduate", 5th year or more undergraduate", "Master's", "Doctorate", Not seeking a degree", and "Other (Please specify)" (ACHA-NCHA III, 2019). Responses were recoded into two categories: undergraduate education or lower and graduate degree or higher. Those who responded to the options of "1st year undergraduate", "2nd year undergraduate" "3rd year undergraduate", "4th year undergraduate", "5th year or more undergraduate" and "Not seeking a degree" were collapsed and recoded as "undergraduate education or lower". Those who responded to the option of "Master's" or "Doctorate," were collapsed and recoded as "graduate degree or higher". Respondents who responded with "other (please specify)" were recoded to either undergraduate education or lower or graduate degree or higher based on their text response. 0.5% of respondents who answered other were not able to be recoded as it was unclear which of the two categories response would fall under.

The independent variable for the second and fourth question is sex. Sex is a nominal variable. The question used to measure this variable was, *"What sex were*

you assigned at birth?" followed by the options of *female, male,* and *intersex.* (ACHA-NCHA III, 2019). Responses were recoded to two categories female and male. Fewer than 1% of the sample self-identified as intersex. Due to the low response to the intersex category, this option was excluded from the analysis.

The independent variable for the third question is loneliness. Loneliness is a nominal variable. To measure loneliness, the UCLA Three-Item Loneliness Scale (Hughes, et. al. 2004) was used. Participants were asked to indicate *"How often do you feel that you lack companionship?, How often do you feel left out?, and How often do you feel isolated from others?"* (ACHA-NCHA III, 2019*)*. Response options included *Hardly ever* = 1; *Some of the time* = 2; or *Often* = 3 (ACHA-NCHA III, 2019). Responses were coded as positive for loneliness if the calculated sum score was between 6-9 and negative for loneliness if the calculated sum score was between 3-5.

The dependent variable for the first three research questions is mental health status, which was measured using the Kessler 6 Distress Scale (K6), resulting in no, low, moderate or serious psychological distress and usage of psychological/ mental health services. The K6 is a tool that measures non-specific psychological distress while screening for mental health issues among the general population. Six self-reported items were used to screen for serious mental illness during the past 30 days.

Using the question stem of "how often do you feel…", participants reported whether they had experienced six psychological symptoms during the past 30 days. Examples of items included: "nervous, hopeless, restless or fidgety, so sad nothing

could cheer you up, that everything was an effort, and lastly worthless". Response options included *All of the time* = 4; *Most of the time* = 3; *Some of the time* = 2; *A little of the time* = 1; and *None of the time* = 0. A calculated score of serious psychological distress ranges from 13-24. A moderate psychological distress score was 9-12 and no or low psychological distress is 0-8. Respondents scores were recoded into two categories. The first category combined those with low to no and moderate psychological distress scores together and recoded as "moderate, low to no psychological distress". The second category consisted of those who scored 13 or higher, indicating serious psychological distress, and was coded as such.

The dependent variable for the fourth research question is usage of psychological or mental health services. This variable was measured by using the question, *"Have you ever received psychological or mental health services?"*, which included response options of "yes" or "no" (ACHA-NCHA III, 2019).

Data Analysis

Descriptive analysis was used to report the demographic characteristics of the sample. A chi-square test of independence was used to answer all four questions: the relationship between educational status and mental health status, the association between mental health and sex, the relationship between loneliness and mental health status.

Finally, to explore the difference between the use of psychological or mental health services and sex, a chi-square test of independence was performed. All statistical analyses were performed using IBM SPSS Statistics version 27.

<center>**Results**</center>

Demographics

The Fall 2019 ACHA-NCHA III included 38,679 respondents, 3,717 of whom were randomly sampled and utilized to answer the research questions in this study. As shown in table 1, the majority of the ACHA-NCHA III respondents identified as female (63.4%), with 63.5% classifying themselves as White (63.5%), followed by Hispanic or Latinx, (18.3%), Asian or Asian American (12.0%), Black or African American (9.3%). Most (51.8%) of the survey respondents were 18-20 years old. Nearly one-quarter were 1st year undergraduate college students. Half (50.9%) of the survey respondents scored a value between 3-5, meaning they are not feeling lonely or social isolation and most (82.7%) of the survey respondents reported having no, low, or moderate psychological distress.

Major Findings

Relationship between Educational Status and Mental Health Status

For the first research question, *"Is there a relationship between educational status and one's mental health status?",* a chi-square test of independence was performed to test the association between educational status and mental health. A significant relationship was found, XX^2 (1, N= 3697) = 10.117, p = .001). This suggests there is a relationship between educational status and mental health. The odds of reporting serious psychological distress are 35.1% less likely when college students are pursuing graduate or higher education, compared to when college students are pursuing undergraduate or lower education.

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Table 2

Chi-Square Results: Educational Status vs. Mental Health Status (N= 3697)

	Mental Health Status		
Educational Status	No, low or moderate Psychological Distress N (%)	Serious Psychological Distress N (%)	Adjusted OR (95% CI)
Undergraduate or Lower Education	2431(65.8%)	545(14.7%)	.685*
Graduate or Higher Degree	625(16.9%)	96(2.6%)	(.542, .866)

OR, odds ratio; CI, confidence interval. Chi-square test was used to assess the relationship between educational status and mental health. *p= .001

Association between Mental Health Status and Sex

To answer the second question, *"Among college students, is there an association between mental health status and sex?",* a chi-square test of independence was performed. A significant association was found, ($\chi^2(1) = 15.926$, *p* = .001). This suggests there is an association between mental health status and sex. The odds of reporting serious psychological distress are 31.2% lower for males, compared to females.

Table 3

Chi-Square Results: Sex vs. Mental Health Status (N=3716)

	Mental Health Status		
Sex	No, low or moderate Psychological Distress N(%)	Serious Psychological Distress N (%)	Adjusted OR (95% CI)
Female	1904(51.2%)	452(12.2%)	.688*
Male	1169(31.5%)	191(5.1%)	(.572, .827)

OR, odds ratio; CI, confidence interval. Chi-square test was used to assess the association between mental health and sex. *p< .001

Relationship between Loneliness and Mental Health Status

A chi-square test of independence was used to answer the third research question, *"Is there a relationship between loneliness and mental health status among college students?"* A significant relationship was found ($X^2(1) = 375.767$, *p* =.001). This suggests there is a relationship between loneliness and mental health status. Among college students, the odds of reporting serious psychological distress are 7.2 times higher for those who are lonely compared to those who are not lonely.

Table 4

Chi-Square Results: Loneliness vs Mental Health Status (N=3717)

	Mental Health Status		
Loneliness	No, low or moderate Psychological Distress N(%)	Serious Psychological Distress N (%)	Adjusted OR (95% CI)
Not lonely	1789(48.1%)	104(2.8%)	7.215*
Lonely	1285(34.6%)	539(14.5%)	(5.780, 9.007)

OR, odds ratio; CI, confidence interval. Chi-square test was used to assess the relationship between loneliness and mental health. *p< .001

Differences in Self- Reported Use of Psychological or Mental Health Services

between Sex

Lastly, to answer the fourth research question, *"Is there a significant association between self-reported use of psychological or mental health services and sex,* a chi-square test of independence was utilized. A significant difference was found ($X^2(1) = 117.016$, $p = .001$). This suggests there is a difference between the two variables, ever use of psychological/ mental health services and sex. Among college students, the odds of ever receiving psychological or mental health services are 53.4% less likely in males, compared to females.

Table 5

Chi-Square Results: Sex vs. Use of Psychological / Mental Health Services (N=3716)

	Use of Psychological Services		
Sex	No N(%)	Yes N (%)	Adjusted OR (95% CI)
Female	1163(31.3%)	1193(32.1%)	.466*
Male	920(24.8%)	440(11.8%)	(.406, .536)

OR, odds ratio; CI, confidence interval. Chi-square test was used to assess the association between self-reported ever use of psychological or mental health services and sex. *p< .001

Summary of Major Findings

The purpose of this study was to examine the relationship between loneliness and mental health educational status among college students. In addition, this study sought to examine the difference in self-reported use of psychological or mental health services between males and females. Using secondary data collected during the Fall 2019 ACHS, the study examined a random sample of 3,717 respondents.

The first research question analyzed the relationship between education and mental health status among college students. According to the results, a significant relationship between educational status and mental health was found. These results align with a Fauziyah & Ampuni (2018) study, that found depression tendencies and loneliness are higher during the fifth year of college. Being in college for more than four years can cause psychological distress for college students. College students begin to feel rushed as if they are running out of time and knowing that fellow peers graduated brings feelings of loneliness. Porrur & colleagues (2021) conducted a study that showed female students' psychological distress is significantly higher among those enrolled in a bachelors degree (M = 27.9, SD= 8.4) compared to those enrolled in a master's degree. ($p = 0.001$). Among male students, those enrolled in a master's degree (M = 22.6, SD= 7.6) reportedly significantly lower level of psychological distress compared to those enrolled in a bachelor's degree ($p = 0.018$). One possible reason why college students experience higher psychological distress during undergraduate studies could be due to the various social transitions that comes from high school to university. College is a stressful time, especially for those who moved

away to college or living on their own for their first time. Students need to adjust to new relationships, routines, and roles. The competing demands of work, study, and family responsibilities maybe contributing to psychological distress (Leahy et al., 2010). This increase independence could be a lot for one to adapt and manage their academics as well, which can cause psychological distress if one does not cope well. Nieuwoudt (2021) found prior literature from Stallman, (2010) indicating psychological distress is associated with reduced academic performance and engagement thus having implications for retention and completion rates. Interventions focusing on college students' early college life transition is essential in ensuring coping strategies are being provided to college students at the beginning of their college years for a successful college completion.

The second research question showed an association between mental health status and sex, with the odds of being at risk for serious psychological distress higher among females than males. These results support previous research indicating female students were more likely to report psychological distress than male students (Porru et al., 2021). Another study showed females scored slightly higher on depression, anxiety, and stress compared to males (Raza, Abbasi, Khurshid, and Ansari, 2018). Our findings confirm that gender matters in mental health. However, gender differences are often caused by other factors rather than gender itself. For instance, Seehuus, Moeller, & Peisch (2021) suggest gender differences in mental problems can be due to minority stress. According to Meyer (2013), sexual minorities have greater incidence of mental health issues as a result of experiences with discrimination, stigma, rejection, and the added stress of keeping one's sexual

orientation a secret or out in the open. This added stress can take a toll on sexual minorities increasing psychological distress. Future research should focus on the factors and mechanisms underlying the gender gap rather than just checking for their presence.

The third research question evaluated the relationship between loneliness and mental health status among college students. Results indicated that there was a significant relationship found between the two variables of loneliness and mental health. The data suggests college students experiencing loneliness are prone to psychological distress. A study conducted by Richardson and colleagues (2017) found a strong connection between students' experiences of loneliness and depression and anxiety. Fauziyyah1 & Ampuni (2018) found poor social skills lead individuals to negative feelings toward their interpersonal relationships, both in quantity (e.g., feeling lack of close friends) and quality (feeling lack of close relationships) thus making them feel lonely. This lack of social relationships will make students vulnerable to feelings of loneliness which can lead to depression (Fauziyyah1 & Ampuni, 2018). Previous studies from Diehl et al., (2018) indicated 32.4% of university students reported feeling moderately lonely and 14.5% of our study being positive for loneliness and having serious psychological distress, it is crucial for universities to establish interventions such as support groups, and social group programs for college students to utilize when their vulnerable. Interventions providing social support groups can help increase social skills thus decreasing loneliness and depression tendencies among college students (Fauziyyah1 & Ampuni, 2018).

Research question four sought to identify the difference between self-reported use of psychological or mental health services between sex. Prior research aligns with our results, indicating a significant difference between the use of psychological/ mental health services and sex. A research study done by Seehuus, Moeller, & Peisch (2021) found among those with anxiety and depressive symptoms, the odds of females being in treatment were 2.32 times higher than the odds of males being in treatment. A study conducted by Eisenberg et al. (2009), found male and Asian students were more likely to have personal stigma associated with use of mental health services, and were less likely to utilize available services. Parental norms as well as stigma and shame are strong predictors of use of mental health treatment among male college students (Corrigan et al., 2016). According to Seehuus, Moeller, & Peisch (2021) since male adolescents are seeking treatment at a much lower rate, it is crucial to target males more directly to normalize seeking help, reduce stigma and explore other ways to reduce barriers for seeking help services.

Public Health Implications

The information obtained from this study can be helpful to public health professionals, local entities, and future research studies to help identify predictors of loneliness in college students and in order to inform efforts to improve the college experience for vulnerable students. The data further showed feelings of loneliness can greatly affect an individual's mental health. As aligned with previous studies determinants of emotional and social loneliness among college students are related to morbidity. The overall goal is to decrease psychological distress leading to feelings of loneliness with the potential to increase the risk of morbidity if left untreated. Public

health professionals and agencies should continue to work with colleges to provide medical and well-being services, for example expanding and enhancing current interventions. Many college campuses already have counseling and psychological services available for students. One public health policy that should be implemented is the removal of limits on mental health office visits. For example, California State University, Fullerton maximum amount of individual therapy sessions per academic year is 10 (Individual therapy, 2022). Having a limit on the amount of sessions is not beneficial as short term counseling is most effective with students who are motivated, and willing to work on suggestions (Individual therapy, 2022).

Another way in which this could be done is by enhancing current interventions in university campuses. Sagar-Ouriaghil, Brown,Tailer, & Godfrey (2020) found that adjusting therapeutic environment to be male-specific, male values can assist with normalizing help-seeking and reduce stigma. Universities can make interventions only for male participants, having this male only space can assist with protecting the vulnerability men experience when trying to seek for mental health. Interventions focusing on social support can also help increase social relationships which in turn decrease feelings of loneliness that lead to psychological distress.

Furthermore, the findings of the study show that females have a higher likelihood of reaching out for support services. Public health professionals should develop innovative marketing strategies for reaching out to a larger portion of male college students experiencing psychological distress. According to a study conducted by Sagar-Ouriaghli et al. (2019) the use of role models to convey information, psychoeducational material to improve mental health knowledge, assistance with

recognizing and managing symptoms, active problem-solving tasks, were all important strategies used in interventions that contributed to improved help-seeking attitudes, intentions, or behaviors among males. For example, the use of role models can help bring awareness and help normalize psychological distress males face thus leading to acceptance of the issues and enabling males to acknowledge their symptoms to help in reducing mental health stigma among males (Ferrari, 2016). Improving mental health literacy and utilizing role models can be a great way to support males in helping them identify symptoms of psychological distress and seeking help. Reasons for why female adolescents report a higher psychological distress and seeking for resources was not studied in our research, however prior research has found males have a lower rate of help seeking due to stigma and shame. Health professionals should explore barriers for help seeking, specifically targeting male college students. It is important to assess college students' mental health while pursuing an education as one's mental health can make college students more vulnerable to mental disorders. Poor mental health can have a huge impact on a college student's ability to complete their education.

Study Limitations

This had a few limitations. First, the study used secondary data collected in the Fall 2019 ACHA-NCHA III. The use of secondary data often results in no control over data quality. Extra steps to evaluate the validity and reliability must be taken by evaluating how information was gathered, analyzed, and presented (Disadvantages of Secondary Research, 2022). Data collection was conducted in prior years for specific research questions. Utilizing secondary data requires researchers to familiarize

themselves with the data and be sure they understand the data limitations. Collapsing the variables from the Kessler 6 Distress Scale, for example moderate, low and no psychological distress into one variable, moderate low to no psychological variable is a limitation. By collapsing the variables and not using the full scale as a continuous variable this forces the use of a nonparametric test.

The ACHA-NCHA III was collected using an online survey. The online survey is a self-report questionnaire which may result in social desirability and recall bias. When participants report on their own experiences they are consciously or unconsciously influenced by social desirability. Participants are likely to report experiences that are considered to be socially acceptable or preferred (Salters, 2020). It is critical to find an alternate option to validate individuals self-reported responses. Next, participants in the study could have forgotten or not easily recalled feelings during the past 30 days when completing the Kessler 6 questionnaire. Therefore, participants will record an estimate making the data less accurate. The length of the survey could also be considered a limitation. The survey consists of 87 questions that is estimated to be completed in 30 minutes. Although the survey consists of 87 questions, most of the questions have more than one question embedded within it. The length of the survey and the structure of the questions explains the response rate of 14%, which is a relatively small sample to gain a full view of college students health issues.

Conclusion

Overall, the study provides evidence that there is a relationship between loneliness and mental health among college students. Further research across predictors of loneliness and mental health among college students is needed to improve the college experience of vulnerable students. Universities need to understand the factors contributing to loneliness and the ways in which it affects the daily lives of college students in ways that may negatively impact their mental health and well-being.

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Appendix A: Tables

Table 1

Demographics Details for Fall 2019 ACHA-NCHA III Respondents (N=3.717)

		N	%
Sex	Male	1360	36.6
	Female	2356	63.4
	Intersex	1	0
Age	18-20 years	1924	51.8
	21-24 years	1032	27.8
	25-29 years	408	11.0
	30+ years	353	9.5
Race/Ethnicity	American Indian or Native Alaska	75	2.0
	Asian or Asian American	447	12.0
	Black or African American	347	9.3
	Hispanic or Latino/a/x	682	18.3
	Middle Eastern/ North African or Arab Origin	35	0.9
	Native Hawaiian or Pacific Islander Native	28	0.8
	White	2360	63.5
	Biracial or Multiracial	152	4.1
	Identity not listed above	60	1.6
Student Status	1st year undergraduate	859	23.1
	2nd year undergraduate	721	19.4
	3rd year undergraduate	684	18.4
	4th year undergraduate	539	14.5
	5th year or more undergraduate	153	4.1
	Master's (MA,MS,MFA,MBA,MPP,MPA,MPH, etc)	380	10.2
	Doctorate (PhD, EdD, MD, JD, etc)	341	9.2
	Not seeking a degree	20	0.5
	Other	20	0.5

Note: N = sample size, % = percentage. Data Source: Fall 2019 ACHA-NCHA III

Table 2

Chi-Square Results: Educational Status vs. Mental Health Status (N=3697)

	Mental Health Status		
Educational Status	No, low or moderate Psychological Distress N(%)	Serious Psychological Distress N (%)	Adjusted OR (95% CI)
Undergraduate	2431(65.8%)	545(14.7%)	.685*
Graduate or Higher Degree	625(16.9%)	96(2.6%)	(.542, .866)

OR, odds ratio; CI, confidence interval. Chi-square test was used to assess the relationship between educational status and mental health. *p= .001

Table 3

Chi-Square Results: Sex vs. Mental Health Status (N=3716)

	Mental Health Status		
Sex	No, low or moderate Psychological Distress N(%)	Serious Psychological Distress N (%)	Adjusted OR (95% CI)
Female	1904(51.2%)	452(12.2%)	.688*
Male	1169(31.5%)	191(5.1%)	(.572, .827)

OR, odds ratio; CI, confidence interval. Chi-square test was used to assess the association between mental health and sex. *p< .001

Table 4

Chi-Square Results: Loneliness vs. Mental Health (N=3717)

	Mental Health Status		
Loneliness	No, low or moderate Psychological Distress N(%)	Serious Psychological Distress N (%)	Adjusted OR (95% CI)
Not lonely	1789(48.1%)	104(2.8%)	7.215*
Lonely	1285(34.6%)	539(14.5%)	(5.780, 9.007)

OR, odds ratio; CI, confidence interval. Chi-square test was used to assess the relationship between loneliness and mental health. *p< .001

Table 5

Chi-Square Results: Sex vs. Self-Use of Psychological / Mental Health Services

(N=3716)

	Use of Psychological Services		
Sex	No N(%)	Yes N (%)	Adjusted OR (95% CI)
Female	1163(31.3%)	1193(32.1%)	.466*
Male	920(24.8%)	440(11.8%)	(.406, .536)

OR, odds ratio; CI, confidence interval. Chi-square test was used to assess the association between self-reported ever use of psychological or mental health services and sex. *p< .001