Mental Health of University Students: Prevalence and a Way to Access Help

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Chin-Ya Yueh
Karen Murphy

INTRODUCTION

Generation Z (born 1997–2012) is facing increasing mental health challenges, especially depression and anxiety, worsened by the pressures of social media and online competitive E environments. Even though more people have started becoming aware of these issues, many students still remain undiagnosed and untreated because of barriers such as lack of access to therapy or stigma preventing them from seeking help. This project's goal is to provide early detection of mental health struggles for both diagnosed and undiagnosed students. We want to identify those at high risk through self-assessment tools like surveys which include PHQ-9, GAD-7, ACHA well-being, and self-health assessment metrics.

Our approach aligns with research [5], which supports universal mental health screening to identify symptoms at a moderate level before they escalate into more severe conditions. By analyzing demographics, mental health total scores, and accessibility, we seek to provide personalized interventions for students in need to improve their mental well-being and ensure that everyone receives the support equally.

METHODOLOGY

Data Collection, Cleaning, and Preparation

The dataset used for this study was taken from the openICPSR public repository and captures insights into mental health perceptions and behaviors among students across U.S. colleges. The survey contained responses to standard mental health screening questionnaires that assess depression (Patient Health Questionnaire-9 (PHQ-9)), anxiety (Generalized Anxiety Disorder-7 (GAD-7)), well-being (American College Health Association (ACHA) Well-Being Assessment), and self-reported general health. Together, these self-reported questionnaires assess the presence and severity of depression (PHQ-9) and anxiety (GAD-7) and insights into the holistic well-being of college students (ACHA).

The original dataset contains 581 rows and 129 columns, covering a range of variables related to mental health metrics, diagnosis status, general health, demographics, and service access.

Before we started on the analysis, we conducted data cleaning and preparation to refine the dataset:

- Removed unrelated variables such as the recorded date and time taken to complete the survey.

- Filtered the dataset to include only students born between 1997 and 2012, focusing on Gen-Z.
- Converted categorical columns into integers (e.g., yes/no as 1/0, frequency scaled from 0 to 6).
- Combined multiple race columns into a single column to account for students identifying with multiple races.
- Created a new record_id column to uniquely identify each student record.
- Added columns for calculating the total scores of the GAD7 and PHQ9 assessments and created a risk_level column to categorize students based on their scores, following the approach recommended by Stochl et al. (2022) [1].
- Checked for and handled missing values and duplicates.
- Converted categorical variables into numerical format for analysis.
- Applied one-hot encoding to multi-category variables.
- Created a new column combining therapy and medication information to represent treatment status.

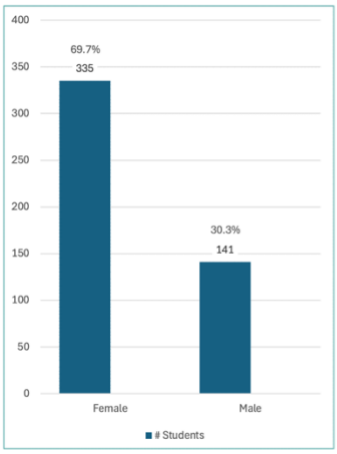
Data Analysis

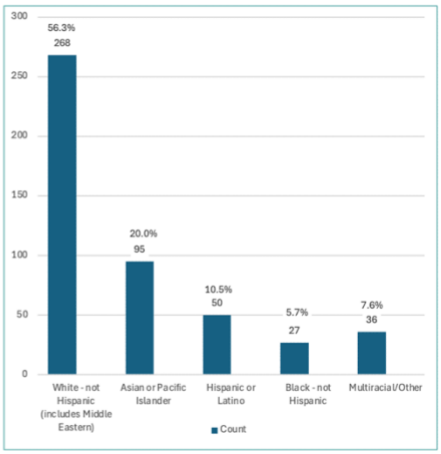
The dataset was analyzed using Excel and Python to extract insights into the prevalence of mental health issues among university students. The initial descriptive statistical analysis summarizes and aggregates the PHQ-9, GAD-7, responses to ACHA well-being, and general health variables. Further statistical analysis was conducted to explore correlations between variables and identify important features using XGBoost for predictive modeling.

KEY FINDINGS

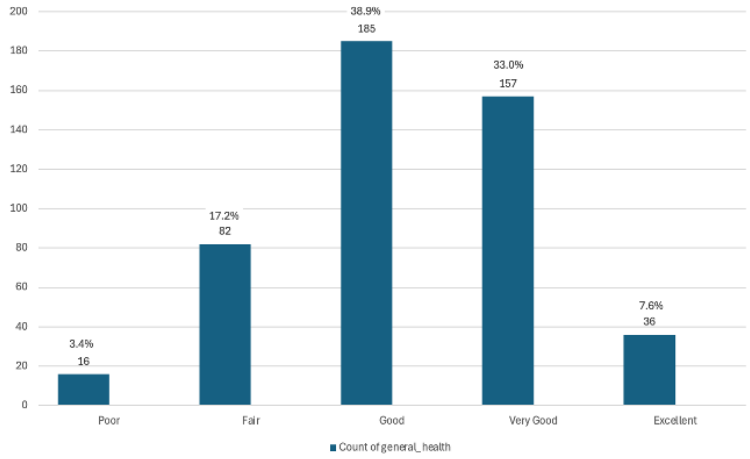
Student Demographics

The participants in the survey were students in universities in the United States. However, no participants were in Alaska, Montana, Wyoming, South Dakota, Mississippi, and Vermont. The states with the highest number of participants are California, Texas, and New York. Of the participants, 69.7% were female and 30.3% were male. Most students identified as White (non-Hispanic), with 20% identifying as Asian/Pacific Islander, 10.5% as Hispanic/Latino, and 5.7% as Black (non-Hispanic). A third of those surveyed had been diagnosed with depression, and 84% were women.



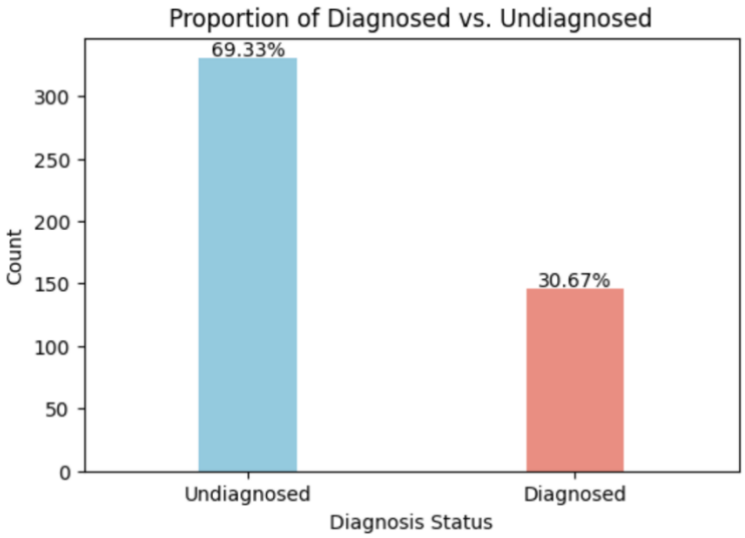


Health Report



Most students describe themselves as in *Good* or *Very Good* health when asked to assess their general health, reflecting a favorable perception of their overall well-being. This trend is seen when the students were broken down by gender or race.

69.33% of students are undiagnosed, which highlights a potential gap in diagnosis within the student population. While this doesn't necessarily mean that all undiagnosed students are at high risk, it shows that there may be a significant portion have not sought or received mental health evaluations. There is a need to improve access to mental health care and ensure that students who are at risk are properly identified and supported.



Survey Results

PHQ-9 and GAD-7

The PHQ-9 and GAD-7 assessments estimate the level of depression and anxiety, respectively. The response describes the frequency of symptoms reported by the patient. A numerical value is assigned to the frequency ranging from 0 (does not experience at all) to 3 (experienced daily). The total score for each question is the sum of the numerical value to the responses, nine questions in total for PHQ-9 and seven questions for GAD-7. The total scores range from 0-27 for depression and 0-21 for anxiety. The scores help determine the severity of the condition. Below is the standard score and severity usually used by clinicians.

PHQ-9	
Score Value	**Description**
0-4:	Minimal or no depression
5-9:	Mild depression
10-14:	Moderate depression
15-19:	Moderately severe depression
20-27:	Severe depression

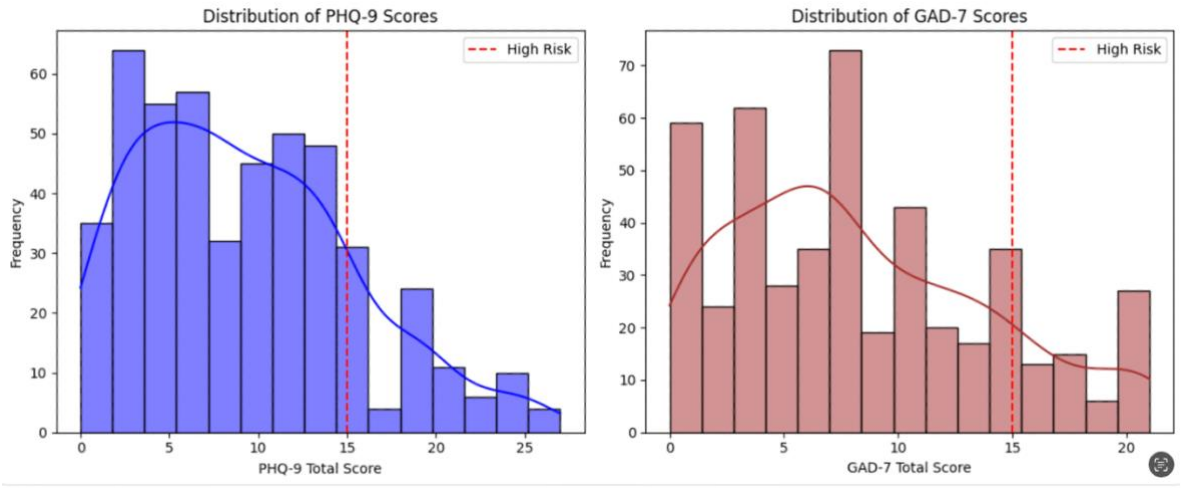
GAD-7	
Score Value	**Description**
0-4:	Minimal or no anxiety
5-9:	Mild anxiety
10-14:	Moderate anxiety
15-21	Moderately severe anxiety
(Though high scores are associated with a diagnosis of depression or anxiety, a clinician must determine the official diagnosis.)	

For this study, the categories were condensed and simplified into three risk categories:

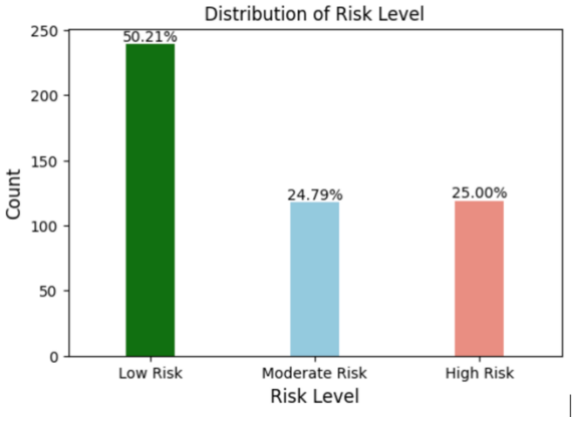
PHQ-9 Condensed	
Score Value	**Description**
0-9:	Low risk
10-14:	Moderate risk
15-27:	High risk

GAD-7 Condensed	
Score Value	**Description**
0-9:	Low risk
10-14:	Moderate risk
15-21:	High risk

The students report that the symptoms of depression is more prevalent than the overlapping anxiety.



We found that around half of the students in our dataset falls into Moderate and High Risk categories. Other studies found a similar trend where at least half students screened in other research were positive for depression, anxiety, burnout, or stress. [2, 4] Women also have a higher proportion of the Moderate to High Risk population, which is also similar to the other studies [2,4].

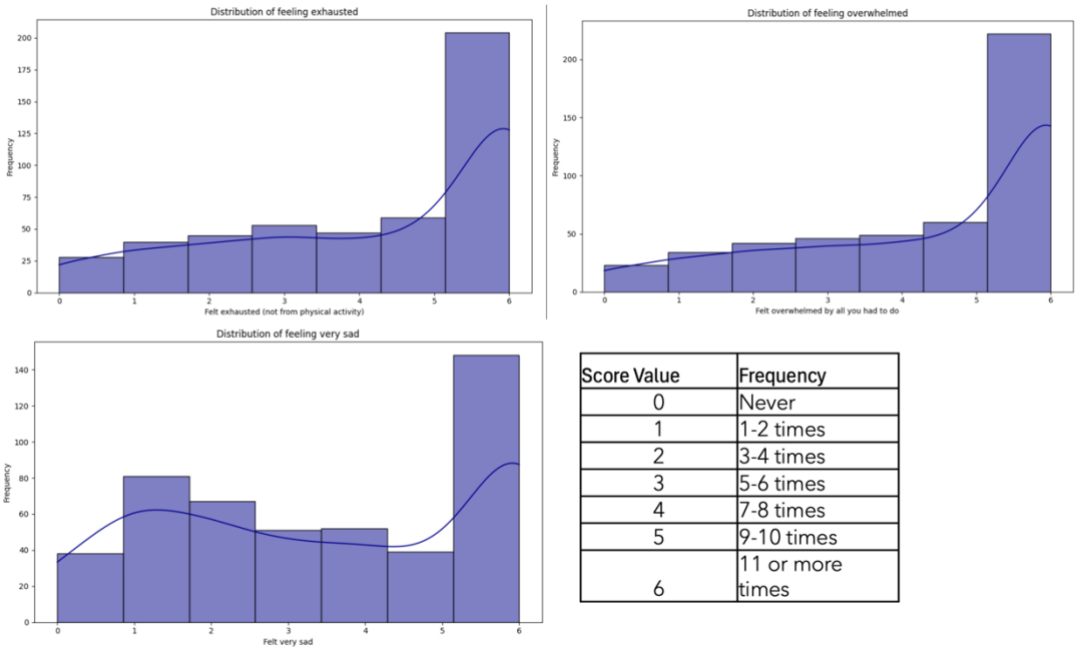


PHQ Risk level			
	Low	Moderate	High
Female	63%	78%	81%
Male	37%	22%	19%
GAD Risk Level			
	Low	Moderate	High
Female	63%	82%	82%
Male	37%	18%	18%

ACHA Mental Health Well-Being Assessment

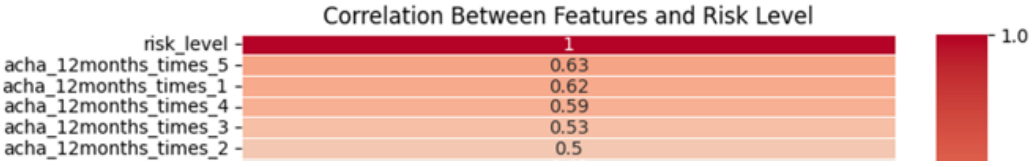
Colleges and universities use ACHA Well-Being Assessments to evaluate the health of their students. These assessments ask about the students' mental health behaviors and general health. These evaluations supply insights into the student population's health and help them decide on campus-wide initiatives.

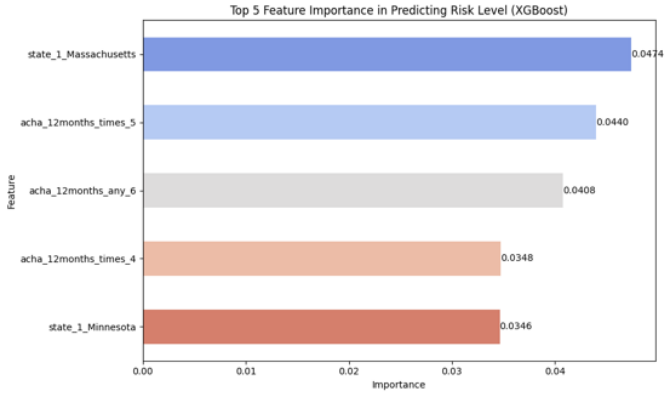
In our analysis, the majority of the students reported to feel exhausted, overwhelmed, and/or feeling very sad. These results indicate high levels of emotional stress and can lead to risks of depression and anxiety.



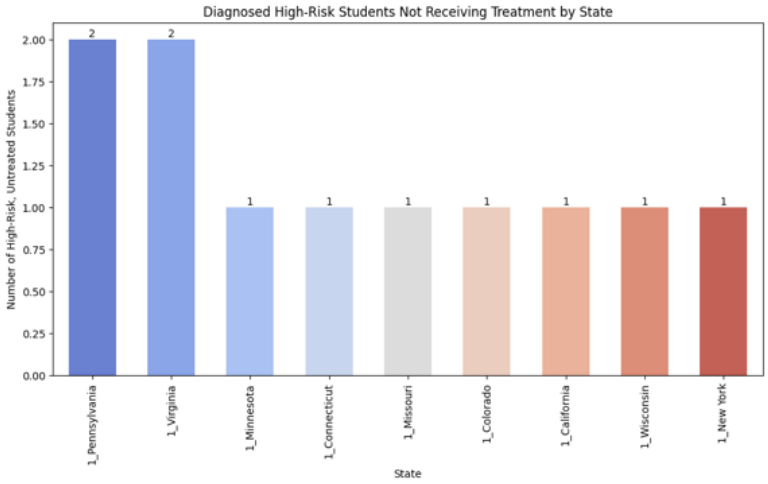
Score Value	Frequency
0	Never
1	1-2 times
2	3-4 times
3	5-6 times
4	7-8 times
5	9-10 times
6	11 or more times

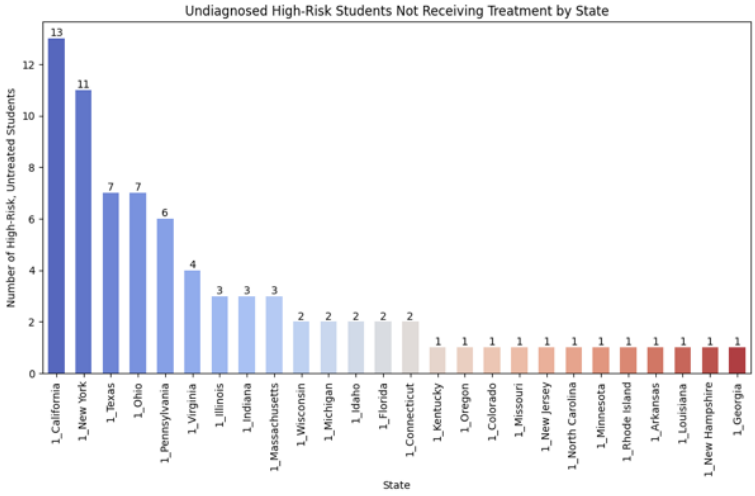
Both correlation analysis and XGBoost feature importance indicate that subjective emotional states which are "Felt too depressed to function" and "Felt very sad", are highly correlated with mental health risk levels. These features are critical predictors of students at high risk for mental health issues. Additionally, the XGBoost model also highlights states like Massachusetts and Minnesota as significant predictors in risk level forecasting, suggesting that geographic factors may influence the likelihood of students being in the high-risk category.



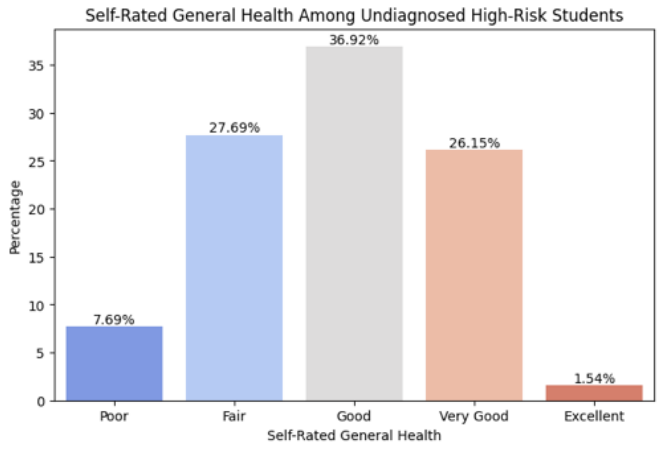


Undiagnosed and High Risk

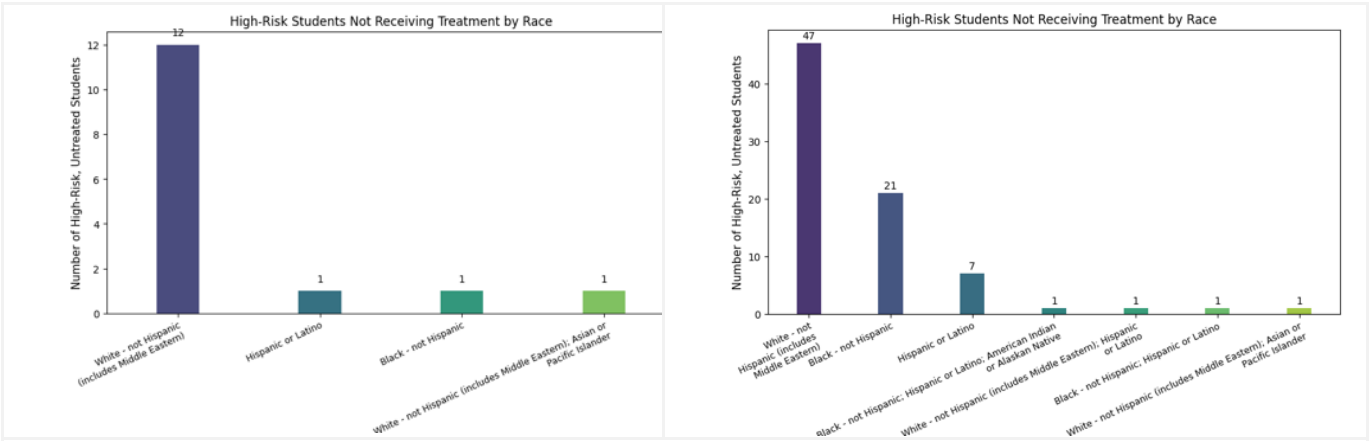




These two graphs show the differences in mental health by regions for dignosed and undiagnosed groups. Undiagnosed high-risk students who are not receiving treatment tend to be in states with urban centers such as California and New York. It suggests a potential disparity in service access based on state.



Of the undiagnosed students who are also high-risk perceive themselves as being in good health. 36.92% students considered themselves in a good condition, 26.15% in very good, and 1.54% in excellent. In total, 67.31% students may not recognize their own mental health struggles.



Another difference we found between diagnosed and undiagnosed group is that more black students in the undiagnosed high-risk group not receiving treatment. It tells us that racial disparity should be considered for mental health services.

PROPOSED INTERVENTION

Our research suggests that barriers to accessing mental health services differ among the varying demographics of students. Privacy, the fear of stigmatization, and financial concerns are the main barriers to accessing mental healthcare [9]. We plan to promote knowledge of mental health issues, normalize seeking help, and educate students and university staff. Our research underscores the necessity for a tailored approach to help any student.

Patient-Focused Interventions

Access and Emergencies

To address the challenges students face in high-stress, competitive environments and reduce regional disparities in the access to mental health services, provide additional resources in larger and more diverse regions, such as a 24-hour availability for virtual counseling options for students who might not have the time or can't prioritize in-person visits as well as on-campus mental health outreach programs to ensure those students in urban or high pressure areas can easily access the support they need [11]. To address the racial disparity in mental health service access, the result shows that black students are disproportionately represented in undiagnosed high-risk groups who are not receiving treatment. The study highlights how racial and ethnic minorities face significant barriers to mental health care, making culturally sensitive and accessible support

essential [10]. We can create a program to identify the common challenges faced by black students and provide them with culturally sensitive resources and a safe environment to seek help without stigma. Ensure the mental health services are distributed equally across racial groups. Finally, universities will follow up and ensure that all high-risk students, especially black students and those from larger states with urban centers, such as California and New York, are directly being offered mental health resources.

Digital and Mobile Interventions

Mobile platforms have shown promise in improving mental health outcomes. In a study done by Tucker, S., Ohr, S., & Roberts, H [4], an online tool proved 85% useful to the students participating in the program. This study shows the trend of high-stress levels and other mental health issues in graduate students. It studies the rate of burnout, stress, depression, anxiety, PTSD, and poor health behaviors among graduate students in a large Midwest university. It found that most participants were not involved in medical or spiritual counseling. Barriers to not seeking help are a lack of access to counseling services, poor finances, poor work/school/life balance, and a lack of coping strategies. The researchers aimed to address the problem of knowledge, cost, and privacy by utilizing an online tool that would deliver mental health screening to the participants. The tool would give them results, advice on the next steps, and resources.

Universities can implement similar solutions and provide them to students for free use. This proactive approach would bridge the gap between risk identification and access to help. The screening portion of the tool should take 15-20 minutes [4] to complete, leveraging data-driven assessments to offer tailored recommendations based on the student's scores to the PHQ-9, GAD-7, and ACHA Well-being questions. It will deliver evidence-based coping strategies [3, 8], supply resources for educational materials, and connect students with clinicians or community mental health groups. The potential to further continuously upgrade the tool will help refine the recommendations for each student, ensuring tailored assistance for the students.

Public Interventions

Encourage students to actively monitor their mental health.

Universities should create a program targeted at educating students about self-management skills and encouraging them to engage with self-assessment tools regularly, such as surveys, to help them recognize when they need mental health support and guide them in seeking treatment early. The researcher found that **self-**monitoring significantly increased awareness of mental health issues and helped reduce **anxiety**

and **stress** in college students [7]. Furthermore, colleges should integrate self-assessment with student activities, making mental health monitoring as routine in their lives. This will help them get used to checking their mental health and understand themselves better. Universities should also increase access to mental health resources for students who are not aware of the importance of seeking help, providing them with clear and accessible pathways to counseling services through surveys that offer rewards to encourage participation and follow-up.

Train the Faculty - Colleges can train the faculty to recognize mental health issues so they can assist students get to the right resources. Colleges can also implement programs like Be REAL in their campuses to teach the coping strategies, cognitive behavioral training, self-compassion, and other practices to help with mental health issues. Furthermore, this program encourages staff to participate in practicing skills to help decrease mental health symptoms. In one study, Be REAL helped students improve their coping skills, depression and anxiety symptoms. 92% of the students indicated this program helped them improve their coping skills and reducing mental health symptoms. [9]

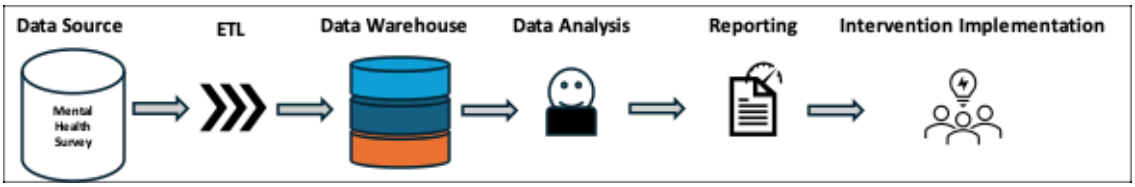
Continued Study

This study will need to be continued to monitor the mental health of college students. Hopefully, student participation can continue throughout their years in the university. Future groups will need to conduct mental health surveys regularly for students at the beginning of the school year, which can help identify at-risk students and provide counseling and personalized treatment plans accordingly. Future studies should target all students but especially focus on identifying undiagnosed high-risk groups, supported by research emphasizing the importance of increasing awareness of symptoms to help address the treatment gap [6]. Based on the results, personalized treatment plans and counseling should be offered to those who need it.

The results of future studies can be accessed by dashboards like the one shown below. This dashboard is meant for university staff use. It will show the results of surveys done throughout time. The dashboard will show current key metrics on count and distribution like those done in this study. Furthermore, because historical data will be available, the report can show measure over time to show trends.

record_id	year_1	state_1	general_health	phq9_1	phq9_2	phq9_3	phq9_4	phq9_5	phq9_6	phq9_7	phq9_8	phq9_9	phq9_total	gad7_1	gad7_2	gad7_3	gad7_4	gad7_5	gad7_6	gad7
1	1997	Florida	4	1	1	1	1	2	1	2	0	0	9	1	1	1	1	1	1	
2	1997	Texas	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	1997	Oklahoma	2	0	0	1	0	1	0	1	0	0	3	0	0	0	1	1	0	
4	1998	Pennsylvania	3	1	0	1	1	1	1	0	0	0	5	2	1	1	1	1	0	
5	1998	New York	3	1	1	1	1	1	1	0	0	0	6	1	1	1	1	1	1	
6	1998	Maryland	3	0	2	1	2	0	2	2	1	0	10	3	2	2	1	0	1	

Data Ecosystem Design Considerations



1. **Data Collection**: Collect survey data from internal system including PHQ-9, GAD-7, mental health screenings, and demographic data regularly from students.
2. **ETL Process**: Apply ETL process to extract raw data from data source, transform the data, including cleaning, remove duplicates and unused data, missing data handling, and convert data into correct format, and finally load the cleaned and transformed data into a data warehouse for storage.
3. **Data Warehouse**: Store all collected survey data, including responses from newly enrolled students each term in a centralized data warehouse. It would be easy to access historical data and all survey data is retained for future use. The data warehouse will serve as a repository to track changes in students' mental health over time and provide ongoing interventions.
4. **Data Analysis**: Analyze diagnosed and undiagnosed groups to categorize students into low, moderate, and high-risk groups based on their GAD-7 and PHQ-9 scores. Use demographic information to check for any disparities or patterns.
5. **Reporting**: Based on the analysis results, generate dashboards and reports using Power BI that provide insights to the university. These reports highlight trends, risks, and provide interventions accordingly.
6. **Intervention Implementation**: Implement interventions based on the analysis and reports, monitor the participation of students in mental health programs, and follow up and evaluate regularly with high-risk students especially those who haven't received

treatment.

CONCLUSION

Addressing mental health issues in college students is critical. Throughout the country, college campuses are seeing an increase in mental health concerns for both students and staff. Many college students, especially those who are away from their families and homes, experience the first onset of worsening mental health problems in their academic years [12]. Untreated mental health issues can have long-term consequences on the student's lives, many of whom will be starting their careers and providing easy access to mental health support, finding innovative ways to connect with mental health professionals, teaching students coping skills, and educating the community and university staff to lessen the fear of stigma. Ongoing studies should also be included to ensure that the campus environment is conducive to learning and thriving in their first step into adulthood.

REFERENCES

[1] Stochl, Jan, Eiko I. Fried, Jessica Fritz, Tim J. Croudace, Debra A. Russo, Clare Knight, Peter B. Jones, and Jesus Perez. "On dimensionality, measurement invariance, and suitability of sum scores for the PHQ-9 and the GAD-7." Assessment 29, no. 3 (2022): 355-366.

[2] Eisenberg D, Golberstein E, Gollust SE. Help-seeking and access to mental health care in a university student population. Med Care. 2007 Jul;45(7):594-601. doi: 10.1097/MLR.0b013e31803bb4c1. PMID: 17571007.

[3] Sontag-Padilla, L., Woodbridge, M. W., Mendelsohn, J., D'Amico, E. J., Osilla, K. C., Jaycox, L. H., … Stein, B. D. (2016). Factors Affecting Mental Health Service Utilization Among California Public College and University Students. Psychiatric Services, 67(8), 890–897. https://doi.org/10.1176/appi.ps.201500307

[4] Tucker, S., Ohr, S., & Roberts, H. (2023). A Mental Health Self-Screening Tool for Graduate Students. Building Healthy Academic Communities Journal, 7(1), 31–48. https://doi.org/10.18061/bhac.v7i1.9332

[5] Kim, Jihye, Dong-gook Kim, and Randy Kamphaus. "Early Detection of Mental Health through Universal Screening at Schools." Georgia Educational Researcher 19, no. 1 (2022): 62-79.

[6] Werlen, Laura, Milo A. Puhan, Markus A. Landolt, and Meichun Mohler-Kuo. "Mind the treatment gap: the prevalence of common mental disorder symptoms, risky substance use and service utilization among young Swiss adults." BMC public health 20 (2020): 1-10.

[7] Gatto, Alyssa J., Yasuo Miyazaki, and Lee D. Cooper. "Help me help myself: examining an electronic mental health self-monitoring system in college students." Higher Education 83, no. 1 (2022): 163-182.

[8] Long R, Kennedy M, Malloy Spink K, Lengua LJ. Promoting College Student and Staff Well-being Through a Mindfulness-based Coping Program. OBM Integrative and Complementary Medicine 2023; 8(3): 034; doi:10.21926/obm.icm.2303034.

[9] Horwitz AG, McGuire T, Busby DR, Eisenberg D, Zheng K, Pistorello J, Albucher R, Coryell W, King CA. Sociodemographic differences in barriers to mental health care among college students at elevated suicide risk. J Affect Disord. 2020 Jun 15;271:123-130. doi: 10.1016/j.jad.2020.03.115. Epub 2020 Apr 18. PMID: 32479307; PMCID: PMC7266827.

[10] Primm, Annelle B., Melba JT Vasquez, Robert A. Mays, Doreleena Sammons-Posey, Lela R. McKnight-Eily, Letitia R. Presley-Cantrell, Lisa C. McGuire, Daniel P. Chapman, and Geraldine S. Perry. "The role of public health in addressing racial and ethnic disparities in mental health and mental illness." Preventing chronic disease 7, no. 1 (2009): A20.

[11] Direktör, Cemaliye. "A new area of mental health care: Online therapy, counseling and guidance." Journal of Research in Humanities and Social Science 5, no. 2 (2017): 78-83.
[12] Pedrelli P, Nyer M, Yeung A, Zulauf C, Wilens T. College Students: Mental Health Problems and Treatment Considerations. Acad Psychiatry. 2015 Oct;39(5):503-11. doi: 10.1007/s40596-014-0205-9. Epub 2014 Aug 21. PMID: 25142250; PMCID: PMC4527955.