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Original Study

Association Analysis of Demographic Factors and the Likelihood of Self-reporting Mental Illness at Student Run Clinics

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Abstract

Background: Patients in the student-run clinics operated by the Tulane University School of Medicine report higher rates of previous diagnoses of mental illness (45.3%) when compared to the national average (22.8%). The diverse group of patients who utilize these resources have various demographic factors that may influence the likelihood of reporting a mental illness. Our objective is to analyze data from Tulane University School of Medicine's student-run clinics to identify associations of self-reported psychological diagnoses with demographic and psychosocial factors.
Methods: Data collected from surveys filled out by students interviewing patients in student-run clinics (n=1494), chi-square analysis, and multivariate regression analysis were conducted to evaluate associations between self-reported psychiatric illness with demographic and psychosocial factors.
Results: In the chi square analysis, patients who were age 18-39, reported using psychiatric medications, identified as White, were female, did not report being homeless, had a previous suicide attempt, had a history of trading drugs for sex or money, were a victim or witness of a violent or traumatic event, and had a history of physical, emotional, and sexual abuse were more likely to report a mental health condition. Patients aged 60-99, who were African American, male, reported homelessness were less likely to report a history of a mental health conditions. Persons who identified as male were the only category statistically associated with decreased odds of reporting a mental health diagnosis. In the regression analysis, patients aged 18-39, aged 40-59, who were female, white, who had a suicide attempt, and had a history of incarceration were likely to report a mental health diagnosis.
Conclusions: Patients with specific demographic and psychosocial characteristics were more likely to report a mental health diagnosis.

Background

According to the American Psychologic Association, unhoused persons living in shelters have estimated mental illness rates that are twice the general population.[1] The rates of mental illness diagnoses among unhoused populations across the United States (U.S.) is an extensively studied issue and past studies have indicated a rate of mental illness as high as 50.0%.[2] To this point, however, we are unaware of any studies that directly examine the self-reported diagnoses of mental health illness in the unhoused population of New Orleans, Louisiana.

Hurricane Katrina in the summer of 2005 had devastating effects on mental health in New Orleans, Louisiana. One year after the storm, around 40.0% of New Orleanians were found to have symptoms consistent with mental illness and half of these illnesses were severe.[3] This same study also investigated the socioeconomic and racial disparities in mental illness after the hurricane

and how permanent displacement from home and community contributed to the psychological hardships. The traditional trajectory seen for mental health disorders after a traumatic event like a devastating storm is a sharp increase followed by a steady decline.[3] This study, however, found that mental illness diagnoses in New Orleans did not follow this trajectory and instead plateaued.[3] The discussion about mental health in New Orleans is especially relevant after a large amount of property loss and displacement after Hurricane Ida in 2021 and the impact of the coronavirus disease 2019 (COVID-19) pandemic.

The purpose of this study is to examine the associations between self-reported mental health diagnoses with demographic factors (race, age, gender identity, previous incarceration, housing status) and psychosocial factors (history of psychiatric medication use, suicide attempts, trading sex for drugs or money, witness/victim of a violent/ traumatic event, and physical, emotional, sexual abuse) among patients who utilize free clinics services. Clinics are run by medical students at Tulane University School of Medicine (TUSOM) and overseen by preceptors who are faculty or resident physicians from TUSOM. They are located at shelters and community centers around New Orleans. The rate of homelessness among the utilizers of the clinics is 43.8% (655/1494). The clinics primarily serve as a connection point for primary care and for acute issues. Many patients have significant barriers to access formal medical care. The entirety of medical care often consists of the services provided by the clinics and visits to the emergency room. Barriers to accessing care include lack of transportation, poor access to phones to coordinate appointments, being un or under-insured, and a lack of capacity to seek care. Our goal with this study is to find associations between reporting a mental health diagnosis and various demographic and psychosocial factors. This data will help guide future decisions regarding providing mental health services to our patients and connecting patients with mental health providers.

Methods

Sample

We utilized survey data that resulted in 1783 patient responses, through the Research Electronic Data Capture (or REDCap, v13.9.0, Vanderbilt, Nashville, TN), a secure and Health Insurance Portability and Accountability Act (HIPPA) compliant web application for conducting surveys developed by Vanderbilt University for clinical research projects. Student volunteers (in their preclinical training) collected survey data from patients after their appointment at the student-run health clinics. This survey collected information on demographics, self-reported mental health status, use of psychiatric medications, housing status, incarceration status, education level, and history of psychosocial stressors. Demographic data included age, gender, and race. Repeats were identified during the process as multiple submissions from the same patients who returned to our clinics. Of the 1738, 244 repeat submissions were identified and omitted from the final data file resulting in a final total of 1494 unique patient responses that were included in our analysis.

Statistical Analysis

Analysis was conducted via two methods. First, chi-square was used to determine whether the demographics or other historical elements of patients who reported a mental health diagnosis differed significantly from those who did not report a mental health diagnosis. Logistic regression was conducted via R (version 4.1.1, R Foundation for Statistical Computing, Vienna, Austria) to model the logistic odds of reporting a mental health diagnosis as a linear combination of predictor variables. All variables that are significant at a .05 level were included. Receiver operating characteristic (ROC) curve analysis was conducted to determine the sensitivity and specificity of this model.

Results

Table 1 includes the demographic data included in our analysis. Of the 1494 patient responses, 676 (45.3%) self-reported a mental health diagnosis. Persons who identified as men the majority (66.8%) and the mean age of participants was 44. The largest racial category was White (56.6%), followed by African American (36.3%). Interestingly, only 43.8% of the patients

Table 1. Demographics and characteristics of REDCap data from student run clinics (n=1494)

Characteristic	Percent
Age, mean (SD)	43.6 (12.5)
18-39 (%)	46.99
40-59	41.36
60-99	11.65
Self-reported mental health diagnosis	45.25
No self-reported mental health diagnosis	54.75
Psychiatric medication use	33.00
Race	
African American	36.28
White	56.56
Native American	1.00
Hawaiian/Pacific Islander	0.40
Asian	0.67
Other	1.81
Did not ascertain	2.48
Gender	
Male	66.8
Female	31.53
Transman	0.30
Transwoman	0.20
Homeless	43.84
Not Homeless	37.68
Previous suicide attempt	5.36
History of trading drugs for sex or money	2.41
Witness/victim of violent or traumatic event	0.94
Physical, emotional, and sexual abuse	8.7
Prior incarceration	34.2

REDCap: Research electronic data capture; SD: standard deviation.

identified themselves as homeless despite most clinic patients accessing resources in a homeless shelter. 33.0% of our patients reported that they are currently using psychiatric medications, 34.2% of our patients reported a history of incarceration, 5.3% reported a previous suicide attempt, and 8.7% reported suffering physical, emotional, or sexual abuse.

We looked at associations between presence or absence of reporting a psychiatric condition and race, gender identity, housing status, age, use of psychiatric medications, previous suicide attempts, trading sex for drugs or money, witnesses, or victims to a violent, traumatic event, and physical, emotional, or sexual abuse. Patients who were age 18-39, reported using psychiatric medications, identified as White, were female, did not report homelessness, had a previous suicide attempt, had a history of trading drugs for sex or money, were a victim or witness of a violent or traumatic event, and had a history of physical, emotional, and sexual abuse were more likely to report a mental health condition. These results were statistically significant compared to patients not reporting a mental health condition (Table 2). Patients aged 60-99, who were African American, male, reported homelessness were less likely to report a history of a mental health conditions

Logistic regression analysis showed mental health diagnosis was significantly associated patients aged 18-39, aged 40-59, who were female, white, who had a suicide attempt, and had a history of incarceration (Table 3).

The ROC analysis of this logistic regression reveals that this model has a sensitivity of 67.8% and a specificity of 62.9% (Table 4 and Figure 1). The accuracy of this model is 65.7%.

Discussion

The study above was an association analysis which used chi square analysis and logistic regression to look at demographic and social factors that are predictive of a patient self-reporting a mental health diagnosis at our student run clinics. Our results show that patients who were age 18-39, age 40-59, reported using psychiatric medications, identified as White, were female, did not report homelessness, had a previous suicide attempt, had a history of trading drugs for sex or money, were a victim or witness of a violent or traumatic event, had a history of physical, emotional, and sexual abuse, and had a history of incarceration were more likely to report a mental health diagnosis.

These patient responses were collected from June 2019- June 2022. Of the 1494 patient responses, 677 (45.3%) self-reported a mental health diagnosis. In comparison according to National Alliance on Mental Illness (NAMI) in 2022, 19.9% of U.S. adults have a mental health diagnosis.[4] Our patient population reports mental health diagnosis at a rate 2.3 times greater than the national average. These clinics are in shelters across the city (Ozanam Inn, Bridge House, New

Table 2. Chi square analysis of patients with self-reported mental conditions vs. patients without self-reported mental health conditions

Characteristic	Self-reported mental health condition (n=676), n	Did not report, n	χ^2	P value
Age				
18-39*	306	281	19.10896	$1.2300e^{-5}$
40-59	280	338	0.00011	$9.9200e^{-1}$
60-99*	39	135	42.17084	$8.3600e^{-11}$
Psychiatric medication use*	376	131	303.22330	$6.5394e^{-68}$
Race				
African American*	165	377	80.66890	$2.6700e^{-19}$
White*	467	374	75.38250	$3.8800e^{-18}$
Native American	7	8	0.00530	$9.4200e^{-1}$
Hawaiian/Pacific Islander	3	3	0.04410	$8.3400e^{-1}$
Asian	5	5	0.07370	$7.8600e^{-1}$
Other	12	15	0.01850	$8.9200e^{-1}$
Did not ascertain	17	20	0.00070	$9.7900e^{-1}$
Gender				
Male*	363	635	97.38610	$5.7000e^{-23}$
Female*	302	169	99.63210	$1.8400e^{-23}$
Transman	1	4	1.28890	$2.5600e^{-1}$
Transwoman	2	1	0.5578	$4.5500e^{-1}$
Homeless*	282	373	6.6480	$9.9300e^{-3}$
Not Homeless*	284	279	7.59670	$5.8500e^{-3}$
Previous suicide attempt*	65	15	50.78760	$1.0300e^{-12}$
History of trading drugs for sex or money*	28	8	21.22550	$4.0800e^{-6}$
Witness/victim of violent or traumatic event*	12	2	11.95080	$5.4600e^{-4}$
Physical, emotional, and sexual abuse*	95	35	53.06430	$3.2300e^{-13}$
Prior incarceration	234	277	2.28610	$1.3100e^{-1}$

**p<0.05.*

Table 3. Logistic regression for factors associated with mental health diagnosis

Variable	Coefficients	Estimated standard error	Z value	P value
Intercept	-0.9043	0.2221	-4.072	$4.6600e^{-5***}$
Age 18-39	0.6931	0.2093	3.311	$9.3000e^{-4***}$
Age 40-59	0.7130	0.2081	3.426	$6.1300e^{-4***}$
Gender	-0.9703	0.1369	-7.090	$1.3400e^{-12***}$
Race White	0.7957	0.1165	6.832	$8.3800e^{-12***}$
Suicide attempt	1.0928	0.3085	3.542	$3.9600e^{-4***}$
Education	0.2549	0.1431	1.781	$7.4876e^{-2}$
Incarceration	0.4650	0.1307	3.558	$3.7400e^{-4***}$

****p<0.001.*

Orleans Mission, etc.), so many of our patients belong to the unhoused population, and this may be a factor contributing to a higher rate of mental illness among our patient population. In our study, 655 (43.8%) of our patient's report being unhoused. It was our hypothesis that our unhoused population would have a higher percentage of mental health conditions. This was theorized because unhoused patients tend to have greater psychosocial stressors than patients with

Table 4. Confusion matrix and statistics

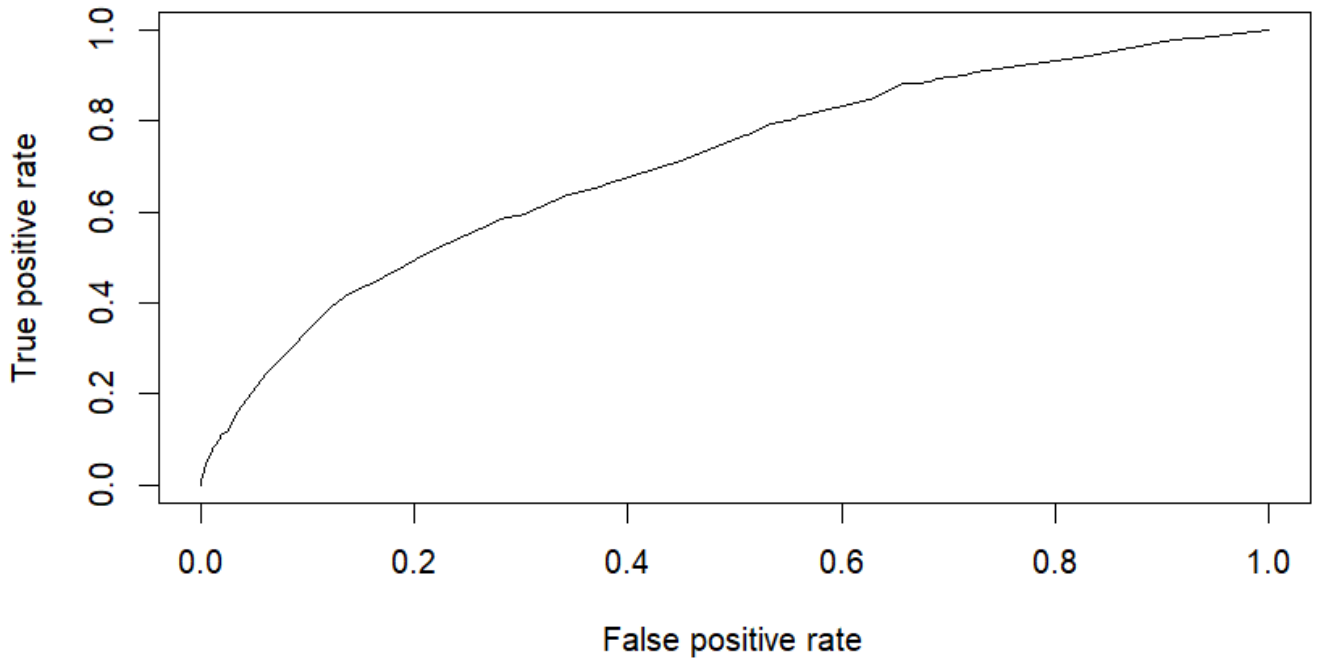
Prediction	**0**	**1**
0	583	235
1	277	399
Variable		**Value**
Accuracy		0.6573
95% CI		0.6326, 0.6184
No information Rate		0.5756
P-value [acc > NIR]		$6.4590e^{-11}$
Kappa		0.3046
Mcnemar's test p-value		0.06999
Sensitivity		0.6779
Specificity		0.6293
Positive predictive value		0.7127
Negative predictive value		0.5902
Prevalence		0.5756
Detection rate		0.3902
Detection prevalence		0.5475
Balanced accuracy		0.6536

CI: confidence interval; acc: accuracy; NIR: no information rate.

housing. One meta-analysis substantiates this claim by showing that patients with housing "disadvantage" had higher rates of depression, anxiety, and stressors. Housing disadvantage was defined as overcrowding, mortgage delinquency, housing mobility, housing tenure, subjective perceptions of inadequate housing, eviction, and physical housing conditions.[5] Although, it should be noted we could not identify literature showing data for the unhoused, we theorized that similar stressors may exist in the unhoused that contribute to higher rates of mental illness. Also, there was no data on a national percentage for mental health conditions among the homeless. There is, however, a meta-analysis which looked at the rates of psychotic illness and personality disorder among unhoused patients in the U.S. The findings of this study showed that unhoused patients have higher rates of psychotic illness (12.7% in unhoused vs 1.0%-2.0% in general population) and personality disorders (23.1% in unhoused vs 4.4% in general populations).[6] In a study by Lamparter et al., most homeless patients' visits to the emergency department (ED) compared to non-homeless individuals (control group) were directly related to complaints of a psychiatric illness.[7] Additionally, it was found that homeless individuals were significantly (56.0% vs. 10.0% non-homeless, $p < 0.01$) more likely to have a medical history of psychiatric illness (such as depression, anxiety, and schizophrenia) and had more frequent use of ED resources.[7] Furthermore, homeless patients encounter many disadvantages to receiving primary care, which range from stigma and fear of discrimination, to more difficulty providing required paperwork and insurance, as well as lack of accessible transportation.[7] One study conducted in an urban population in Fort Worth, Texas of 740 individuals experiencing homelessness also reported a 40.0% rate of mental health conditions among their patient population.[8] This figure is similar to the rate we reported. Other meta-analysis report highly variable figures when it comes to determining the percentage of unhoused patients with a mental health condition. In Hodgson *et al*., the rate of mental health conditions among the homeless varied among samples from 48.4% to 98.0%.[9,] Overall, however, these studies corroborate that unhoused populations tend to have higher rates of mental illness compared to the national average.

The data does demonstrate higher rates of mental health diagnoses in White patients compared to African American patients. The demographic of New Orleans shows that 60.0% of the population identifies as African American. Our study was not reflective of this and only 36.3% of respondents identified as African American. Also, there was positive correlation between being White and reporting a mental health diagnosis. African American patients however had a negative correlation with mental health diagnosis in our data. This may reflect stigma regarding using mental health services and acknowledging mental health conditions being more common in the African American community.[10] It has been suggested in literature that this stigma arises from beliefs that mental health conditions are a sign of weakness or lack of inner strength,[11] leading to less acknowledgment of these conditions and underreporting of mental health conditions among our African American patients. A study of young African American males discusses this cultural perception that this population is "strong", and found that this population engaged with

Figure 1. ROC curve for logistic regression model



ROC: receiver operating characteristic.

other coping mechanisms instead of seeking care such as drug use.[12] Also, patients experience of social discrimination leads to them having less trust in the mental health system.[13] Another study showed that, African American women felt that mental health physicians would not understand their issues, and therefore did not approach or seek this care.[14] One study revealed four major barriers to seeking mental health support in the Back Community: "structural barriers such as poverty, racism, discrimination; reliance on other coping mechanisms; and fear".[13] A more detailed analysis revealed "lack of health insurance, unemployment, housing issues, and low education" as barriers.[15] In summary, the literature suggests that our African American patients may be underdiagnosed with mental health conditions due to not seeking mental health care due to a fear of social discrimination and lack of access to care leading to an underreporting of such conditions to providers.

More than one in three of our patients reported a history of incarceration, and according to our model, incarcerated patients were more likely to report a mental health diagnosis. Incarcerated patients in our population reported a mental health diagnosis at a rate of 45.8%. Other studies have shown that formerly incarcerated persons incarcerated have worse health outcomes before, during, and after incarceration.[16] Incarcerated patients also report more severe depressive symptoms and poor life satisfaction scores during incarceration and report higher rates of heavy drinking and illicit drug use.[16,17] A systematic review in 2012, conducted for 33,000 incarcerated patients showed that one in seven patients had major depression or psychosis.[18] This is much lower than our rate; however, it should be noted that this study only looked at major depression and psychosis. Another study looked at the trauma exposure of prisoner's "majority of effect size was reported on childhood trauma (55.1%), followed by lifetime trauma (32.8%), imprisonment trauma (6.1%), pre-imprisonment trauma (5.6%), and post-imprisonment trauma (0.5%)" and the association between trauma and mental health disorder were "stronger for imprisonment trauma relative to childhood trauma and pre-imprisonment trauma and mixed trauma relative to physical trauma".[19] The trauma of imprisonment mixed with difficulty in societal reintegration may be contributing to increased mental

health diagnoses like post-traumatic stress disorder, depression, and anxiety.

The logistic regression and chi square analysis revealed an association with women reporting a mental health diagnosis but not with men. Once again social stigma may lead to underreporting of mental health diagnosis among our patients who identify as men based on views that posit that "masculinity being enforced by restriction in behaviors (e.g, crying, fear) based on gender roles that amplify existing power structures that favor the dominance of men".[20] One study shows that male patients tend to be diagnosed with behavioral disorders (labeled "substance abuse") rather than the "emotional underpinning of addiction (depression)".[20] Another study showed that "young men's rate of in person attendance and e-mental health access remain well below their female peers".[21] Men's views on mental Women reporting mental health diagnosis more than their male counter parts may also be due to less overall health services utilizations by men. In terms of overall healthcare utilization there is a statistically significant difference in healthcare utilization between men and women; with men accessing resources less than women.[22] This disparity of men underreporting mental health conditions is most commonly seen in data showing that despite women reporting more depressive symptoms, men are four times more likely to commit suicide. Historically, this was believed to be due to men having more access to lethal forms of committing suicide; however, newer literature is showing that the "prevalence of male depression is far greater than previously suspected".[23] The combination of men coping with their mental health through substance use, toxic masculinity leading to the suppressing of negative emotions, and less utilization of health services by males may contribute to our data not showing a correlation between male gender and reporting a mental health diagnosis.

This association study aims to define the mental health crisis among our shelter population to help target interventions at higher risk population. There is a severe lack of mental health resources and care for the population of New Orleans. In Louisiana, "the level of access to MDs was 4.1 times lower than the nationally recommended level" for mental health care.[24] The population that visits our clinics is a critical area that could be targeted with future funding and programs to address the mental health crisis in the city. Moving forward, our clinics hope to implement comprehensive mental health care into the services offered as well as increase the access to referrals to mental health care specialists. We have started discussions with our school's Psychiatry Department to have attendings and resident physicians in our clinics to provide initial contact to patients in our shelters to serve as a bridge to establishing outpatient care. Another area of research that will be important is to understand barriers to care access among our patients, so that we can target interventions to reduce these barriers. We have started offering mental health education as a part of our patient education program that we have at our shelters. We hope to incorporate teaching that is culturally sensitive to our African American patients and that looks to destigmatize mental health by addressing discriminatory concerns that African American patients may have and by normalizing the action of seeking help among our male patients. The effectiveness of these programs has been supported by literature showing positive outcomes with respect to "knowledge of mental health, help seeking behavior, and attitudes towards mental health".[25] We hope to conduct future studies to assess the impact of this education on our patients seeking mental health care and receiving medications for their conditions. For our formerly incarcerated patients, this year the Formerly Incarcerated Transition (FIT) clinic which was started by Dr. Niyogi in the Tulane Faculty became a part of our student run clinics. By referring patients from our other shelters to this clinic, we will be able to coordinate care for our formerly incarcerated patients to receive more specialized care with a provider that they can establish continuity with and serve as a bridge to access specialty services including Psychiatry.[26]

There were multiple limitations in collecting data for this study. The mental health diagnosis questions were asked in the following format: "Do you have any history of psychiatric illness?", and the response was recorded as either yes or no. If the patient responds yes, it then prompts the interviewer to ask the patient what the diagnosis was, and the interviewer could fill in the blank

space with the diagnosis that the patient states. In our study we focused more on the presence of an illness, the data on what the type of illness's were recorded and may be an avenue for future research. One limitation with this method of reporting is that many patients may be unaware of their current diagnosis or may lack insight into their current condition. According to the literature, "insight impairment is an important prognostic factor in schizophrenia, impacting negatively on medication adherence, treatment outcome, and social functioning", "insight impairments are observed in many, if not all, mental disorders", and "impaired insight is a common reason that many people with clinical depression or anxiety disorders never seek appropriate treatment and most of the people with addictions and personality disorders fail to recognize and address their problems even when the consequences are devastating".[27] Therefore, patient's lack of insight of their own mental health may lead to an underreporting of psychiatric conditions especially in the context of self-reporting. With regards to the accuracy of self-reporting, we assumed that may serve as a limitation as some patients may not accurately know their diagnosis. Upon review of the literature, however, showed that "self-reported diseases were slightly overestimated with regard to mood disorders, whereas there proved to be no such trend regarding anxiety disorders."[28] This may limit the validity of the study, however, the slight overestimation also shows that self-reporting is relatively close with regards to being similar to finding diagnosis in patient charts.[28]

In conclusion, the study showed association between demographic factors and reporting mental health conditions in our student run clinic population through a logistic regression model. Interventions targeted at raising awareness of mental health conditions, providing mental health services at shelters, and referring patients who are formerly incarcerated to the FIT clinic will help our patients receive access to mental health care.

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Disclosures

The authors have no conflicts of interest to disclose.

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