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PHQ-2 Scores in Broward County's Homeless: Prevalence, Barriers, and Proposed Solutions to Mental Health Disparities

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ABSTRACT

Introduction: Florida ranks 9th in states with highest prevalence of mental illness among homeless individuals. The state also ranks 43rd of 52 states in providing adequate access for mental health concerns in homeless individuals. This study surveyed people experiencing homelessness in Broward County to investigate utilization of healthcare and mental health resources and accessibility of the target population to adequate care.. Aims included a collection of demographics concerning homelessness such as age and gender, prevalence of mental illness, history of substance use and emergency department, and then correlating these with scores from a standardized depression rating scale (PHQ-2). Methods: The Community Based Participatory Research model was employed while working with local volunteer organizations. Participants completed an 18-question survey and PHQ-2 at three feeding sites in Broward County, totaling 136 participants. Results: 100% of participants surveyed had an income below $12,488, thereby falling in the Affordable Care Act (ACA) coverage gap. 66% stated "none" for insurance, 67% screened positive for depression with the PHQ-2 questionnaire, while 57% acknowledged having mental illness. Only 19% reported using the ER during mental health emergencies but 80% of this population had at least 1 ER visit within the year. Individuals who reported no to the question, "In the past year, was there ever a time when you were prescribed a drug but were unable to get it", scored 1.23 points lower (95% CI: -0.33,-2.12) on the PHQ-2 than individuals who were able to obtain medications. Individuals who reported history of binge drinking, substance use and thoughts of suicide scored 1.21 points higher (95% CI: -0.14,-2.28) on the PHQ 2 than individuals who responded no. Discussion: Our results suggest a majority of homeless individuals need further assessment concerning depression. Based on the utilization of the

ER, healthcare resource awareness is inadequately approached. Programs available are underutilized due to lack of awareness, accessibility and outreach. These findings encourage redistribution of funding and further advocate for resources available to this population. (322 words)

Keywords: Mental health disparities, homeless populations, healthcare equity

INTRODUCTION

The Homeless population represents a community of individuals who are oftentimes underrepresented and neglected when considering policy decisions, allocating funds, and addressing healthcare needs. Despite being a significant portion of most communities, concerns of the homeless population are frequently ignored or bypassed with temporary solutions. Their economic, social, medical, and mental health needs are largely left unaddressed and understudied. Homelessness is accompanied with a multitude of high-risk factors such as increased subjection to violent situations, inadequate hygiene, poor nutrition, and shelter insecurity, with uprooting of their environment. These factors directly lead to physiological and psychological distress.[1] Florida provides a particularly interesting population of study with regards to homelessness. Florida has the second largest number of people experiencing homelessness in unsheltered locations, representing seven percent of the U.S. total.[2] Of Florida's homeless population, 16.2% are estimated to suffer from severe mental illness and 14.1% undergo chronic substance misuse.[3] With Florida being such a large reservoir for the U.S. homeless population, focusing research on the local communities allows for an opportunity to gain comprehensive data of a microcosm that can be applied on a larger scale. One of the most challenging issues for this population to face is the constant interplay between homelessness and health. Poor health conditions can lead to homelessness, and at the same time, homelessness can lead to poor health.[4] This positive feedback loop makes it imperative for their health needs to be addressed. Despite overall understanding about this vicious health cycle, the homeless population is continuously left uninsured, making it more difficult to break the pattern. A study conducted by the Kaiser Commission on Medicaid and the Uninsured found that 62% of the homeless population were in fact uninsured, which is almost quadruple the uninsured rate for the general population.[5]

The Affordable Care Act does not provide subsidies for people with income below the poverty level, because federal lawmakers determined that they should have Medicaid instead. However, 19 states refused to expand Medicaid. Despite 68% public support, Florida was one of the states to refuse the federal Medicaid expansion. This left over 400,000 Florida residents in the ACA coverage gap.[6] This coverage gap particularly affects homeless people, furthering the cycle and interplay between homelessness and poor physical and mental health.

Homelessness continues to present as a pressing issue in Broward County. As of January 2018, Broward

County identified 2,318 homeless individuals who met the US Department of Housing and Urban Development definition of homelessness from Florida's total of 29,717 total homeless population.[7] Unfortunately, Florida continues to have one of the nation's lowest per capita expenditures towards mental health.[8] This study seeks to uncover the various barriers to progress for homeless people in the public health sector, particularly zeroing into the mental health needs and barriers to access for the homeless in Broward County.

This study utilized a Community-Based-Participatory Research Model, which is further discussed in the methodology section. This study is unique because the conductors not only researched the prevalence of depression and its correlation with healthcare access, but also took initiatives to impact change. By participating in public health outreach and education, the conductors began to create and implement preliminary solutions. Volunteers and researchers created comprehensive lists of local free healthcare resources and provided maps with bus routes to these locations. Volunteers and researchers also embodied osteopathic principles of patient-centered care, empathy, humanism, and considered cultural context when interviewing patients.

This research study attempts to unravel a topic that is multifaceted and multidimensional. Using a Needs Assessment tool, Barriers Survey, PHQ-screening tool, osteopathic principles, and on-site public health education and outreach, the researchers attempt to unravel and address this multifaceted public health issue.

METHODS

Setting

This project used a Community - Based Participatory Research (CBPR) model that was utilized in Broward County, Florida. The survey participants were members of the homeless community as determined by inclusion criteria outlined in this paper who were living in Broward County at the time the surveys were taken. Broward county is the second largest county in the state of Florida with an estimated population of 1.9 million, second only to Miami -Dade County.[9] This project was a collaborative effort between Nova Southeastern University medical students, Project Downtown Fort Lauderdale, a nonprofit organization that regularly hands out food and supplies to the homeless population of Fort Lauderdale, Jubilee Center of South Broward, a nonprofit service that provides various social services and meals to homeless in the community, and Central Terminal Bus Stop volunteer program. Members of each organization cooperated to create an efficient setting that allowed optimal access to the population of study while ensuring volunteers and researchers were participating in a safe educational environment that was monitored by safety personnel and community leaders.

Utilizing Community Based Participatory Research Approach

This study utilized multiple members of the academic and volunteer community to collect and analyze the provided data, as per the CBPR Model.[10] Knowing the population of study was underserved, many individuals and local leaders immediately offered assistance with outreach, awareness and participation. The study model required a cohesive and teamwork-oriented approach that was made possible by members of the local Broward community who were willing to advocate for homeless research, collect donated funds, engage with the homeless population and assist in collecting data while distributing collected donations. Volunteers working with the homeless community on a regular basis and organizations offering assistance provided input on how to best approach engaging this population. The CBPR approach was instrumental in the grassroots steps that made underfunded research for an at-risk population possible.

In this study, we collaborated with a diverse group of individuals running the gamut from volunteer community leaders and the homeless to academics and research experts. Through the CBPR approach we all worked together toward a common goal and gathered meaningful data while advocating for a population in dire need. Involvement of community leaders was instrumental in the execution of this study and increasing participation allowing for the preliminary steps to be taken to raise awareness and bring help to a hurting population. By working together as a cohesive team, a more holistic approach has been taken to address this problem which will initiate further action in research, advocacy, and politics. Implementation of this CBPR approach or other similar models by researchers can improve the impact of action based, community-oriented research.

Surveys

The survey was approved by Nova Southeastern University's Institutional Review Board (IRB) and was administered at all three collection times in this study. The survey consisted of 17 questions, the first two questions were a part of the standardized patient health questionnaire (PHQ-2). PHQ-2 and PHQ-9 are both validated and routinely used screening tools for depression screening. If PHQ 2 is positive for depression, meaning a score of three or more, further evaluation is necessary with PHQ-2 and clinical interview. This study only used PHQ-2 in its survey due to time constraints and because it was meant to serve only as an initial screening tool indicating further investigation might be needed.

The survey assessed inclusion criteria by asking if any of the following applied to the participant: homeless or living on streets for more than 6 months, income of less than $12,488 USD, receiving assistance for food and clothing weekly, or living in a shelter or home provided through a charity or governmental organization.

In addition to PHQ-2, participants were asked if they suffered from any mental illnesses and whether they struggled with dependence to any substances. Coping skills during a mood or behavior crisis, such as

Table 1 Inclusion criteria

Homeless or living on streets for more than 6 months
Income of less than $12,488 USD
Receiving assistance for food and clothing weekly
Living in a shelter or home provided through charity of governmental organization

calling suicide hotline, speaking with family, or calling a specialist, were evaluated in the survey. The survey's contents also included questions regarding emergency department (ED) visits in one year and the reason for visiting the ED. This was included in the survey to better assess emergent vs. non emergent utilization of healthcare by this population. Access to medical care and barriers faced in getting prescription medications were added to the survey. Participants were lastly asked on the survey about what community health resources they had heard about and which ones would be most beneficial to them and the community.

Training Volunteers

Prior to the collection process, a group of volunteers, including three to five public health students from a local university and two to three Project Downtown high school volunteers were trained on how to appropriately undergo the data collection process. A script was created that outlined what each volunteer should say when approaching possible participants so that biases could be limited. In addition to face-to-face training, the researchers provided an extensive training manual to all volunteers. The training also taught volunteers to incorporate the osteopathic philosophies including humanism when approaching participants. Volunteers were trained in the following Osteopathic Principles and Practice:

- Empathy: Osteopathic philosophy relies heavily on empathy. Empathy is thought to translate into "improved patient comprehension and as a result patients can experience better health outcomes"[11]
- Patient-centered care: Involves "consistently taking more aspects of a person's life into account when outlining a treatment program or health goals".[12] This involves acknowledging the patient as a person and understanding that their life, including culture, family, environment, and genes, all are important factors that play roles in the patient's overall health. Patient centered care also means that health should be thought of as a discussion and alliance between the patient and the physician instead of having one person making all the decisions.
- Osteopathic Bio-Psycho-Social Model: This model is thought to be the osteopathic guide to individualized patient care. This model "recognizes the various reactions and psychological stresses which can affect patients' health and well being. These include environmental, socioeconomic, cultural, physiological, and psychological factors that can influence disease".[13] This model essentially encourages

the usage of various techniques, osteopathic manipulative therapy (OMT) includes, as tools to treat all aspects that could contribute to a person's health.

The training manual and accompanying script can be found in the Index.

Survey Collection

Survey administration was conducted at three different locations each on a different date. The first collection took place on January 19, 2019 in Stranahan Park in Fort Lauderdale, FL through Project Downtown. A total of 53 participants took part in the survey completion at this location and 43 of these met the inclusion criteria. The second collection took place on January 21, 2019 in Hollywood, FL at the Jubilee Center of South Broward. A total of 37 individuals participated at this location. The last collection took place January 26, 2019 at Central Terminal Bus Stop in Fort Lauderdale, where a total of 46 participants filled out the survey.

During all three collection times, participants were given pizza, socks and toothbrushes as incentives for completing the survey. It should be noted that participation in the study was not required to receive the incentives, and everyone present regardless of their presentation was offered the donated supplies. Incentives were given in this study to encourage participation in order to obtain a significant sample size as evidence from outside research studies. Incentives offered no influence on whether or not a participant fully completed the survey. For example, a study done in 2016 on addressing health care disparities among the homeless in Alachua County found that not providing incentives resulted in poor participation. It was only when incentives were provided that participants began getting significant data collection.[14] The incentives provided in this study were donated to this initiative by the Jamuna Center Hindu Temple in Orlando, Florida.

To gauge utilization of existing community resources, a comprehensive list of free and low-cost health clinics in Broward county needed to be compiled. To compile such a list involved a combination of internet searching, community interviewing, and cold calling. First, an extensive internet search was conducted through keywords such as 'Community Resources' and 'Broward County' resulting in approximately 50 addresses and phone numbers being recorded. To expand this list to include smaller sites that may not be represented on the internet, social workers and community volunteer leaders were interviewed. By word of mouth, an additional 15 sites were recorded that provided free healthcare to the homeless in Broward county. The next step involved cold calling all of the sites to see and verify the information gathered through internet search queries and community interviewing. A series of phone calls and voicemails helped eliminate resources that were out of business, had changed names, or are no longer providing free services. In seeking this additional information, the initial list was parsed down to a final 19 service providers who are actively engaged in serving the homeless community. This information was

included in the survey to ascertain the community's utilization of these resources as well as to educate them if they did not previously know about the resources.

Based on this collection of community resources, an informational flier was made to include nearby sites along with transportation via bus routes to several of the listed locations. The map was created by selecting seven locations offering different services including mental health, addiction rehabilitation assistance, medical and dental care. To create the map seen on the handout, site names and addresses were entered into an excel spreadsheet, which was subsequently converted to a map using "EasyMapMaker", which produced an image with pins to indicate the desired locations. The image was then edited to include numbers that would correlate to clinics or centers along with directions on the following page. Directions to each site were based from Broward Central Terminal, as it is a large station with numerous routes, and is in close proximity to one of the survey sites, Stranahan Park. This would allow for participant convenience should they desire to visit any of the listed locations for care. Directions to each location was formed by utilizing Google Maps, and creating directions based on transit systems available within the area. Each result was added to the document along with the corresponding number and site information as found on the map.

Statistical Analysis

First, the raw data was converted from paper form to electronic by inputting each survey response into a collective excel, via Google Sheets. This data was separated by collection sites. Incomplete surveys were still inputted, with the unanswered questions left blank and removed from the total percentage calculation. Surveys that did not meet inclusion criteria were not recorded in excel. Bar graphs and pie charts were generated using Excel.

We then enlisted the support of Nova Southeastern University's Statistician department, and conducted a bivariate analysis between the independent variables listed below and the dependent variable of PHQ-2 score. We recorded all of the independent variables into two or three categories, depending on the number of response options. Our next step was to employ lasso regression, since the methodology deals well with multicollinearity and displays the ideal properties to minimize the numerical instability that may occur due to overfitting.

RESULTS

Calculations were determined based on each individual question asked in the survey.

The following is a bar graph depicting specific coping mechanisms selected by participants:

The following graph demonstrates responses when asked resources utilized in the event of a mood or behaviour crises such as thoughts of suicide, binge drinking, or use of illicit drugs. Some participants

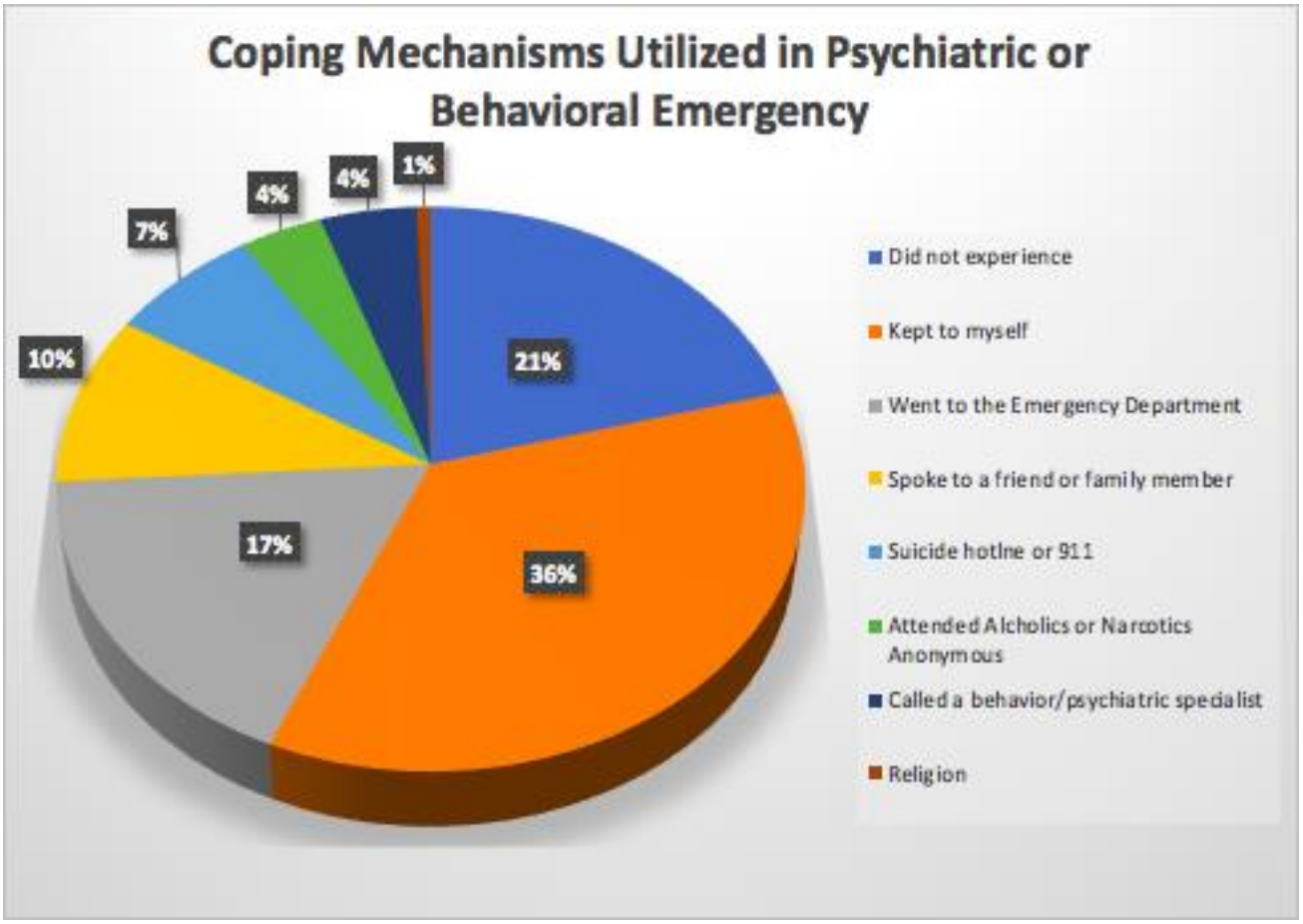

Figure 1 Coping Mechanisms Utilized in Psychiatric or Behavioral Emergency #1

provided multiple answers.

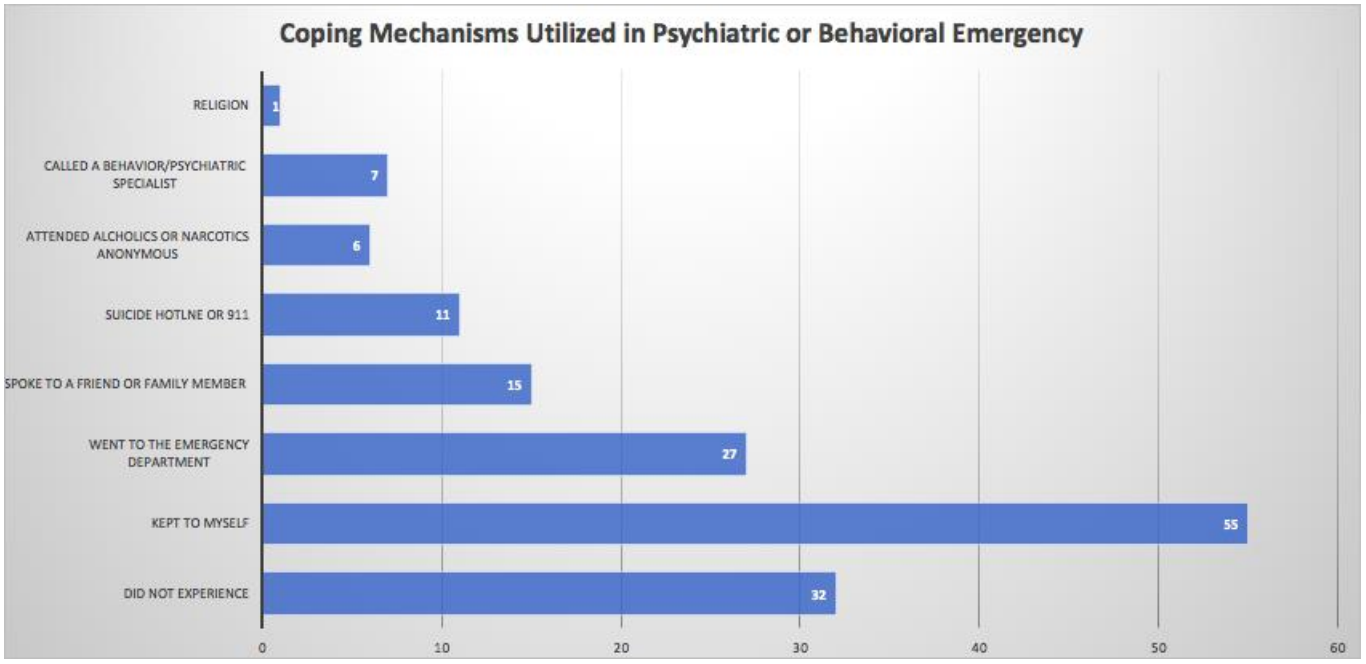

Figure 2 Coping Mechanisms Utilized in Psychiatric or Behavioral Emergency #2

37.30% said that they have not heard of any free healthcare resources, even with a list prompting them.

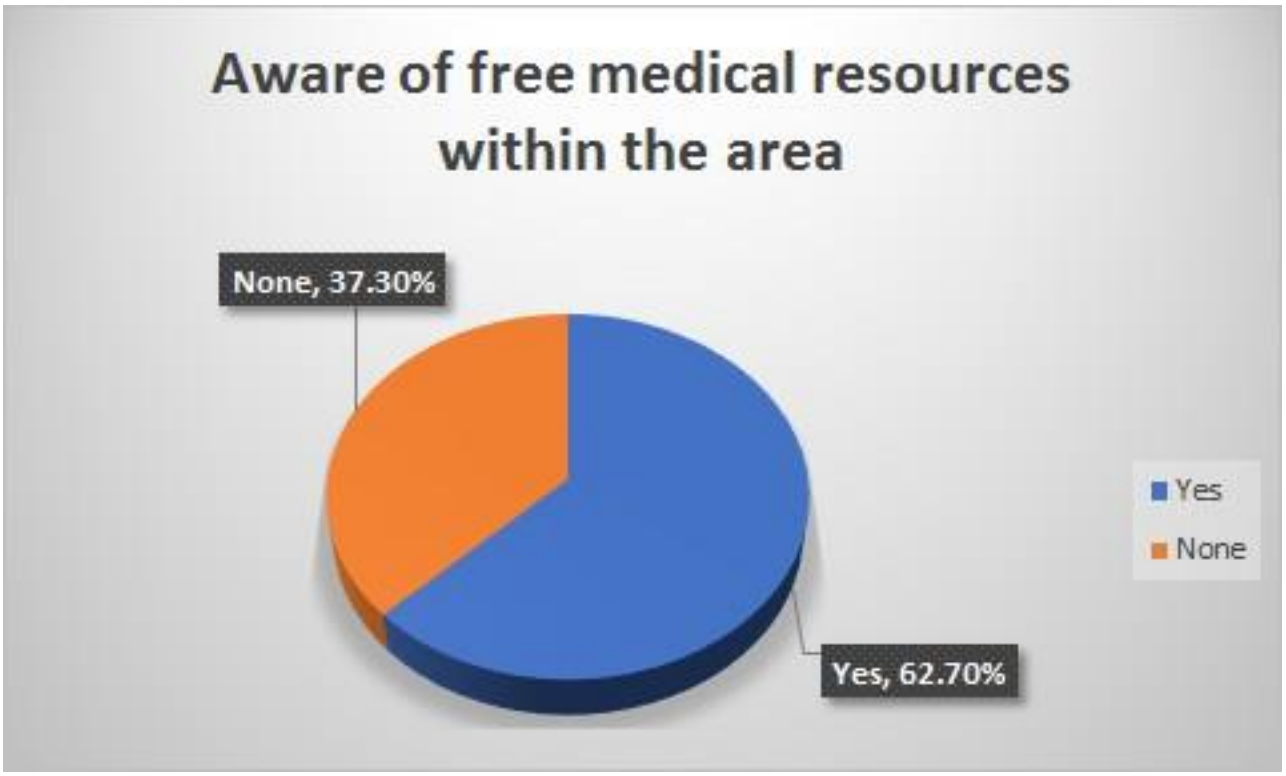

Figure 3 Aware of Free Medical resources within the area

68% of participants said they have no health insurance.

64.93% said there **was a time that they needed medical care but did not get it**.

61.90 % of the participants already suffer from mental illnesses. This is depicted in the graphic below.

72% of participants have a substance abuse problem. The breakdown of specific substance abuse disorders is detailed in the pie chart below.

In the Needs Assessment, the top three requested free services were as follows:

1. Dental care (24%)
2. Prescription Drug Assistance (18%)
3. Mental Health Resources (16%)

Below is a diagram depicting a comprehensive list of what the surveyed population listed as their most desired healthcare services by percentage.

Results from the final model indicate that the following variables are statistically significant (R-Square = 0.32, AIC = 293.45, $P < 0.05$): (1) In the past year, was there ever a time when you were prescribed a drug

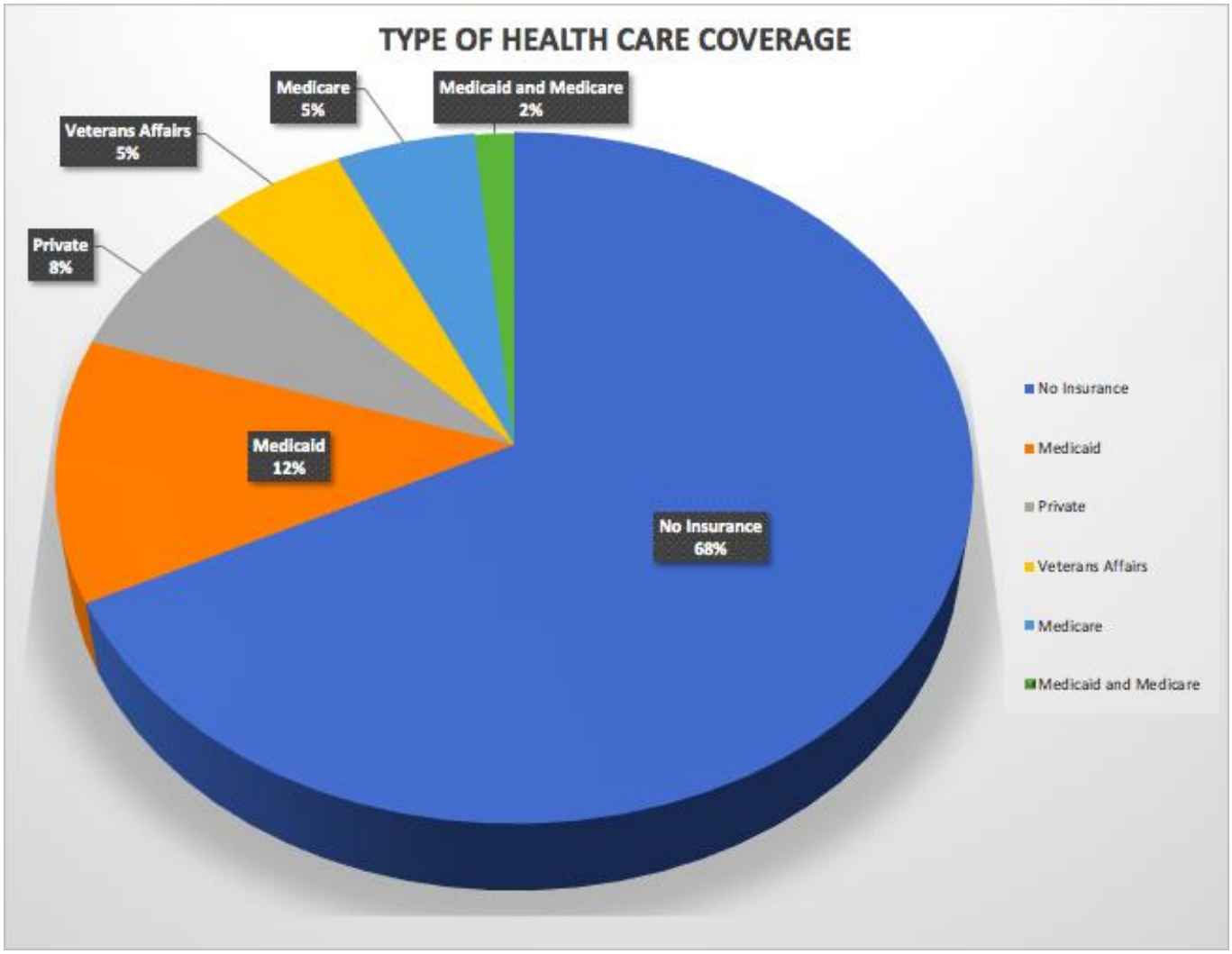

Figure 4 Type of Health Care Coverage

but were unable to get it? If yes, why were you unable to get the prescription? and (2) In the past, if you have experienced any type of mood or behavior crises or struggled with thoughts of suicide, binge drinking, or use of illicit drugs, how have you coped?

Specifically, we found that:

1) Individuals who reported no to the question, In the past year, was there ever a time when you were prescribed a drug but were unable to get it, scored 1.23 points lower (95% CI: -0.33,-2.12) on the PHQ-2 than individuals who were able to get their medications.

2) Individuals who reported no to the question, In the past, if you have experienced any type of mood or behavior crises or struggled with thoughts of suicide, binge drinking, or use of illicit drugs, how have you coped, scored **1.21 points lower** (95% CI: -0.14,-2.28) on the PHQ-2 than individuals who responded yes.

Below are the two corresponding tables to the statistically significant questions.The rest of the supporting materials to include remainder of the raw data, organized tables with p-values, and graphs can be found in

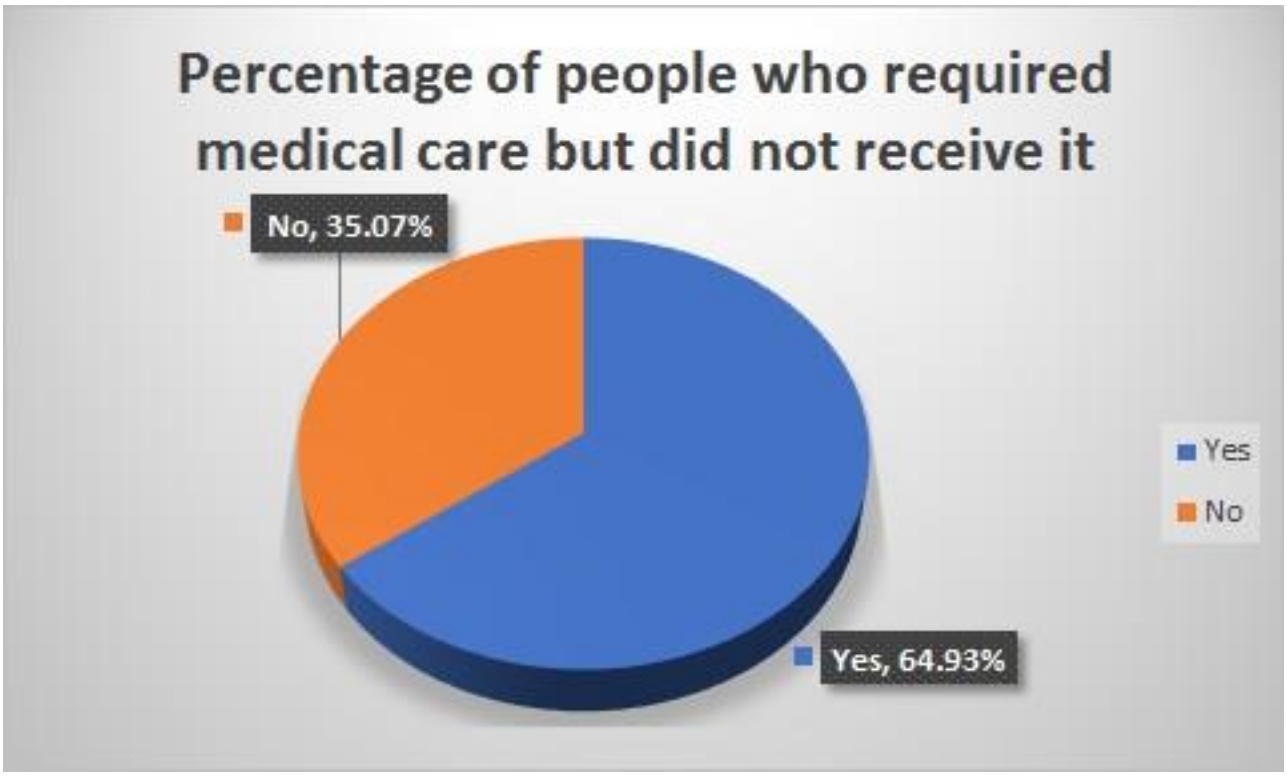

Figure 5 % of people who required medical care but did not receive it

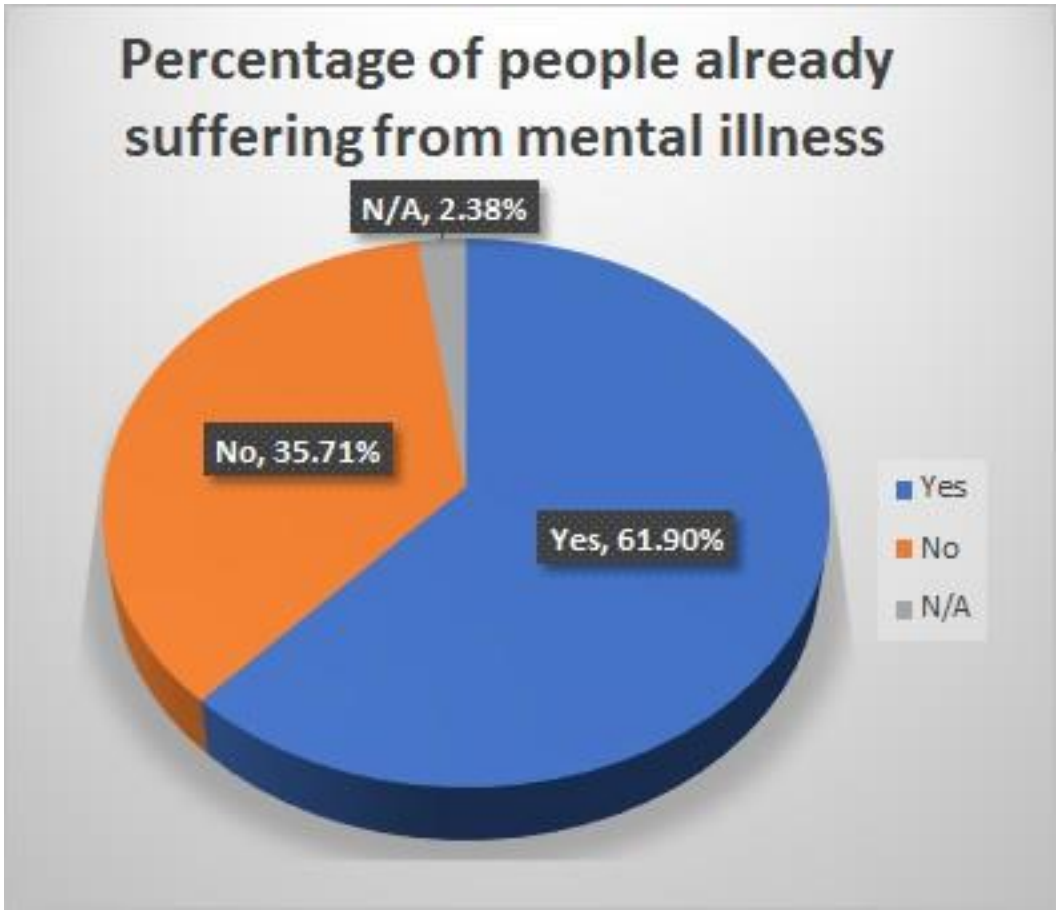

Figure 6 % of people already suffering from mental illness

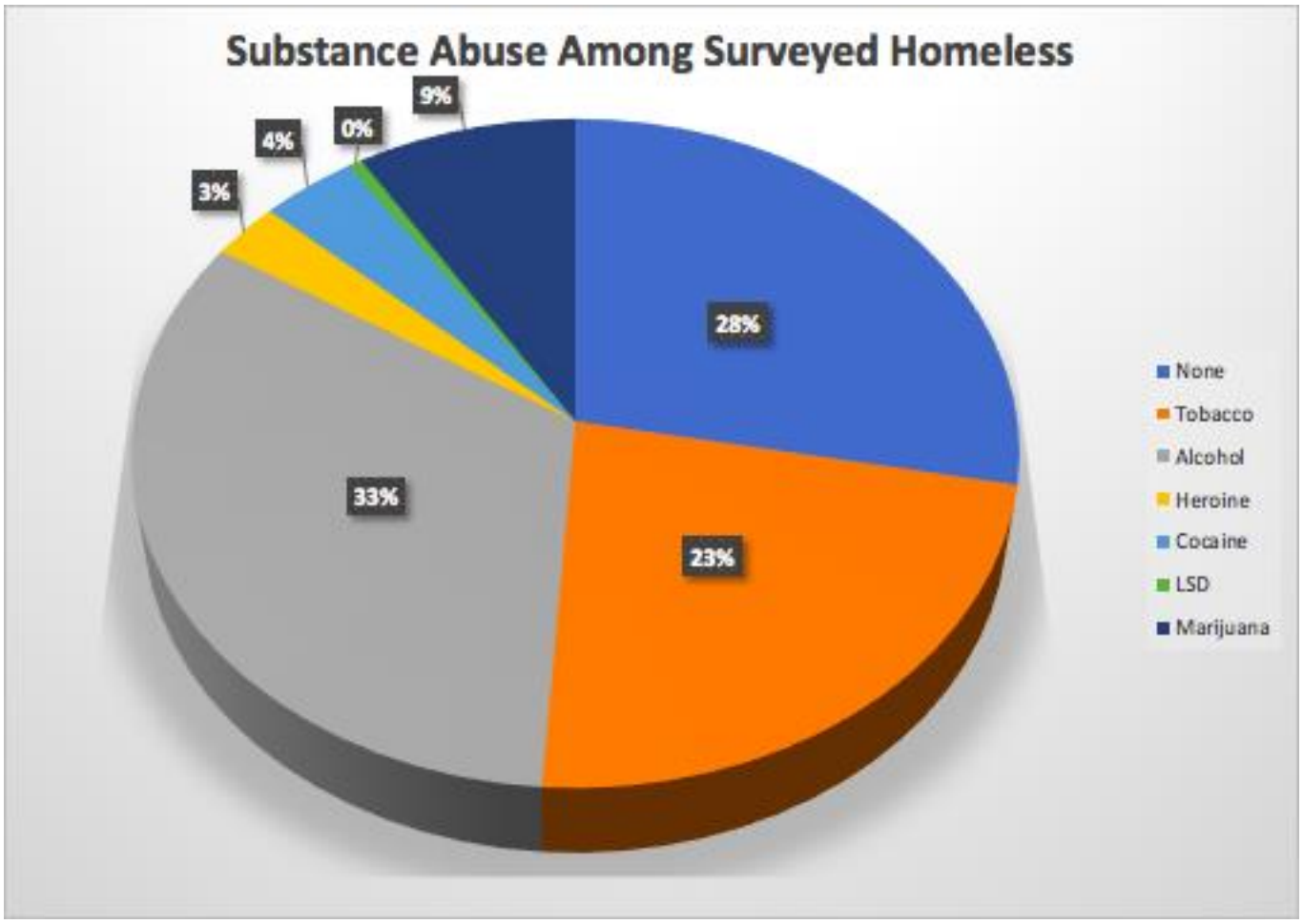

Figure 7 Substance abuse among surveyed homeless

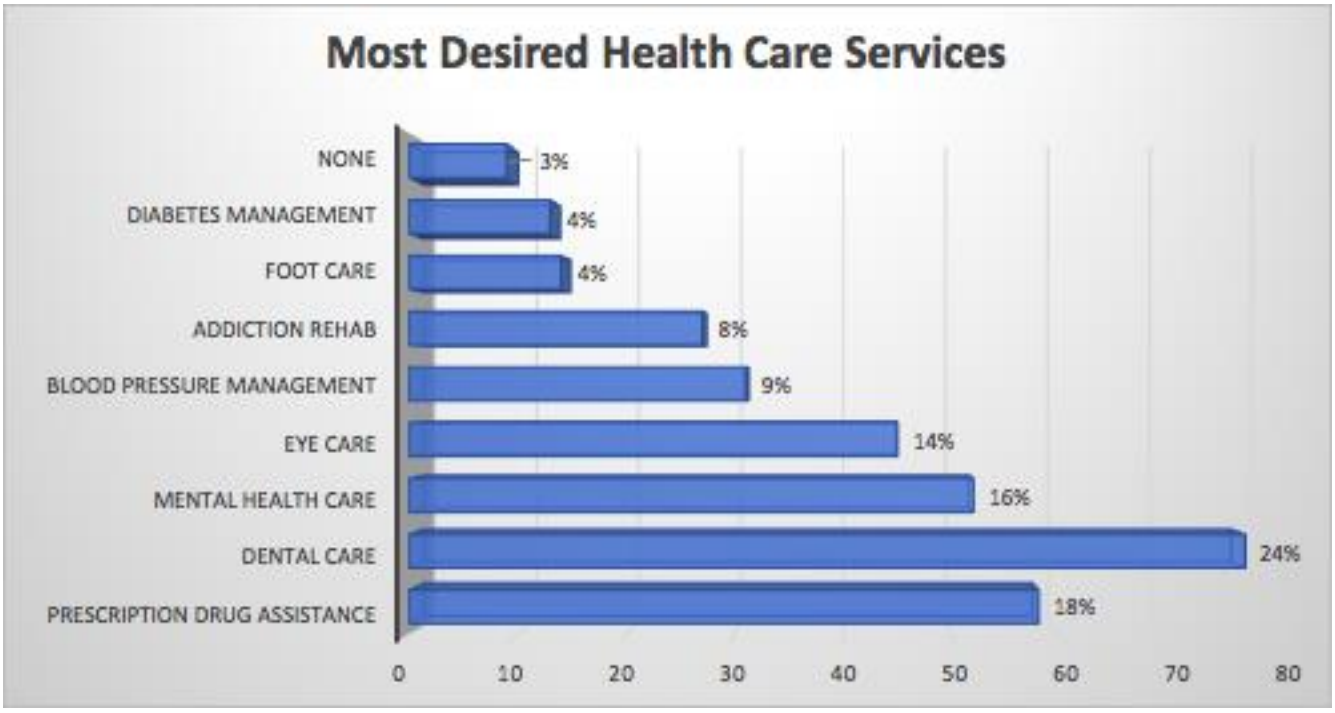

Figure 8 Most desired health care services

the Appendices.

Table 2 PHQ-2 Score by Positive Coping Mechanism Awareness

Coping Mechanism		PHQ-2 Mean (Std Dev)	P-Value
	Yes (N=106)	3.42 (1.67)	<0.0001
	No (N=24)	1.13 (1.48)	

Table 3 PHQ-2 Score by Prescribed Drug but UNABLE to Get

Prescribed Drug but UNABLE to get		PHQ-2 Mean (Std Dev)	P-Value
	Yes (N=79)	3.49 (1.56)	0.0002
	No (N=51)	2.16 (1.96)	

The remainder of the raw data, organized tables with p-values, and graphs, can be located in the index.

DISCUSSION

From the data collected in this study, 37% of participants reported not knowing about free resources. From this, it is clear that existing community programs in this region fail to reach their target population. A multitude of variables can contribute to the shortcomings of existing resources. The nomadic nature of homeless populations can result in a lack of established familiarity with an area and hence a failure to use resources within that community. The issue can arise with transportation barriers as well. Increased distances between community shelters and clinics with lack of bus routes can also contribute to this underutilization of resources due to a lack of accessibility.

A very concerning problem may also stem from the clinics themselves, as they may not provide adequate outreach and marketing. For these programs and clinics to be existing but unheard of is unacceptable. This further supports our belief that more public health outreach is necessary to assist the homeless population and create more efficient solutions. Further analyses would need to be conducted to better understand the factors creating this problem of underutilized resources. The failure of these community programs to reach their target audience reinforces the need for a CBRP approach. Through the CBRP approach, we were able to connect with volunteers and organizations in the community who knew the patterns and movements of the local homeless population and this allowed for an increase in participation in this study. Because of this, we feel this information provides a more accurate and holistic view of the homeless population and the problems that they face. Through CBRP, we were able to directly immerse ourselves in the population we were studying and give back. We partnered with community leaders to effectively disperse clothing

donations, and toiletries. We also generated a comprehensive list of free healthcare resources, and created mapped bus routes (Appedix item 6) to help alleviate one of the predicted barriers to access.

The backbone of this study was based on the mental health status of the participants through utilization of PHQ-2 test scores. 67% of participants scored 3 points or higher on PHQ-2, indicating that there was a high possibility that they had an underlying depression that required further evaluation. This finding supports our hypothesis that depression would be an underlying problem present in much of the homeless population. An important discussion to be had on this topic is whether depression contributed to their homeless or is the homelessness contributing to their depression. It also brings forth the question of whether proper treatment for any underlying depression could help the homeless in other aspects of their lives, such as helping them find stable jobs and housing. It is important to note that mental illnesses can be comorbid[8]; therefore, any underlying possible depression should be evaluated for other mental illnesses as well and thereby making the importance of proper medical screening even more important.

As we discuss the results of the PHQ-2 Screening, we must also delve into the limitations of this screening tool. The PHQ-2 is a relatively short test which yields a primary assessment for depression in a 'first step approach'. This test comprises the first two questions of the longer PHQ-9 and gives the participant a retrospective two-week time frame to assess the frequency of mood and motivation. While there are more comprehensive assessments for depression, we felt that the PHQ-2 was optimal given its brevity to reduce participant burden and maximize our voluntary sample size. Also, for the purposes of this study only, an initial screen for depression, as provided by the PHQ-2, was necessary as opposed to a more comprehensive assessment that would yield a more specific diagnosis or treatment plan. Given the accuracy of the PHQ-2 for preliminary assessment of depression, this allowed us to rapidly and effectively evaluate the prevalence of depression in our sample. Although the PHQ-2 is a useful tool, it is not without limitations. One shortcoming of the PHQ-2 is that it only assesses frequency of mood over the past two weeks. This brief timeline may allow for participants with Seasonal Affective Disorder (SAD) or other fluctuating moods to not be accurately represented.

A particularly shocking statistic that was elicited from this study was that 36% of participants answered "Kept it to myself" when they were asked what they did in the event of a psychiatric or behavioral emergency. Psychiatric crises are defined as "severe changes in emotion or behavior which, if unchecked, post serious threats of physical, emotional or social harm" [15]. Examples of psychiatric crises include suicidality, homicidality or any otherwise rapid deterioration of psychiatric status. The second and third most common responses to this question was stating that they use the emergency department (17%) and speaking to a friend or family member (10%). This was a particularly surprising statistic because a staggering 62.70% of participants stated that they were aware of free medical resources. It is saddening

that a population that is already disenfranchised and ignored has an additional obstacle of mental health, with no constructive coping skills. Keeping intrusive thoughts or negative thoughts to oneself is not a positive coping skill and needs to be replaced with more constructive and long-term manageable practices. We now know that many psychiatric crisis events can be prevented with prior training and education. These statistics demonstrate the need for such prophylactic intervention in order to teach this population stress management techniques, which would be more sustainable. In our efforts to both assess and address mental health disparities, we also provided participants with a pamphlet on coping skills during a psychiatric crisis. Since people experiencing homelessness face unique psychosocial stressors[16], our pamphlets were created with their specific needs in mind. (Appedix item 11)

The participants ranked Mental Health as one of their most requested needs, following only Dental Care and Prescription Drug Assistance. It was in their top three requested services, further supporting our argument that we need to allocate more funding and resources towards Homeless Mental Health. While we did pass out the Coping Skills Pamphlet described above, these statistics indicate the pressing need for further resources and outreach to meet this population's mental health needs. Nearly one quarter (24%) of those surveyed said that they would benefit from Mental Health Resources- a statistic that can be used for further advocacy.

Altogether, 67% of participants answered that they were aware that they had a mental health diagnosis of some sort prior to the collection of this study. In addition, 72% of participants said that they had a substance use problem to some degree that they were aware of. Yet, these individuals are not getting the help they need to manage their conditions. 64.93% stated that in the past year, there was a time where they needed health care but did not receive it. This again points to this populations' mental health needs being left unaddressed and mismanaged.

The sample size for our study consisted of individuals from known homeless congregation sites in Broward County. A limitation of this convenience sample is that it restricts application of this data to individual's experiencing homelessness in Broward County and is not representative of a larger population. Another consideration is that with administration of surveys for this study, participants had the option of reading and completing the survey individually or having a surveyor dictate it for them. Given that education level was not assessed in this survey, literacy and comprehension levels are variable. Differing literacy rates and levels of comprehension within the sampled population may have affected how participants answered questions and influenced the results of this study.

CONCLUSION

The purpose of this study was to assess mental health disparities in the local population and raise awareness about challenges they face. From the data presented in this study, it is evident that depression is a serious problem experienced within the homeless population and there is a drastic underutilization and knowledge about community resources.

In future studies we would like to further analyze the mental health status of the homeless population and resource utilization in Broward County as well as extend our reach to a larger population. Although the PHQ-2 provided us with a good preliminary assessment of depression in our sample, we would like to use more comprehensive questionnaires such as the PHQ-9. With this, we hope to dig deeper and better assess the severity of depression being experienced within the sample. Another problem we would like to assess is the underutilization of free community resources.

This study provided for a useful initial assessment of the mental wellbeing and knowledge of community resources, and implemented preliminary outreach through resource lists, bus routes, and coping skills pamphlets. The statistics gathered in this study on mental health resource awareness are paramount. They can allow politicians and community leaders to adapt existing community resources to increase accessibility and to direct future funds in a cost-efficient manner towards community resources that will be more helpful to this struggling population. Without adequate access to community resources, the health status of the homeless population will continue to decline and costly and inappropriate use of the Emergency Department will remain high. This study provides a window into the current state of Broward County's homeless community, and provides a springboard for further research and advocacy for this population.

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