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Predictors of Mental Health Need and Treatment in Safety Net Primary Care

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PREDICTORS OF MENTAL HEALTH NEED AND TREATMENT IN SAFETY NET
PRIMARY CARE

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science
at Virginia Commonwealth University.

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Table of Contents

List of Tables

Abstract

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Many mental health (MH) needs go unidentified in primary care, and certain patients appear to

be at higher risk of needs going unidentified and subsequently untreated. Little is known about

patterns of detection and treatment in clinics with integrated mental health services. The purpose

of this study was to characterize the prevalence of MH needs and evaluate patient characteristics

as predictors of both the presence of a MH need and type of MH services received. Subjects were

patients receiving care at two safety net primary care clinics with integrated mental health

services (N=816; 52.7% Latinx, 15.9% African American), and were classified as either having

received integrated MH services in the previous year or as not. Sociodemographic and medical

information was extracted from all medical records, and patients who had not received integrated

MH services completed a MH needs assessment. The prevalences for depression, suicidal

ideation, anxiety and PTSD were within expected ranges. Surprisingly, patient characteristics did

not predict the presence of a MH need, though several characteristics predicted the type of MH

treatment received. Patients were less likely to receive integrated MH services if they were older

($\chi^2(1) = 7.36$, $p= .007$), Hispanic/Latinx ($\chi^2(1) = 7.97$, $p= .005$), and/or partnered ($\chi^2(1) = 20.65$,

$p= .000$). This study suggests that biases in detection of MH needs in integrated primary care

may be less pronounced than in non-integrated primary care. However, longstanding disparities

in MH treatment may persevere in this newer model of primary care.

Predictors of Mental Health Need and Treatment in Safety Net Primary Care

Untreated mental illness is a major economic and medical burden to the United States. Poor health outcomes have been directly linked to depression (Kinder et al., 2008), anxiety (El-Gabalawy et al., 2014), and post-traumatic stress (Andersen et al., 2010; Felitti et al., 1998). Not surprisingly, these mental health needs are often present in patients that interact with the healthcare system at higher frequencies (Greene et al., 2016). Epidemiological research shows that psychiatric disorders are more prevalent in primary care settings than the general population. This puts primary care physicians in a unique position to identify mental health needs early on and connect their patients to appropriate treatment.

Unfortunately, mental health services are often challenging for patients to attain even once a need has been identified. The majority of primary care physicians report difficulty in finding and arranging outpatient mental health services (Trude & Stoddard, 2003). Further, only a small percentage of patients follow-up on referrals. Additional barriers to connecting patients to the services they need are cost, stigma, (Mental Health: A Report of the Surgeon General, 1999) transportation, and other logistical barriers (Sadock et al., 2017). To combat these barriers, various forms of collaborative care models have been implemented coordinating care between primary care physicians (PCP) and mental health specialists. The integrated behavioral healthcare (IBHC) model is characterized by having psychologists housed within the primary care clinic, sharing space, medical files, and working collaboratively with physicians (American Psychiatric Association, 2016). This model is particularly efficient in providing population-focused care for the community in that it is provides emergent, brief interventions on an as-needed basis (Bryan et al., 2009, 2012).

IBHC has recently gained significant support, propelling its expansion throughout healthcare systems. Expansion to safety net clinics is particularly important due to the great need for behavioral health services within the populations they serve. Safety net clinics are characterized as serving free or reduced cost services to patients regardless of health insurance status (Sadock et al., 2014). High-utilizer patients of these clinics tend to be low-income, insured by Medicaid or Medicare, and are faced with a high burden of mental health, social, and chronic medical conditions (Bell et al., 2017). Safety net clinics therefore serve a critical role in providing healthcare services to individuals who would otherwise experiences barriers to access.

Behavioral health interventions delivered to patients within primary care clinics have shown to improve psychiatric symptoms and distress (Bryan et al., 2009, 2012; Corso et al., 2012; Landis et al., 2013; Mcfeature & Pierce, 2012; Sadock et al., 2017), improve health outcomes (Woltmann et al., 2012), and reduce overall healthcare costs (Jacob et al., 2012; Stephenson et al., 2019). It is clear that psychiatric distress can be effectively managed at a reasonable cost using brief evidence-based interventions within an IBHC model. However, to successfully manage these needs, physicians must first be able to identify patients with need and refer them to the behavioral health clinicians. Currently, research suggests that patients are not being identified in an equitable manner.

In the following sections, I will summarize what is known about the prevalence of common psychiatric disorders in primary care, particularly safety net clinics, how well they are identified by physicians, and which patients are at increased risk of non-detection. Our knowledge of biases in physician detection and referral to behavioral health services must be incorporated into improving current integrated safety net clinics. IBHC will not be able to reach

its full potential until patients' mental health needs are more frequently identified and

subsequently more patients are connected to treatment.

Literature Review

Prevalence of Mental Health Needs

Depression. Depression is a common disorder in the general population, annually

affecting about 7% of the population (R. C. Kessler et al., 2005). However, prevalence rates have

been consistently reported as much higher in primary care settings. An urban general medicine

practice found that depression was nearly three times as prevalent in their patient population,

with 19% of patients meeting criteria for depression and 7% reporting suicidal ideation (Olfson

et al., 2000). Similarly, 20% of patients at an urban gynecological clinic met criteria for major

depression (Miranda et al., 1998). Although the pervasiveness of depression in primary care

settings is well documented, less it known about the prevalence in safety net primary care clinics.

Safety net patient populations are vulnerable to many risk factors for depression, such as

financial strain (Lorant et al., 2007), having one or multiple chronic medical conditions (Read et

al., 2017), major life stressors (Mazure, 1998), social isolation (Prince et al., 1997) and being a

migrant or ethnic minority (Tarricone et al., 2012). It is important to note that depression is seen

at particularly high rates in primary care clinics serving impoverished urban areas (Gillespie et

al., 2009). One study examining comorbid depression and substance use in Los Angeles safety

net clinics reported that 29.7% of patients screened met criteria for depression (Chang et al.,

2015). Therefore, it is likely that the burden of depression in safety net clinics is substantial.

Anxiety. Anxiety disorders are the most prevalent mental disorders in the general

population. Between 10-22% of individuals experience anxiety each year (Bandelow &

Michaelis, 2015; R. C. Kessler et al., 2005), of which, more women than men are affected

(Alonso & Lépine, 2007; Bourdon et al., 1992; R. C. Kessler et al., 2012). In primary care

settings, the prevalence of anxiety lay within the general population's range or exceed it,

depending on the patient population. A large national study of primary care patients found that

nearly 20% of patients met criteria for an anxiety disorder, with approximately half of them

receiving the diagnosis of generalized anxiety disorder (Kroenke et al., 2007). Not surprisingly,

the highest rates of anxiety are seen in female patient populations. An urban gynecological clinic

reported 63% of their patients met criteria for generalized anxiety disorder (Miranda et al.,

1998). Anxiety is likely common in a safety net patient population, though this has not been

explicitly studied. Although migrant or ethnic minority primary care patients do not appear to

have a higher prevalence of anxiety, it remains a very common concern (Tarricone et al., 2012).

An urban general medicine clinic with high proportion of low-income immigrant patients

identified 14.8% of individuals as meeting criteria for generalized anxiety disorder (Olfson et al.,

2000).

Post-Traumatic Stress Disorder. Most individuals will be exposed to at least one

traumatic event in their lifetime. A national survey revealed that as many as 89.7% of adults have

been exposed to trauma, many of whom report being exposed to multiple traumas (Kilpatrick et

al., 2013). However, only a minority of individuals will go on to develop PTSD. The annual

prevalence of PTSD in the general population lays between 5.3-12.9% (Kilpatrick et al., 2013;

Spottswood et al., 2017). Patients in primary care settings also report high rates of trauma

exposure (Gillespie et al., 2009; Miranda et al., 1998). However, understanding the prevalence of

PTSD in primary care clinics is challenging due to the wide range of reported prevalence rates.

Civilian patient populations' prevalence range from 2-48.8%, with a median of 11.1%

(Spottswood et al., 2017). This inconsistency is attributed to varied levels and types of trauma

exposure in each of the patient populations studied (Eisenman et al., 2003). Risk for developing

PTSD is directly related to exposure to violence and trauma. As a result, the highest rates of

PTSD in civilians are observed in those living in areas with more violence (Alim et al., 2006).

The importance of this is that safety net clinics serve high proportions of racial and ethnic

minority individuals of low economic status, many of whom are vulnerable to violence exposure.

African American and Latinx individuals residing in urban poverty-level communities are more

frequently exposed to violence than their peers of other racial and ethnic backgrounds (Breslau et

al., 1998). Also, immigrant and refugee individuals are frequent victims of violence, both during

their migration and upon arriving in the United States (Spottswood et al., 2017). Therefore,

physicians in safety net settings must be mindful of the potential for PTSD symptoms in their

trauma-exposed patients.

Physician Detection of Mental Health Needs

The importance of treating mental health needs is widely acknowledged by the healthcare

community, however, the presence of patient need does not always result in receiving the

necessary care. One major cause for this is that PCPs and other members of the clinical care team

have a difficult time detecting mental health disorders in their patients. Physicians in urban

clinics identify depression in their patients less than half of the time (Cepoiu et al., 2008;

Mitchell et al., 2009, 2011). Notably, PCPs are marginally better at detecting depression in mid-

life adult patients than older adults (Borowsky et al., 2003; Mitchell et al., 2009, 2010). Nurses'

ability to identify depression in patients is reported to be roughly similar to that of PCPs

(Armstrong & Earnshaw, 2005; Mitchell & Kakkadasam, 2011). Promisingly, systematic use of

brief screeners in primary care have been shown to improve physician detection of depression in

patients (Löwe et al., 2005; Vöhringer et al., 2013).

Similar difficulties are reported in the ability of PCPs to detect anxiety in their patients (Olariu et al., 2015). This is consistent across all anxiety disorders. However, cross-sectional research may exaggerate the problem. A longitudinal study evaluating PCP detection found that only 39% of patients with depression or anxiety were identified at the initial visit (D. Kessler et al., 2002). During the following three years, up to 64% of the originally distressed patient group were diagnosed and the majority of those identified did receive treatment. Despite improvement over time, detection still remains an issue. Brief screeners for anxiety have shown to successfully assist physician detection of anxiety disorders (Olariu et al., 2015), and are recommended for use with high-risk patients (Muntingh et al., 2013). Little is known about detection of anxiety by other providers. Ability to detect anxiety has not been formally evaluated in other members of the care team, though nurses consistently under detect general psychological distress (Marks et al., 1979; Plummer et al., 1997).

Detection rates of PTSD in primary care paint a bleak picture, with as few as 0%-38% of patients with symptoms being detected (Kimerling et al., 2006). A study conducted in an urban primary care clinic found that although one fourth of the patients met criteria for current PTSD, only 11% of them had it documented in their medical records (Liebschutz et al., 2007). Detection appears to be slightly better in veterans populations, with just over half of individuals' being diagnosed (Magruder et al., 2005). The issue of non-detection has been attributed to several factors. Patients often choose not to disclose their trauma history (Graves et al., 2011) and commonly report physical rather than psychiatric symptoms (Dobie et al., 2004). Physicians may also attribute distress to a more familiar and often comorbid diagnosis of major depression than PTSD (Liebschutz et al., 2007). Incorporating brief screeners for PTSD may improve detection and understanding of the nature of patient distress. Patients at an outpatient clinic reported that

completing brief PTSD screeners cause little distress and were acceptable in length (Warlan et al., 2016)

Difficulty in identification of mental health needs remains a significant barrier to patients receiving necessary treatment, despite available interventions suitable for primary care. Brief screeners for disorders common to primary care have been rigorously studied and demonstrate improvement in physician detection. In 2009, the United States Preventive Services Task Force began recommending regular screening for depression to facilitate identification and intervention. Similar guidelines do not exist for anxiety or PTSD, although brief screeners have been reported to also facilitate identification of needs. Although brief screeners are widely available and the patient populations of safety net clinics have great mental health needs, screeners are not systematically being used in these clinics. Until physicians are better able to identify mental health needs in their patients, they will not be able to create appropriate treatment plans or make necessary referrals.

Patient Factors Related to Physician Detection of Mental Health Needs

Understanding and raising awareness of which patients are at increased risk of non-detection may help to improve overall detection rates. Research suggests that PCPs' ability to detect mental health needs in their patients is related to many factors unrelated to the patients' psychopathology (Pini & Tansella, 1999), including demographic, social, and medical factors. Investigations into demographic factors suggest that sex, age, race and ethnicity influence detection. Physicians consistently demonstrate better detection of mental health needs in patients who are female than male (Afana et al., 2002; Balestrieri et al., 2002; Borowsky et al., 2003; Y. A. Kim et al., 2008; Marks et al., 1979). Detection also appears to be better for middle-aged patients rather than their younger (Afana et al., 2002; Borowsky et al., 2003; Odell et al., 1997)

or older counterparts (Carey et al., 2015; Mitchell et al., 2010). Finally, White patients are more

likely to have their psychiatric distress correctly identified than their Black, Asian, or Hispanic

peers (Borowsky et al., 2003; Y. A. Kim et al., 2008; Lewis-Fernández et al., 2005; Odell et al.,

1997). One study reported that under-detection of need in Asian patients persisted after

controlling for physicians' self-reported familiarity with patients (Y. A. Kim et al., 2008). Under-

detection in cultural groups may be in part due to language differences, health literacy barriers,

somatic presentations, and unique cultural idioms of distress (Lewis-Fernández et al., 2005).

Patients' social factors which influence physician ability to detect mental health needs are

marital status, socioeconomic and employment statuses, education level, and health insurance

coverage. Individuals who are not married, particularly whose marriages ended in divorce or

through death show increased likelihood of their physicians detecting their mental health needs

(Borowsky et al., 2003; Liu et al., 2004; Marks et al., 1979). The roles of patient socioeconomic

status (SES) and education level in detection of mental health needs requires further

investigation. American patients were more likely for their physicians to detect their needs if

they were unemployed (Balestrieri et al., 2002; Marks et al., 1979), low SES (Borowsky et al.,

2003), or had achieved lower education levels (Borowsky et al., 2003). In an Australian sample,

patients with health care cards for low-income had an increased likelihood of their PCP

identifying their depression (Carey et al., 2015).Yet, a study conducted in Taiwan found that

patients with low SES were less likely to have their mental health needs detected by their

provider (Liu et al., 2004). These findings were hypothesized to be explained by education level

confounding SES. The researchers stated that patients with higher SES and education may be

better able to articulate their distress and symptoms.

Finally, the literature provides a somewhat unclear picture of how physical health may influence PCPs' ability to detect patient mental health needs. Presence of medical conditions and more severe physical illness compared to less severe reportedly increased the likelihood of providers' identifying psychiatric distress in patients (Borowsky et al., 2003; Pini et al., 1997; Robbins et al., 1994). One study found that the presence of hypertension, diabetes, or heart disease all individually increased the likelihood of a physician detecting mental health problems (Borowsky et al., 2003). However, the effects remain unclear due to similar investigations in English medical clinics and Taiwanese primary care, finding that the presence of physical illness hindered ability to detect mental health need (Liu et al., 2004; Odell et al., 1997; Tylee et al., 1993).

Although this literature provides insight into which patients are at increased risk of their mental health needs going undetected, much of it was published over fifteen years ago and the landscape of primary care has changed drastically. Notably, the integration of mental health services into clinics has expanded in recent years. One meta-analysis noted that across studies, there was a trend of improvement in physician diagnostic sensitivity, specifically physicians appear to be getting better at detecting depression (Cepoiu et al., 2008). Furthermore, improvements in detection of common psychiatric disorders were reported in VA health clinics following integration of mental health services (Zivin et al., 2010). At the population level, it appears that one goal of primary care mental health is being achieved, to improve detection of mental disorders ("What is primary care mental health?," 2008). Yet, this overall improvement in detection in the VA health care system was not uniform across patient demographics (Zivin et al., 2010). Improvement was primarily seen for patients who were younger and White compared to older and minority patients. Therefore, it is possible that across other integrated primary care

clinics certain patients continue to be at increased risk of their mental health needs going

undetected and untreated. As integration of mental health services into primary care clinics

continues to expand, the reach of these services must be further investigated.

RE-AIM Model

The RE-AIM framework is a model which serves as a guide for implementation and

evaluation of interventions (Glasgow & Linnan, 2008). RE-AIM includes 5 domains for

measurement: Reach, Effectiveness, Adoption, Implementation, and Maintenance. Reach refers

to the degree to which the target population participates in the intervention. Effectiveness

represents the benefits or intended outcomes produced by the intervention. Adoption describes

the acceptability and support from those who implement the intervention. Implementation

represents the fidelity to the intervention protocol by those who are carrying it out. Finally,

Maintenance refers to the long-term effects of the intervention, including the extent that the

intervention has been retained by the organization. This framework will be applied to the

implementation of integrated mental health services in a safety net setting, with a focus on one

dimension: Reach. Reach will be evaluated by comparing characteristics of patients who receive

integrated mental health services versus those who do not. This framework has been widely

applied to many health promotion programs (R. S. Kessler et al., 2013), but has not yet been used

to evaluate integrated behavioral health services or health promotion services in a safety net

setting. Indeed, literature evaluating integrated mental health services in safety net settings

remains scant. Therefore, use of this framework may provide meaningful groundwork for future

research and literature in this area.

The Present Study

The integrated model, housing psychologists and other mental health clinicians within primary care clinics eliminates barriers that historically have prevented patients from accessing mental health services. This allows for the expansion of services within safety net clinics to better meet the mental health needs of patients. Although integrating mental health services reduces some practical barriers within a clinic setting, other barriers still persist. A key element necessary for integrated services to meet its full potential is PCP's detection of patients' mental health needs. If detection does not occur, patients will not be referred to or receive necessary treatment. The literature indicates that subgroups of patients are at heightened risk for having mental health needs go unidentified. Furthermore, several patient characteristics associated with increased risk of non-detection, including being a racial or ethnic minority and low socioeconomic status, are particularly relevant to safety net populations.

The main focus of the present study is to understand which patients may benefit from proactive screening and referral to mental health services. This will be achieved by first identifying patient characteristics that predict a positive screen for depression, anxiety or PTSD. Additionally, by evaluating patient characteristics as predictors of type of mental health services received, we can identify patients at risk of receiving lower tier mental health services or none at all. The literature indicates that certain patient factors influence the likelihood of their mental health needs being identified. Therefore, we hypothesize that these same patient characteristics may be related to both physician detection of mental health need and referral to mental health services within an integrated safety net clinic.

This study also addresses the lack of patient diversity in current literature (Hunter et al., 2018). To date, much of the research has been conducted with patient populations that are

majority White, middle-class, English-speaking and veteran. The current study uses two urban

safety net populations, specifically a low-income, minority patient population with high burden

of chronic medical conditions, and is inclusive of both English and Spanish speakers.

Specific Aims

Aim 1: Examine the internal reliability of the PHQ-9, GAD-7, and PC-PTSD-5 in a

safety net primary care sample.

Aim 2: Characterize the prevalence of mental health needs for patients who did not

receive treatment from an integrated mental health clinician in the previous year, and

evaluate patient characteristics as predictors of having a positive screen.

Aim 3: Evaluate patient characteristics as predictors of type of mental health services

received in the previous year.

Method

Participants

An a priori power analysis was conducted using G*Power 3.1.9.3. The chosen criteria

were: odds ratio of 1.32, alpha level of .05, and power level of .80. These criteria were chosen to

maximize power, while minimizing the likelihood of obtaining a false positive (Type I error).

Previous work on patient characteristics predicting physician detection of psychiatric distress

reported odds ratios ranging from 0.54 to 7.08 (Afana et al., 2002; Balestrieri et al., 2002;

Borowsky et al., 2003; Carey et al., 2015; Y. A. Kim et al., 2008; Liu et al., 2004; Odell et al.,

1997; Pini et al., 1997; Robbins et al., 1994; Tylee et al., 1993). The median odds ratio of 1.32

was used. In the present study, a minimum of 471 participants will be required to have adequate

power to detect a similar effect size.

Inclusion criteria for the current study are that participants must (1) speak English or Spanish, and (2) Be >18 and <89 years old . Those who had not received mental health services in the previous year were eligible for the mental health assessment, and were administered brief screeners for depression, anxiety, and PTSD as a part of usual care. Patients were excluded from the study if 1) they did not speak English or Spanish, or 2) their age was <18 or >89 years old. In order to maintain generalizability and recruit a sample that is representative of typical clinical practice in these settings, only two exclusion criteria were used.

Participants (n=816) were patients receiving health care from two safety net clinics in the Greater Richmond area. The two safety net clinics include an urban clinic and a suburban clinic. Both clinics are integrated care clinics with behavioral health services and serve diverse populations in respect to race/ethnicity and SES.

Procedure

Patient Classification. The current study used secondary data analysis of archival clinical data. This is an observational study with a cross sectional design. Patients were classified as either: not having received integrated mental health services in the previous year or as having received integrated mental health services in the previous year. Receipt of integrated mental health services were defined as at least one encounter with the clinic's mental health staff or volunteers in the previous 12 months. Staff and volunteers included Licensed Professional Counselors (LPCs), psychiatric nurse practitioners, psychiatrists and psychology residents. Receipt of external mental health services were not considered.

Group that did not receive treatment from an integrated mental health clinician. Patients who did not receive treatment from an integrated mental health clinician in the previous year were eligible for a mental health needs assessment, which was conducted over a 4-month

period from June – September 2018. Eligible patients were systematically selected to participate

in the assessment. On assessment days, the daily schedule was reviewed and every third patient

was selected for recruitment. These patients completed the assessment upon arrival to their usual

medical appointments while they waited to be seen. Patients either self-administered the

measures or participated in a structured interview depending upon their preference. Structured

interviews were administered in English and Spanish at both clinics by a bilingual intern. For the

script used to introduce the assessment to patients, please see Appendix B. Medical records were

retrospectively reviewed to collect demographic, social, and medical information.

Group that did receive treatment from an integrated mental health clinician.

Patients who did receive treatment from an integrated mental health clinician in the previous year

were screened for eligibility for the study. Eligible patients' medical records were reviewed to

collect demographic and medical information.

Measures

Demographic and Social Characteristics. Patient demographic characteristics were

collected from medical records. Characteristics of interest included: age, sex, race/ethnicity,

education level, marital status, and income level.

Medical Characteristics. Patient medical characteristics were collected from medical

records. Characteristics of interest included: presence of hypertension, diabetes, and heart

disease.

Depression Measure. The Patient Health Questionnaire-9 (PHQ-9; Spitzer, Kroenke, &

Williams, 1999) is a self-report measure with the purpose of identifying depressive symptom

severity. Each participant rated 9-items of depressive symptoms on the degree to which they

were bothered by them over the previous 2 weeks. Individual responses range in value from "0"

(not at all) to "3" (nearly every day). The measure is scored by taking the sum of scores for all

questions, with possible scores ranging from 0-27. Scores are interpreted in ranges of severity:

Minimal (0-4), Mild (5-9), Moderate (10-14), Moderately Severe (15-19), and Severe (>20). The

clinical cut-off is 10. Its psychometric properties were evaluated with primary care patients and

demonstrated: strong relationship between other depression related constructs and excellent

reliability with Cronbach's α of 0.86-0.89 (Kroenke et al., 2001).

      Anxiety Measure. The Generalized Anxiety Disorder-7 (GAD-7; (Spitzer et al., 1999) is

a self-report measure with the purpose of identifying anxiety symptom severity. Each participant

rated 7-items of symptoms on the degree to which they were bothered by them over the previous

2 weeks. Individual responses range in value from "0" (not at all) to "3" (nearly every day). The

measure is scored by taking the sum of scores for all questions, with possible scores ranging

from 0-21. Scores are interpreted in ranges of severity: Minimal (0-4), Mild (5-9), Moderate (10-

14), and Severe (15-21). The clinical cut-off is 8. Its psychometric properties were evaluated

with Hispanic American community samples with both Spanish or English language preferences

and primary care patients, demonstrating excellent reliability with Cronbach's α of 0.92-0.93

(Mills et al., 2014; Spitzer et al., 2006).

      PTSD Measure. The Primary Care PTSD Screen for DSM-5 (PC-PTSD-5; Prins et al.,

2016) is a self-report measure with the purpose of identifying post-traumatic disorder symptom

severity. Each participant reviewed 5-items describing symptoms of PTSD, reporting whether or

not they had experienced them in the previous month. Individual response options were "Yes"

(1) or "No" (0). The measure is scored by taking the sum of symptoms endorsed, and the clinical

cut-off is considered to be 3. Its psychometric properties were evaluated with veteran primary

care patients and demonstrated strong PTSD diagnostic accuracy and excellent reliability with

Cronbach's α of 0.83 (Prins et al., 2016).

Table 1
Measures in the Mental Health Needs Assessment

Measure	Construct Measured	Number of Items
Patient Health Questionnaire – (PHQ-9)	Depression and Suicidality	Ten, 4-point Likert
Generalized Anxiety Scale – (GAD-7)	Anxiety	Eight, 4-point Likert
Primary Care – Posttraumatic stress disorder – (PC-PTSD-5)	PTSD	Six, Yes/No

Data Analytic Plan

Preliminary Analyses

First, data will be examined for missingness, outliers, and normality prior to conducting

analyses. Then data will be examined for any violations to the assumptions of logistic regression.

Means, standard deviations, and bivariate correlations will be computed for each of the following

variables: depression, anxiety, PTSD, and age. Finally, we will examine demographic, social and

medical characteristics of the sample. Specific variables of interest include: age, sex,

race/ethnicity, education level, marital status, income level, hypertension, diabetes, and heart

disease.

Analyses by Aim

Aim 1: Examine the internal reliability of the PHQ-9, GAD-7, and PC-PTSD-5 in a safety net

primary care sample.

Reliability of the measures for this sample will be characterized by internal consistency. This was estimated using Cronbach's alpha. A value will be computed for each of the following: PHQ-9 English, PHQ-9 Spanish, GAD-7 English, GAD-7 Spanish, PC-PTSD-5 English, and PC-PTSD-5 Spanish. Internal consistency will be characterized as follows: >.90 (high reliability), .80-.89 (good reliability), .70-.79 (acceptable reliability), <.69 (poor reliability).

Aim 2: Characterize the prevalence of mental health needs for patients who did not receive treatment from an integrated mental health clinician in the previous year, and evaluate patient characteristics as predictors of having a positive screen.

The prevalence of probable mental health disorders (MDD, GAD, PTSD), trauma exposure and suicidal ideation will be determined for the entire group. Prevalence rates will be presented as simple percentages. Descriptive demographic, social, and medical characteristics will also be provided for each probable disorder group. Additional descriptive information will include the percentage of patients with prescriptions for psychiatric medication, a psychiatric diagnosis in their medical record, or neither. This will distinguish how many patients with probable disorders were detected and not receiving integrated mental health services versus were truly undetected.

A binary logistic regression analysis will evaluate demographic, social, and medical characteristics as predictors of whether or not a patient has probable depression. All predictor variables will be included in the model. Demographic variables will include: age, sex, ethnicity, education level, marital status, and income level. Medical variables included: hypertension, diabetes, and heart disease. Importance of individual predictors will be evaluated using a Wald statistic. These analyses will be repeated for probable anxiety and probable PTSD.

Aim 3: Evaluate patient characteristics as predictors of type of mental health services received

in the previous year.

Two multinomial logistic regression analyses will explore which demographic, social, and medical characteristics best contribute to the prediction of type of mental health services received (none, general medication management, integrated mental health services). Demographic variables will include: age, sex, ethnicity, education level, marital status, and income level. Medical variables include: hypertension, diabetes, and heart disease. The first model will use integrated mental health services as the reference group, and the second model will use no mental health services as the reference group.

Additional Exploratory Aim: Evaluate patient characteristics as predictors of mental health

needs being either diagnosed or treated.

A binary logistic regression analysis will evaluate demographic, social, and medical characteristics as predictors of a patient's mental health needs being either detected or treated. Specifically, this will include patients with a diagnosis in their medical record, a prescription for psychotropic medication, or who had a positive screen for probable depression, anxiety, or PTSD. Demographic variables will include: age, sex, ethnicity, education level, marital status, and income level. Medical variables include: hypertension, diabetes, and heart disease.

Results

Preliminary Analyses

Examination for missing data indicated that three variables were missing data: ethnicity, marital status and education level. The little's MCAR test was used to assess for missingness of data. Results indicated that all missing data were missing at random, $X^2(1)=2.37$, $p=.124$. A multiple imputation procedure was then used to estimate values for these missing data. Five

imputed datasets were created using existing data. All binomial and multinomial logistic

regression analyses were conducted using these five datasets.

The basic demographic information is available for the both groups appear in Table 2,

specifically those who did not receive integrated mental health services in the previous year and

those who did. Patients who did receive integrated mental health services (n=464) were middle

aged (M=43.77, SD=12.73), female (68.8%), spoke Spanish (61.5%), and Hispanic (45.5%).

Patients who did not receive integrated mental health services (n=352) were on middle aged

(M=46.60, SD = 13.45), female (73.6%), spoke English (50.2%), and Hispanic (62.2%). Chi-

square analyses revealed that English speaking patients were significantly more likely to receive

integrated mental health services than Spanish speaking patients ($X^2(1)$=35.28, p=.000). For the

patient group that did not receive integrated mental health services, means and standard

deviations for all mental health assessment variables appear in Table 3. Based on the previously

defined clinical cut-offs, on average, patients did not endorse clinical levels of depression,

anxiety, or PTSD.

Table 2
Demographics of Sample

Variable	Did Receive Integrated MH Services (n=464)	Did Not Receive Integrated MH Services (n=352)
Age, M (SD)	43.77 (12.73)	46.60 (13.45)
Sex, Female %	68.8	73.6
Language, English %	50.2	29.5
Race, %		
White	33.2	19.9
Black	18.1	13.1
Asian	.6	1.4
American Indian/Alaska Native	.9	0
Hispanic	45.5	62.2

Not Reported	1.7		3.4	

Table 3
Means and Standard Deviations of Mental Health Assessment Variables

Variable	M	SD	Rating
Depression	4.45	5.15	None
Anxiety	3.63	4.53	None
PTSD	.49	1.15	None

Correlation Matrix. A correlation matrix was created to examine the bivariate

correlations among mental health needs assessment variables (Table 4). Depression was

significantly positively related to anxiety and PTSD. Anxiety and PTSD were also significantly

positively related to each other. Age was not significantly related to depression, anxiety, or

PTSD.

Table 4
Bivariate Correlations of Mental Health Assessment Variables

Variable	1	2	3	4
1. Depression		.741**	.319**	.018
2. Anxiety	.741**		.345**	.009
3. PTSD	.319**	.345**		-.062
4. Age	.018	.009	-.062	

** Denotes significance at 0.01 level

Aim 1: Examine the internal reliability of the PHQ-9, GAD-7, and PC-PTSD-5 in a safety

net primary care sample.

Internal reliability was assessed using Cronbach's alpha for the full measures of the

PHQ-9 and GAD-7 in English and Spanish. The PHQ-9 demonstrated high internal reliability in

English (Cronbach's alpha of .90) and good internal reliability in Spanish (Cronbach's alpha of

.86). The GAD-7 demonstrated high internal reliability in both English (Cronbach's alpha of .91)

and Spanish (Cronbach's alpha of .90). Finally, the PC-PTSD-5 demonstrated poor internal

reliability in English (Cronbach's alpha of .63) and acceptable internal reliability in Spanish (Cronbach's alpha of .78).

Aim 2: Characterize the prevalence of mental health needs for patients who did not receive treatment from an integrated mental health clinician in the previous year, and evaluate patient characteristics as predictors of having a positive screen.

Of the patients who had not received integrated mental health services in the previous year (n=352), 73.6% were female, 70.5% spoke Spanish, 19.9% were White, 72.3% were Hispanic or Latinx. Of this group, 34.5% were partnered, 50.2% achieved a high school degree or higher, 34.3% live in poverty, 34.4% had hypertension, 19.9% had diabetes, and 2.3% had heart disease. See Table 5 for more detailed information pertaining to this group. Based on responses to the mental health needs assessment, some patients were characterized as having: probable depression, suicidal ideation, probable anxiety, trauma exposure, and/or probable PTSD. The five groups did not appear to differ on most demographic variables.

Table 5

Demographic and Medical Characteristics of each Positive Screen Group

Variable	Positive Screen Group					
	Full sample (n=352)	Probable Depression (13%, n=46)	Suicidal Ideation (8.24%, n=29)	Probable Anxiety (13.35%, n= 47)	Trauma Exposure (23.58%, n=83)	Probable PTSD (7.67%, n=27)
Mean Age (SD) [range]	46.60 (13.45) [18, 87]	46.3 (13.48) [25, 73]	48.07 (14.32) [26, 79]	46.53 (12.74) [25, 72]	46.47 (11.38) [21, 67]	43.22 (10.12) [21, 66]
Sex, % Female	73.6%	82.6%	79.3%	72.3%	75.9%	85.2%

Male	26.4%	17.4%	20.7%	27.7%	24.1%	14.8%
Language, %						
English	29.5%	37%	31%	40.4%	32.5%	40.7%
Spanish	70.5%	63%	69%	59.6%	67.5%	59.3%
Race, %						
American-Indian/ Alaska Native	0%	0%	0%	0%	0%	0%
Asian	1.4%	0%	3.4%	0%	2.4%	7.4%
Black/African American	13.1%	13.0%	13.0%	17.0%	14.5%	18.5%
White	19.9%	21.7%	10.3%	21.3%	25.3%	25.9%
Hispanic	62.2%	65.2%	65.5%	59.6%	55.4%	44.4%
Unreported	3.4%	0%	6.9%	2.1%	2.4%	3.7%
Ethnicity, %						
Not Hispanic or Latinx	27.7%	32.6%	27.6%	36.2%	31.3%	40.7%
Hispanic or Latinx	72.3%	67.4%	72.4.0%	63.8%	67.5%	59.3%
Marital Status, %						
Partnered	34.5%	30.4%	25%	38.3%	31.3%	26.9%
Non-partnered	65.5%	69.6%	75%	61.7%	67.5%	73.1%
Education Level, %						
Elementary school	26.9%	28.2%	33.3%	24.4%	15.9%	21.7%
Some High School	23.2%	20.5%	16.7%	19.5%	18.8%	26.1%
High School/equivaler	33.3%	25.6%	37.5%	34.1%	46.4%	30.4%
Some college	5.4%	7.7%	4.2%	9.8%	8.7%	17.4%
College	8.8%	17.9%	8.3%	12.2%	8.7%	4.3%
Graduate School	2.7%	0%	0%	0%	1.4%	0%
Poverty Level, %						
0 – 49	42.9%	52.2%	48.3%	48.9%	39.7%	48.1%
50 – 99	22.7%	21.7%	24.1%	21.3%	22.9%	18.5%
100 -138	20.7%	13%	17.2%	14.9%	22.9%	18.5%
139 – 200	12.2%	13%	10.3%	12.8%	12.0%	14.8%
Above 200	1.4%	0%	0%	0%	2.4%	0%
Hypertension, %						
Yes	34.4%	32.6%	34.5%	29.8%	34.9%	29.6%

No	65.6%	67.4%	65.5%	70.2%	65.1%	70.4%
Diabetes, %						
Yes	19.9%	23.9%	41.4%	27.7%	21.7%	33.3%
No	80.1%	76.1%	58.6%	72.3%	78.3%	66.7%
Heart Disease, %						
Yes	2.3%	2.2%	6.9%	2.1%	1.2%	0%
No	97.7%	97.8%	93.1%	97.9%	98.8%	100%
Scale Score, Mean						
(SD), %	4.45	15.48	14.38	12.04	5.60	9.85
PHQ-9	(5.15)	(4.44)	(6.69)	(6.94)	(5.48)	(6.39)
GAD-7	3.63	10.37	11.66	13.06	4.66	8.67
PC-PTSD-5	(4.53)	(6.61)	(6.56)	(4.52)	(4.78)	(6.00)
	.49	1.37 (1.96)	1.85	1.16	1.89	3.89
	(1.15)		(2.26)	(1.77)	(1.55)	(0.80)

Note. This table reflects the raw data not including multiple imputation.

Prevalence and Nature of Mental Health Needs

Depression. Forty-six patients endorsed depressive symptoms that indicated probable presence of depression, and did not appear to differ from the larger group on most demographic variables. Approximately one in four of these patients had a diagnosis of depression in their medical records, and around one in five were prescribed antidepressant medication. Nearly seventy percent of these patients' needs were undetected, with no diagnoses or psychiatric medication prescriptions. Of this group, 58.7% also had a positive screen for anxiety and 27.9% also had a positive for PTSD.

Suicidal Ideation. Twenty-nine patients endorsed some or frequent suicidal ideation. This group had nearly twice the rate of diabetes (41.4%), and over three times the rate of heart disease (6.9%) as the overall group. Post hoc chi-square analyses revealed that patients with suicidal ideation were significantly more likely to have diabetes ($X^2(1)=9.38$, $p=.002$) than not.

The relation between suicidal ideation and heart disease was not significant ($X^2(1)$=3.01, p=.083). Of this group, 69% also had a positive screen for depression, 58.6% had a positive screen for anxiety, and 42.3% had a positive screen for PTSD. Approximately three fourth of these patients' distress were undetected, with no diagnoses or psychiatric medication prescriptions. Of those who appeared to have been detected, 10.3% were prescribed psychiatric medication and 24.1% had psychiatric diagnoses in their medical records. Twenty percent of patients had a diagnosis of depression, 3.4% had a diagnosis of anxiety, and no patients had a diagnosis of PTSD.

Table 6
Comorbidity in, Detection and Medication Management of each Positive Screen Group

Variable	Positive Screen Group				
	Probable Depression (13%, n=46)	Suicidal Ideation (8.2%, n=29)	Probable Anxiety (13.4%, n=47)	Trauma Exposure (23.6%, n=83)	Probable PTSD (7.7%, n=27)
Positive Screen					
Depression	100%	69%	57.4%	20.5%	44.4%
Anxiety	58.7%	58.6%	100%	20.5%	37%
PTSD	27.9%	42.3%	22.2%	31.3%	100%
Diagnoses					
Depression	26.1%	20.7%	27.7%	13.3%	14.8%
Anxiety	4.3%	3.4%	10.6%	7.2%	3.7%
PTSD	0%	0%	0%	0%	0%
Medication					
Antidepressant	17.4%	6.9%	21.3%	12.0%	7.4%
Anxiolytic	4.3%	3.4%	4.3%	2.4%	7.4%
Either	21.7%	10.3%	21.3%	14.5%	14.8%

Anxiety. Forty-seven patients endorsed anxious symptoms that indicated probable presence of anxiety, and did not appear to differ from the larger group on most demographic variables. Only 10.6% of these patients had a diagnosis of anxiety in their medical records,

21.3% were prescribed antidepressant medication and 4.3% were prescribed anxiolytic medication. Sixty-three percent of these patients appeared to have undetected need, with no diagnoses in their medical record or prescriptions for psychiatric medication. Of this group, 57.4% also had a positive screen for depression and 21.3% also had a positive screen for PTSD.

PTSD. Eighty-three patients reported having ever experienced a traumatic event, and one third (n=27) of those patients endorsed symptoms that indicated probable presence of PTSD. Neither groups appeared to differ from the larger group on most demographic variables. Of the patients with positive screens for PTSD, none had a diagnosis of PTSD in their medical records, 14.8% had a diagnosis of depression and 3.7% had a diagnosis of anxiety. Eighty-two percent of these patients appeared to have undetected need, with no diagnoses in their medical record or prescriptions for psychiatric medication. Forty-four percent of patients with probable PTSD also had a positive screen for depression and 37.0% had a positive screen for anxiety.

Predictors of a Mental Health Needs

Three logistic regression analyses assessed whether their demographic and medical characteristics predicted a positive screen for depression, anxiety, or PTSD.

Depression. A direct logistic regression analysis assessed whether age, sex, ethnicity, education level, marital status, income, diabetes, hypertension, or heart disease significantly predicted whether or not a patient would have a positive screen for depression. When all nine predictor variables were considered together, they did not significantly predict whether or not a patient had depression. Multiple imputation was used, so five models were run. The average model across five samples was χ^2 (9) = 7.13, p = .624, Nagelkerke R^2 = .04.

Anxiety. A direct logistic regression analysis assessed whether age, sex, ethnicity, education level, marital status, income, diabetes, hypertension, or heart disease significantly

predicted whether or not a patient would have a positive screen for anxiety. When all nine

predictor variables were considered together, they did not significantly predict whether or not a

patient had anxiety. Multiple imputation was used, so five models were run. The average model

across five samples was χ^2 (9) = 9.68, p = .532, Nagelkerke R^2 = .04.

      PTSD. A direct logistic regression analysis assessed whether age, sex, ethnicity,

education level, marital status, income, diabetes, hypertension, or heart disease significantly

predicted whether or not a patient would have a positive screen for PTSD. When all nine

predictor variables were considered together, they did not significantly predict whether or not a

patient had PTSD. Multiple imputation was used, so five models were run. The average model

across five samples was χ^2 (9) = 12.00, p = .214, Nagelkerke R^2 = .08.

Aim 3: Evaluate patient characteristics as predictors of type of mental health services

received in the previous year.

      A multinomial regression model was constructed to predict the type of mental health

services (integrated mental health services, general medication management, none) received by

clinic patients (n=630). The model used integrated mental health services as the reference group.

The step summary indicated that all predictors should be retained, therefore the initial and final

models both consisted of nine variables: age, sex, ethnicity, education level, marital status,

poverty level, diabetes, hypertension, and heart disease.

      When all nine predictor variables were considered together, they significantly predicted

the type of mental health services received. The average model across five samples was χ^2 (18) =

79.73, p= .000. The average Nagelkerke pseudo R^2 across five samples indicated that the model

accounted for 11.6% of the total variance in type of mental health services received. On average

across the models, 61.5% of cases were correctly predicted; correct prediction rates were 81.9%

for patients that received integrated mental health services, 0% for general medication

management, and 38.2% for no mental health services.

For the comparison of no mental health services relative to integrated mental health

services, significant unique contributions were made by age χ^2 (1) = 14.25, p= .000, ethnicity χ^2

(1) = 14.21, p= .000, and marital status χ^2 (1) = 20.87, p= .000. For every year that age increases

for a patient, their likelihood of receiving no mental health services compared to integrated

mental health services increases by 1.03 (p=.000). Non-Hispanic or Latinx patients are 52% less

likely than Hispanic or Latinx patients to receive no mental health services compared to

integrated mental health services (p=.000). Non-partnered patients have a 66% less chance of

receiving no mental health services compared to integrated mental health services than partnered

patients (p=.000). The remaining predictors did not provide unique significant contributions:

education, x^2(1) = 2.42, p= .123, income, x^2(1) = .12, p= .733, sex, x^2(1) = .88, p= .349,

hypertension, x^2(1) = .27, p= .600, diabetes, x^2(1) = 1.60, p= .206, or heart disease, x^2(1) = .01,

p= .914.

For the comparison of general medication management relative to integrated mental

health services, significant a unique contribution was made by age χ^2 (1) = 5.34, p= .021. For

every year that age increases for a patient, their likelihood of receiving general medication

management compared to integrated mental health services increases by 1.04 times (p=.021).

The remaining predictors did not provide unique significant contributions: education, x^2(1) = .10,

p= .740, income, x^2(1) = .29, p= .589, sex, x^2(1) = 1.58, p= .209, ethnicity, x^2(1) = 2.92, p= .087,

marital status, x^2(1) = 2.81, p= .094, hypertension, x^2(1) = .38, p= .537, diabetes, x^2(1) = 1.36, p=

.244, or heart disease, x^2(1) = .05, p= .822.

A second multinomial regression model was constructed to predict the type of mental health services (integrated mental health services, general medication management, none) received by clinic patients (n=630). The model used no mental health services as the reference group. The step summary indicated that all predictors should be retained, therefore the initial and final models both consisted of nine variables: age, sex, ethnicity, education level, marital status, poverty level, diabetes, hypertension, and heart disease.

When all nine predictor variables were considered together, they significantly predicted the type of mental health services received. The average model across five samples was χ^2 (18) = 79.73, p= .000. The average Nagelkerke pseudo R^2 across five samples indicated that the model accounted for 11.6% of the total variance in type of mental health services received. On average across the models, 61.5% of cases were correctly predicted; correct prediction rates were 81.9% for patients that received integrated mental health services, 0% for general medication management, and 38.2% for no mental health services.

For the comparison of general medication management relative to no mental health services, none of the predictors made significant unique contributions. For the comparison of integrated mental health services relative to no mental health services, significant unique contributions were made by age χ^2 (1) = 14.25, p= .000, ethnicity χ^2 (1) = 14.21, p= .000, and marital status χ^2 (1) = 20.87, p= .000. For every year that age increases for a patient, their likelihood of receiving integrated mental health services compared to no mental health services decreases by 3% (p=.000). Non-Hispanic or Latinx patients are 2.08 times more likely than Hispanic or Latinx patients to receive integrated mental health services compared to no mental health services (p=.000). Non-partnered patients are 2.28 times more likely than partnered patients to receive integrated mental health services than no mental health services (p=.000). The

remaining predictors did not provide unique significant contributions: education, $x^2(1) = 2.42$, $p= .123$, income, $x^2(1) = .12$, $p= .733$, sex, $x^2(1) = .88$, $p= .349$, hypertension, $x^2(1) = .27$, $p= .600$, diabetes, $x^2(1) = 1.60$, $p= .206$, or heart disease, $x^2(1) = .01$, $p= .914$.

Additional Exploratory Aim: Evaluate patient characteristics as predictors of mental health needs being either diagnosed or treated.

A direct logistic regression analysis assessed whether age, sex, ethnicity, education level, marital status, income, diabetes, hypertension, or heart disease significantly predicted whether or not a patient with mental health need would have been detected or treated. When all nine predictor variables were considered together, they did not significantly predict whether or not a patient had their needs detected. Multiple imputation was used, so five models were run. The average model across five samples was $\chi^2(9) = 13.27$, $p = .155$, Nagelkerke $R^2 = .05$.

Discussion

This study evaluated untreated mental health needs amongst English and Spanish speaking patients in two safety net primary care clinics. First, the internal reliabilities were characterized for English and Spanish versions of the brief screeners for depression, anxiety, and PTSD. Next, patient socio demographic characteristics were examined as predictors of whether a patient had a mental health need and the level of mental health services received. It was hypothesized that certain patient groups would be at increased risk of having mental health needs going undetected and untreated or undertreated. The findings extend the literature on the relation between patients' sociodemographic characteristics and detection of mental health needs in primary care, to demonstrate the relation between sociodemographic characteristics and mental health services received in an integrated safety net primary care clinic.

Internal Reliability of Measures

The observed internal reliabilities for all English and Spanish screeners were good, with the exception of the English version of the PC-PTSD-5. These findings were consistent with previously reported internal reliabilities, though this sample of racially and ethnically diverse patients in safety net settings provides a unique contribution to our understanding of the measures' performances.

The English and Spanish versions of the PHQ-9 demonstrated high and good internal reliability respectively. These findings parallel past research on the English version with predominantly White primary care patients (Kroenke et al., 2001, 2016), racially and ethnically diverse primary care patients (Huang et al., 2006) and Black safety net primary care patients (Pugh et al., 2020). Both English and Spanish versions have demonstrated good internal reliability in a community sample of Latina women (Merz et al., 2011).

Both English and Spanish versions of the GAD-7 demonstrated high internal reliability. Previously, the English version performed well with predominantly White primary care patients (Spitzer et al., 2006) and Black safety net primary care patients (Pugh et al., 2020). Both English and Spanish versions had good internal reliability with Hispanic community members in the United States (Mills et al., 2014) and in other countries (Barthel et al., 2014; Garabiles et al., 2019; García-Campayo et al., 2012). This study broadened the patients represented in the literature, with a racially and ethnically diverse safety net primary care sample.

The English version of the PC-PTSD-5 had poor internal reliability with the current sample. The sample size used for this analysis was particularly small, which may have contributed to the findings. However, this finding did align with those from a sample of deployed members of the Australian army (Steele et al., 2014), which led the authors to suggest that its

brevity may have been a factor. Less is known about translations into other languages, however this study begins to fill an important gap in the literature being the first to examine internal reliability of the Spanish version. The Spanish PC-PTSD-5 demonstrated acceptable internal reliability, which adds to the literature of translated versions demonstrating good internal reliability, such as the Korean version (Jung et al., 2018).

Prevalence of Mental Health Needs

In the current sample of patients who had not received integrated mental health services, approximately 13% had a positive screen for depression, 8% endorsed suicidal ideation, 13% for anxiety and 8% for PTSD. These prevalences were comparable to those reported in non-integrated primary care clinics (Kilpatrick et al., 2013; Kroenke et al., 2007; Miranda et al., 1998; Olfson et al., 2000). Patient groups with positive screens for depression, anxiety, and PTSD did not differ from the overall group on demographic and medical characteristics.

The group of patients endorsing suicidal ideation did notably differ from the overall group on two medical characteristics. First, there was a significant relation between suicidal ideation and diabetes, patients with suicidal ideation had nearly twice the rate of diabetes than the overall group. Secondly, while the relation between suicidal ideation and heart disease was not significant, patients with suicidal ideation were reported to have three times the rate of heart disease than the overall group. These findings are consistent with past literature, which indicate suicidal ideation and behavior are higher amongst patients with chronic health conditions (Gürhan et al., 2019; Karasouli et al., 2014; Kurella et al., 2005). Specifically, higher rates of suicidal ideation have been documented in patients with hypertension (Lehmann et al., 2018), diabetes (Sarkar & Balhara, 2014) and heart disease (Gürhan et al., 2019; Lehmann et al., 2018). Yet, a higher proportion of hypertension in this sample was not seen. There are several possible

explanations for that. First, hypertensive patients with suicidal ideation may be less likely to be

'high risk' and therefore not detected by the PHQ-9. One study found that hypertensive patients

with suicidal ideation tend to be characterized as 'lower risk' as compared to diabetic patients

with suicidal ideation (Lehmann et al., 2018). Not surprisingly, the PHQ-9 has more false

negatives with patients who have suicidal ideation without a plan than patients with a plan or

intent (Uebelacker et al., 2011). Therefore, it is possible that the suicidal ideation item on the

PHQ-9 underdetected suicidal ideation in hypertensive patients. The second possible explanation

is that the role of educational attainment with suicidal ideation in patients may vary by health

condition. Suicidal ideation appears to be more common in hypertensive patients who have

received a formal education than those who have not (Igwe et al., 2013). Conversely, suicidal

ideation in diabetic patients is more likely among those who have not received a formal

education than those who have (Igwe et al., 2013). This nuanced relation between suicidal

ideation and educational attainment by patients with health conditions may explain the results of

the present study; the majority of patients in the current sample had not received a formal

education. Finally, the small size of the patient group endorsing suicidal ideation could also

explain the findings. It may be that the group was too small to reveal any relation between

suicidality and hypertension, if it exists in the current patient population. The majority of patients

endorsing suicidal ideation also endorsed clinical levels of depression and/or anxiety,

comorbidities that are well documented (Bomyea et al., 2013; Raue et al., 2014). More

concerning, forty-two percent of the group with suicidal ideation also screened positive for

PTSD. Individuals with PTSD show significantly increased risk for completed suicide than those

without PTSD or with other disorders (Gradus et al., 2010; Nepon et al., 2010). These results

highlight the critical need for detection of PTSD, a disorder which has consistently been under

detected in primary care (Bomyea et al., 2013; Raue et al., 2014).

Approximately 23% of the sample endorsed lifetime trauma exposure. This was much

lower than those previously reported in underserved primary care clinics (Bruce et al., 2001;

Gillespie et al., 2009) and urban dwelling African American and Latinx populations (Alim et al.,

2006; Breslau et al., 1998). It is possible that the current sample has had less trauma exposure

than other similar populations. However, it is worth considering whether these findings may be

an underestimate of the true trauma exposure. American screeners for trauma exposure have long

been criticized for their narrow scope of trauma (Kaltman et al., 2010, 2011). As such, it is

possible that the full trauma exposure of this population was not captured. The prevalence for the

current study was based off of one item from the PC-PTSD-5. While the PC-PTSD-5 has shown

to be one of the more accurate screeners for PTSD in primary care (Freedy et al., 2010), it is less

clear how accurate it is in measuring trauma exposure. The item on the PC-PTSD-5 used to

assess trauma exposure for the present study provides a short list of examples of traumatic events

(e.g. a serious accident or fire, physical or sexual assault or abuse, an earthquake, a war, or

seeing someone killed or injured). While this list does include a wide range of traumas, it does

not capture all traumas relevant to diverse populations, specifically threats of violence or

political persecution.

A significant portion of the current sample includes Latinx immigrants and refugees,

individuals who are frequent victims of violence both during their migration and upon arriving in

the United States (Spottswood et al., 2017). Previous research reported that approximately half of

Latinx immigrant patients in community clinics had experienced political violence in their

country of origin. Importantly, Latina immigrant women have described a range in types of

traumas experienced, which were documented through more flexible methods such as qualitative interviews (Kaltman et al., 2010). As such, the current study's prevalence may be an underrepresentation of the patient population's true trauma exposure.

Previous research in primary care has shown a large range in PTSD prevalences (Spottswood et al., 2017). The median reported prevalence for civilian primary care populations of 11% exceeds the 8% prevalence observed in the current sample. This finding was unexpected given the population's high risk for PTSD. However, these findings align with a previous study in an urban primary care where status as an immigrant was associated with lower rates of PTSD (Liebschutz et al., 2007). The authors of that study hypothesized that this was due to their strong social support, which has shown to protect against the development of PTSD particularly in women (Ahern et al., 2004). In fact, level of social support appears to better predict mental health of immigrant individuals than extent of acculturation (Furnham & Shiekh, 1993). A longitudinal study following immigrant health over time reported that immigrants who did *not* learn English maintained better health than those who did learn English (Bruce Newbold, 2005). They attributed these findings to strong social networks which prevented those individuals from needing to learn English. This body of literature may provide some explanation for the low prevalence of PTSD reported in this sample. The higher proportion of patients in the current study with a Spanish language preference may be suggestive of social support and subsequent protection against PTSD. The expectations for high rates of trauma exposure and PTSD are not supported, though PTSD remains an issue in the sample and should continue to be assessed for by the care team.

Patient Characteristics as Predictors of Mental Health Need and Treatment Type

Analyses revealed that no patient characteristics predicted a positive screen for

depression, anxiety, or PTSD, though several patient characteristics did predict the type of

mental health services received by clinic patients. The four characteristics that predicted type of

mental health treatment received by patients were age, ethnicity, and marital status.

Older patients were more likely to receive medication management from their general

practitioner or no mental health services at all than integrated services compared to younger

patients. Age disparities in mental health service utilization have been consistently reported

(Bartels et al., 2005). In primary care, mental health needs are detected less frequently in older

than younger patients (Borowsky et al., 2003; Carey et al., 2015; Odell et al., 1997). Once

detected, internalized stigma may serve as additional barrier to being treated. A national survey

among depressed older adults indicated that many individuals endorsed high levels of mental

health-related stigma and no intention to seek mental health treatment (Conner et al., 2010).

Further, older age and stigma has shown to predict unsuccessful mental health referrals (Sirey et

al., 2014). It may be that older primary care patients are being detected less frequently and are

less willing to accept or follow through with referrals to mental health services even if housed

within primary care.

Hispanic or Latinx patients were less likely to receive integrated mental health services than

no mental health services compared to non-Hispanic patients. Similar as with age, ethnic

disparities in mental health care utilization have consistently been reported in the literature (Abe-

Kim et al., 2007; Alegría et al., 2007; Neighbors et al., 2007). Generally, these differences in

service utilization have been attributed to instrumental barriers such as English language

proficiency, insurance, transportation, and childcare (Alegría et al., 2007; Alvidrez & Azocar,

1999). Other barriers that have also been detected include lower detection rates in Latinx

patients, internalized mental health stigma, and ethnic differences in perceived need for mental

health care (Alegría et al., 2007; Borowsky et al., 2003; Nadeem et al., 2009). Although

integrating mental health services into primary care aims to reduce barriers for patients, it

appears that Hispanic or Latinx patients in the current study may face additional logistical and

cultural barriers in accessing mental health services than their non-Hispanic or Latinx peers.

Finally, non-partnered patients were more likely to receive integrated mental health treatment

compared to their partnered peers. These findings are not surprising given previous studies

suggesting non-partnered patients have a higher likelihood of their physician detecting their

mental health needs in non-integrated primary care clinics (Balestrieri et al., 2002; Liu et al.,

2004; Pini et al., 1997). Better detection in non-partnered patients may be in part due to their

higher interaction with the healthcare system for mental health services compared to married

patients (Roberts et al., 2018; Twomey et al., 2015). Additionally, being married has shown to be

negatively associated with seeking treatment while distressed (Magaard et al., 2017; Roberts et

al., 2018). Although, there are observed differences between partnered and non-partnered

patients in detection, there appear to be no differences in treatment acceptance and referral

follow through (J. J. Kim et al., 2010). It is possible that the bias in treatment received is due to

biases in treatment offered by the care team.

Unexpectedly, most demographic, social, and medical characteristics did not predict which

patients would have a positive screen amongst those who had not received integrated services in

the past year. Additionally, few characteristics predicted the type of mental health treatment

received by clinic patients. Following these non-significant results, an additional analysis found

that among patients with a mental health need, no sociodemographic or medical characteristics

predicted the clinic's detection of it (i.e. diagnosis, prescription for psychotropic medication, or receipt of integrated mental health services). Taken together, these results suggest that staff at these clinics may generally identify and mental health needs uniformly across patients, and that the integrated system appears to be working for all patients to some extent. While research in non-integrated primary care clinics have historically demonstrated inequities in detection of mental health needs (Afana et al., 2002; Balestrieri et al., 2002; Borowsky et al., 2003; Carey et al., 2015; Y. A. Kim et al., 2008; Liu et al., 2004; Mitchell et al., 2010; Odell et al., 1997; Pini et al., 1997; Robbins et al., 1994; Tylee et al., 1993), it appears that some of these inequities may be less pronounced in clinics where mental health services are integrated within it. Physician surveys indicate that having an integrated psychologist in their clinics have led to reductions in their personally held stigma around mental health, increased their comfort discussing behavioral health concerns with their patients, and improved their perceived ability in managing behavioral health concerns with patients (Hine et al., 2017; Miller-Matero et al., 20160310, p.; Torrence et al., 2014). Additionally, research conducted in the VA health system reported that detection of common mental health needs improved across the patient population once mental health services were integrated into their clinics, though improvements were most pronounced for White patients (Zivin et al., 2010). This is the first study to evaluate how patient characteristics relate to detection of mental health needs or type of treatment received in integrated safety net primary care. These findings are preliminary and future research is needed to better understanding patterns of detection and treatment in these settings.

Although previous research has investigated the relation between patient characteristics and receipt of mental health services in primary care, this study differs in several important ways. First, this was conducted in two safety net primary care clinics with integrated mental health

services. Another unique contribution of this study was the examination of the type of mental health services received. To the author's knowledge, no study has looked at differences between patients receiving treatment from their general practitioners, integrated mental health providers, or no treatment at all.

Clinical Implications

Taken together, this study highlights the importance of evaluating mental health needs, detection and treatment within an integrated safety net primary care clinic. While detection of common mental health needs appears to be equitable across most patient characteristics in these two-safety net primary care clinics, this study highlights three important clinical implications.

First, although suicidal ideation prevalence was within the expected range, it comprises a significant portion of the patient population. Diabetes was overrepresented in the group of patients endorsing suicidal ideation, highlighting the importance of regular screening of suicidality amongst patients with diabetes in particular. Additionally, this study found lower rates of trauma exposure and PTSD than expected. This indicates that clinicians should not operate under the assumption that patients who have emigrated to the United States have a trauma history or are at risk of developing PTSD. However, it was found that 42% of patients with suicidal ideation also screened positive for PTSD. Though a small group, this speaks to the importance of detecting PTSD in patients and assessing for suicidal ideation concurrently.

The third noteworthy finding was the role of age, ethnicity, and marital status in predicting type of mental health treatment received by patients. It is unclear what factors are contributing to the lower levels of mental health care provided for patients in these clinics who are older, Hispanic/Latinx, and/or partnered. However, they may benefit from increased screening, psychoeducation, and clear referral processes outlined for their physicians. Brief

screeners enhance physician detection and understanding of patients' psychiatric symptoms through qualitative characterization of symptom severity (Löwe et al., 2005; Olariu et al., 2015; Vöhringer et al., 2013). These qualitative characterizations of symptom severity may also provide a basis for streamlining referral procedures in the clinic (e.g. refer all patients within a defined symptom range). Additionally, brief psychoeducation about psychotherapy has been shown to increase therapy attendance among African American patients (Alvidrez et al., 2005). Similar brief psychoeducation by trusted primary care physicians may also increase patient acceptance and follow through of referrals to integrated mental health services in primary care clinics.

Limitations and Future Directions

This study described the present mental health needs of patients who have not recently received integrated mental health services and examined the relation between patient characteristics and mental health needs being detected, as well as the level of mental health treatment received. Despite the current study's strengths, it comes with limitations. The findings should be understood alongside the following limitations.

First, there were limitations related to the sample size. Although the mental health assessment group was fairly large, some of the groups used for internal reliability analyses were quite small. Reasons for this were that some patients did not complete each measure and that the English and Spanish versions of measures were analyzed separately. The English version of the PC-PTSD-5 had a particularly small group for this analysis, with 26 patients. While internal reliability analyses do not depend on sample size, it is possible that this small sample of patients completing the PC-PTSD-5 are not representative of the safety net population; the reported internal reliability may be an inaccurate estimation of the measure's performance in safety net

primary care. Future research should consider using larger group sizes to evaluate the internal

reliability of these measures in safety net primary care. Sample size was also a concern for the

groups of patients with positive screens for depression, anxiety, and/or PTSD. Analyses

evaluating patient characteristics as predicting a positive screen included 10 predictors for

sample sizes of 97-248. Recently statisticians have argued for less stringent expectations for case

to predictor ratios (van Smeden et al., 2016; Vittinghoff & McCulloch, 2007), though future

research should consider sampling larger patient groups to minimize small sample bias.

Another limitation was use of data from an electronic medical record (EMR). Using

electronic medical records for research allows researchers to access a wealth of information

without burdening participants, however they have been reported to contain inaccuracies (Cowie,

2017). For instance, a study examining the accuracy of EMR classification of ethnicity/race as

compared to patient self-report found that race cases had 91.1% of agreement (Bergdall et al.,

2012). While this overall agreement was high, lower agreement was seen in Hispanic, Native

American and mixed-race patients, suggesting that EMR data may be less reliable for them. It is

important to consider these potential errors in EMR data, particularly when using data for diverse

patient samples or those who have been reported to have more errors. Future researchers that

utilizes data from the electronic medical record may consider implementing a quality check for

variables of interest and/or including brief patient self-report for variables most at risk for error.

Third, this study used self-report measures to determine mental health needs for the

patients who had not received services in the previous year. In general, self-report measures are

appealing because they are relatively low-cost and can be completed quickly. However, they

may be less sensitive in picking up on mental health needs than a clinical interview would be

(Altura et al., 2016; Arroll et al., 2010; Stafford et al., 2007). These self-report measures were

also created and initially validated with predominantly white patient populations, and their

ability to assess mental health needs in diverse populations is less understood. For instance, the

PC-PTSD-5 includes a list of examples of traumatic experiences before prompting the individual

to report whether or not they have experienced a traumatic event. These examples of traumatic

events are not necessarily representative of all traumatic events, particularly those which may be

experienced by immigrants and refugees. To enhance accuracy in estimation of mental health

needs in integrated safety net primary care, future researchers may want to consider use of

clinical interviews.

Finally, this study uses a cross-sectional design. The mental health needs identified

through the needs assessment indicated the current needs of patients that did not receive

treatment from an integrated mental health clinician in the previous year, and were considered to

have gone undetected. An important limitation to consider is that their symptoms may be new

and therefore could not have been detected during their previous appointment at the clinic.

Future research using a similar design may consider including an item to the assessment asking

when any endorsed symptoms first began to help decipher whether the symptoms were truly

missed during their previous appointment(s) with their primary care provider.

Conclusion

The current study found prevalences of depression, suicidal ideation, anxiety, and PTSD

that were expected, given those reported in non-integrated primary care clinics. Patients with

suicidal ideation had significantly higher rates of diabetes than those without, and high rates of

PTSD. No patient characteristics predicted a positive screen for depression, anxiety, or PTSD;

many patient characteristics didn't predict the type of mental health services received. Though,

patients who were older, Hispanic or Latinx, and/or partnered were less likely to receive

integrated mental health services. This study suggests that inequities in detection of mental health needs may be less pronounced in integrated primary care than in non-integrated primary care. However, longstanding disparities in mental health treatment may persevere in this newer model of primary care. Additional research is needed to better understand patterns of detection and treatment in integrated primary care settings.

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Appendix A: Demographic, Social, and Medical Information

Demographic and Social Information
    Age
    Sex
        Female
        Male
    Primary Language Spoken
        English
        Spanish
    Race
        American-Indian/Alaska Native
        Asian
        Black/African-American
        White
        Hispanic
        Unreported
    Ethnicity
        Not Hispanic or Latino
        Hispanic or Latino
    Education Level
        Elementary School
        Some High School
        High School/GED/Apprenticeship
        Some College
        College
        Graduate School
    Marital Status
        Partnered
        Non-partnered
    Income Level (% of the federal poverty line)
        0 – 49
        50 – 99
        100 -138
        139 – 200
        Above 200
Medical Information
    Diabetes
        Yes
        No

Hypertension
    Yes
    No
Heart Disease
    Yes
    No

Appendix B: Mental Health Needs Assessment Script

Introduction

      CrossOver Healthcare Ministry is conducting a survey to understand how we can better serve our patients. You have been randomly selected to be invited to participate in our survey!

Please note:

- Your Privacy is Protected. All information that would let someone identify you or your family will be kept private. Crossover will not share your personal information with anyone without your OK. Your responses to this survey are also completely confidential. You may notice a number on the cover of the survey. This number is used only to let us know if you returned your survey .
- Your Participation is Voluntary. You may choose to answer this survey or not. If you choose not to, this will not affect the health care you get.
- If you need help filling out the form. Kristen can help you with any questions you may have.
- What To Do When You're Done. Once you complete the survey, please return it to Kristen.

Appendix C: Patient Health Questionnaire (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems?

1. Little interest or pleasure in doing things?
    0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
2. Feeling down, depressed, or hopeless
    0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
3. Trouble falling or staying asleep, or sleeping too much
    0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
4. Feeling tired or having little energy
    0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
5. Poor appetite or overeating
    0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down.
    0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
7. Trouble concentrating on things, such as reading the newspaper or watching television.
    0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual.
    0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
9. Thoughts that you would be better off dead, or of hurting yourself.
    0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day

If you have indicated having been bothered by any of these problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?
    (a) Not at all difficult; (b) Somewhat difficult; (c) Very difficult; d. Extremely difficult

Appendix D: Generalized Anxiety Scale (GAD-7)

Over the last 2 weeks, how often have you been bothered by any of the following problems?
1. Feeling nervous, anxious, or on edge
      0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
2. Not being able to stop or control worrying
      0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
3. Worrying too much about different things
      0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
4. Trouble relaxing
      0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
5. Being so restless that it's hard to sit still
      0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
6. Becoming easily annoyed or irritable
      0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day
7. Feeling afraid as if something awful might happen
      0 (Not at all); (1) Several Days; (2) More than half the days; (3) Nearly every day

If you checked off any problems, how difficult have these made it for you to do your work, take care of things at home, or get along with other people?
      (a) Not at all difficult; (b) Somewhat difficult; (c) Very difficult; d. Extremely difficult

Appendix E: Primary Care – Posttraumatic stress disorder (PC-PTSD-5)

Sometimes things happen to people that are unusually or especially frightening, horrible, or traumatic. For example:
- A serious accident or fire
- A physical or sexual assault or abuse
- An earthquake or flood
- A war
- Seeing someone be killed or seriously injured
- Having a loved one die through homicide or suicide

Have you ever experienced this kind of event?
     YES   NO

In the past month, have you…
1. had nightmares about the event(s) or thought about the event(s) when you did not want to?
     YES   NO
2. tried hard not to think about the event(s) or went out of your way to avoid situations that reminded you of the event(s)?
     YES   NO
3. been constantly on guard, watchful, or easily startled?
     YES   NO
4. felt numb or detached from people, activities, or your surroundings?
     YES   NO
5. felt guilty or unable to stop blaming yourself or others for the event(s) or any problems the event(s) may have caused?
     YES   NO

Vita

Kristen Marie O'Loughlin was born on September 15, 1992, in Seattle, Washington. She graduated from Shorewood High School, Shoreline, Washington in 2011. In 2015, she received a Bachelor of Science in Psychology from the University of Washington, Seattle Washington then began working as research coordinator at the University of Washington's School of Medicine. In 2018, she received a Master of Arts in Clinical Psychology from Northwestern University, Feinberg School of Medicine, Chicago, Illinois.