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Retention in Depression Treatment among Ethnic and Racial Minority Groups in the United States

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Abstract

Background—Premature discontinuation of psychiatric treatment among ethnic-racial minorities is a persistent concern. Prior research on identifying factors associated with ethnic-racial disparities in depression treatment has been limited by the scarcity of national samples with adequate representation of minority groups and especially non-English speakers. In this article we aim to identify variations in the likelihood of retention in depression treatment among ethnic-racial minority groups in the US as compared to non-Latino whites. Secondly, we aim to identify factors which are related to treatment retention.

Methods—We use data from the Collaborative Psychiatric Epidemiology Surveys (CPES) to examine differences and correlates of depression treatment retention among a representative sample (n=564) of non-Latino whites, Latinos, African American and Asian respondents with last 12 month depressive disorder and who report receiving formal mental health treatment in the last year. We define retention as attending at least four visits or remaining in treatment over a 12 month period.

Results—Being seen by a mental health specialist as opposed to being seen by a generalist and having received medication are correlates of treatment retention for the entire sample. However, after adjusting for demographics, clinical factors including number of co-occurring psychiatric disorders and level of disability, African Americans are significantly less likely to be retained in depression treatment as compared to non-Latino whites.

Conclusions—Availability of specialized mental health services or comparable treatment within primary care could improve treatment retention. Low retention suggests persistent problems in the delivery of depression treatment for African Americans.

Keywords

Depression; Retention in Care; Ethnic-Racial Minorities

Background

Depression is a prevalent condition with similar rates among African Americans, Latinos, and non-Latino Whites in the US. Nonetheless, there are disparities in treatment access, engagement and retention for ethnic minority communities (1,2). Studies have shown that even when ethnic, racial and linguistic minorities access psychiatric treatment, early dropout and high rates of missed follow-up appointments for psychiatric care are a persistent concern (3-7). There is a considerable literature describing factors which may serve as specific

barriers to retention in mental health treatment for depression among ethnic-racial minorities. Factors which have been considered include unfulfilled treatment expectations (8,9), less likelihood of obtaining specialty mental health care (10), lack of ethnic/racial matching between patient and provider (11), cultural mistrust of the mental health system (12) and inadequacy of services provided to ethnic minorities (1,13,14).

Prior research identifying the factors associated with poor retention in mental health care for racial-ethnic minority populations has been limited by the scarcity of national samples that include an array of diagnostic and quality indicators and sufficient numbers of non-English-speaking individuals from minority groups. In this paper we focus on two primary questions: Are there differences in the likelihood of retention in treatment for depression among the major ethnic-racial minority groups in the US as compared to non-Latino whites? Which factors are associated with retention in formal care for depression? Our approach to examining these questions is based on an understanding that improving depression treatment among ethnic minority communities will likely require addressing both patient related factors (e.g. mental health need, satisfaction with services) and provider and health system related factors (e.g. mental health treatment knowledge of providers, insurance coverage).

Methods

Sample Design and Data Collection Procedures

The analysis for this article uses data from the Collaborative Psychiatric Epidemiology Surveys (CPES) which includes the National Comorbidity Survey Replication (NCS-R), the National Survey of American Life (NSAL), and the National Latino and Asian American Study (NLAAS) (15). The CPES surveys were developed under the sponsorship of the National Institute of Mental Health (NIMH), and the data collection was conducted by the Survey Research Center (SRC) of the Institute for Social Research at the University of Michigan from early 2001 through the end of 2003 (15). Together, the studies of the CPES focus on collecting nationally representative epidemiological information on mental health, substance disorders and service usage among the general population of the United States. There is a special emphasis on ethnic minority groups with interviews conducted in multiple languages in the NLAAS (Latino and Asian subgroups). The NSAL is focused on socioeconomically diverse African American communities (16,17). The NCS-R also contains a representative non-Latino White and African American sample. The University of Michigan Survey Research Center (SRC) collected data for the studies using an adaptation of a multiple-frame approach to estimation and inference for population characteristics (17).

Interviews for the studies were conducted by professional interviewers from the SRC, with 92.5% of interviews in English and 7.5% in other languages (Spanish, Mandarin, Cantonese, Tagalog, and Vietnamese). As described in detail elsewhere (17), the NLAAS is a nationally representative survey of household residents age 18 and older in the noninstitutionalized Latino and Asian populations of the coterminous United States. The final sample included 2,554 Latinos and 2,095 Asian Americans. The weighted response rates were 73.2% for the total sample, 75.5% for Latinos, and 65.6% for Asians (18). The NCS-R is a nationally representative sample with a response rate of 70.9%. Eligible respondents were English-speaking, non-institutionalized adults age 18 or older living in civilian housing. The NSAL is a nationally representative survey of household residents in the non-institutionalized black population and included 3,570 African Americans and 1,621 black respondents of Caribbean descent. The NSAL response rate was 70.9% for the African-American sample and 77.7% for the black Caribbean sample (19). Interviews conducted for the NSAL were all done in English. For the present article, a pooled sample of data from Asians and Latinos from the NLAAS, non-Latino whites from the NCS-R, and African Americans from the NSAL were used. The CPES uses an integration of design-based analysis weights to combine datasets as

though they are a single, nationally-representative study (17). More detailed information of the sample design and weighting is described by Pennell et al. (15).

Analytical Sample

The analytical sample for this article includes participants from the CPES who fulfill two criteria: 1) having a past 12 months depressive disorders defined as meeting DSM-IV diagnostic criteria for dysthymia, subthreshold depression or full criteria for major depressive in the past 12 months as determined by the World Health Organization Composite International Diagnostic Interview (WMH-CIDI) and 2) reporting at least one formal mental health visit during the previous year or the respondent reporting that they had dropped out of care in the last 12 months. The sample includes 323 Non-Latino Whites, 123 Latinos, 37 Asians, 81 African Americans (Total Sample=564). We excluded the Afro-Caribbean subsample due to small sample size. This subgroup also has a high proportion of immigrants and other characteristics which differ from African Americans and limits the appropriateness of combining with the African American sample.

Retention in Care Outcome Variable

Our primary dependent variable of interest is a binary outcome called *retention in care* defined by: 1) attending at least four formal mental health care visits in the last 12 months (2,20) attending at least one visit, accrued less than four formal visits in the last 12 months but still in care. Receiving formal treatment for depression is defined as attending mental health visits with a specialty mental health provider or a general medical provider. Retention has been defined in the literature as the prevention of premature termination; either by keeping at least four visits over twelve months, or completing treatment as defined by providers (20). We establish the cutoff point of four visits or greater for defining treatment retention based on the quality of depression treatment literature (20,21) and evidence-based treatment guidelines which find that no fewer than four visits for follow-up or medication monitoring are required for the acute and continuation phases of depression (1,20). Berndt et al. (21) combined data from a large retrospective medical claims data base with expert clinical opinion elicited from a two-stage Delphi procedure to examine the probability of depression remission for different combinations and durations of medication and psychotherapy treatment. According to the expert panel, the probability of a full remission of depression was highest for combinations of antidepressants and ≥ 4 psychotherapy visits. This data suggests that attending at least four clinical visits with counseling/psychotherapy is important for depression remission. Using a clinically meaningful cutoff point for defining retention is supported by the disparities research literature which has shown that minority populations are not only less likely to be retained in treatment (7,14,22) but are also at risk for receiving less adequate care based on practice guidelines (1,5,23).

Racial-Ethnic Categories and Socio-demographics

Self-reported racial-ethnic categories included in the analysis are: Hispanic/Latino, non-Latino White, African American and Asian. The categories correspond to US Federal Census categories for race and Hispanic ethnicity. Additional socio-demographic factors examined include: sex, age, education (*less than high school, high school, some college or more*), marital status (*married vs. single/separated/divorced/widowed*), poverty level, language proficiency in English (*good/excellent vs. poor/fair*). These factors have been found to vary by racial-ethnic groups and/or have been associated with variations in health service use and retention (1,8-10,13,14,24).

Treatment Provider and Severity of Need Variables

We examine clinical and systems of care factors which can influence retention in treatment: severity of psychiatric illness (using the WHO-DAS II assessment of disability and number of lifetime psychiatric disorders), sector of care (specialty mental health provider or generalist), whether medication is prescribed; and the type of insurance either public or private (*yes/no*). Participants were asked about which type of professionals (formal healthcare providers) they saw about problems with depression. Specialty mental health providers include psychiatrists, psychologists, counselors and social workers. Generalists include a general practitioner, family doctor, a nurse or other health professional not specializing in mental health. Finally we are interested in examining the effect of satisfaction with the health provider on retention in care (Were you satisfied with the treatment provided to you by the provider: Yes or No?).

Depression, Other Co-Occurring Psychiatric Disorders and Disability

Last 12 month depressive disorders are determined by the World Health Organization Composite International Diagnostic Interview (WMH-CIDI). The WMH-CIDI is a fully structured diagnostic instrument administered by trained lay interviewers and psychiatric diagnoses are based on criteria of the Diagnostic and Statistical Manual of Mental Disorders, Version 4 (DSM-IV) and ICD10-symptom criteria. The instrument has demonstrated good concordance between DSM-IV diagnoses based on the WMH-CIDI assessments and the Structured Clinical Interview for Axis 1 Disorders (SCID) (25). The CIDI provides a thorough evaluation of last year major depressive disorder (meeting all five DSM-IV criteria for major depression), dysthymia (meeting criteria for two or more depression criteria which persist for 2 years or more) and subthreshold depressive disorder (meeting criteria for at least two but no more than four depression criteria including depressed mood for two weeks or more) (26,27). We include subthreshold depression because it has implications for patterns of service use. Kessler (27) and Sherbourne et al. (28) found that patients with subthreshold depression have similar levels of medical and psychiatric comorbidity except for anxiety disorders, and similar need for mental health care (27). Use of services are considerably lower for patients with subthreshold depression than for patients with major depression disorder in the general medical sector, but tend to be similar in the mental health specialty sector (29).

In our analyses, we adjust for the severity and complexity of mental health need among patients with depressive disorders by including the number of other lifetime psychiatric diagnoses in our models. The other psychiatric diagnoses are determined by WMH-CIDI and include anxiety disorders (i.e. generalized anxiety disorder, PTSD, social phobia, panic disorders and agoraphobia) and substance use disorders (alcohol and drug use disorders). We also adjust for level of impairment in the following domains: cognition/communication, mobility, self-care, social interactions and social role as assessed by the World Health Organization's (WHO) Disability Assessment Scale (30). We include this measure as individuals with measurable disability in these domains may be more severely impaired and likely to remain in treatment (24,31). The WHO-DAS is a generic health-status instrument firmly grounded in the WHO's International Classification of Functioning, Disability and Health (WHO-ICF). Psychometric testing of the WHO-DAS II has been rigorous and extensive (30,32).

Statistical Analyses

Descriptive and inferential statistics are computed using STATA 10.0. We compare demographic and clinical characteristics of the study sample by race/ethnicity and retention status (*< 4 visits vs. ≥ 4 visits*) using chi-squared tests. Weighted proportions are used to adjust for the complex sampling design. Significance tests for differences among the

weighted proportions are conducted using a Rao–Scott statistic for the Pearson chi-squared test for contingency tables (33-35).

We then conduct a series of logistic regression analyses to evaluate the main effect of ethnicity/race on retention in depression treatment sequentially adjusting for potential correlates of treatment retention and examine changes in the estimated coefficient of ethnicity/race. We start with a model which includes only demographic variables in order to examine racial differences in retention adjusting for common factors influencing access to treatment and retention for underserved populations such as poverty, gender. We then sequentially add variables pertaining to mental health status as indicators of treatment need, type of insurance and region as measures of health services access, and finally type of provider and treatment satisfaction as indicators of the influence of treatment sector and treatment experience. This multi-stage analysis allows us to examine factors which have been considered important to treatment retention while conceptually grouping them in order to examine the impact on racial-ethnic differences in retention. We then individually include interaction terms for race/ethnicity by insurance status/type, type of provider seen, satisfaction with treatment and number of psychiatric illnesses to explore possible differential effects of these factors by race/ethnicity in the likelihood of being retained in care. These factors were chosen for inclusion in interaction terms as they represent both patient and health system variables with the potential for influencing retention in treatment for specific ethnic minority groups differentially (8,9,14).

We conduct two sets of sensitivity analyses, a statistical technique used to determine how sensitive a model is to changes in the value of the parameters of the model and to changes in the structure of the model (36,37). First, we repeat the regressions using three visits as a cut off for retention in order to test if there is a difference in the significant correlates for this cutoff given that a lower frequency of visits may be more prevalent in primary care settings as compared to what is usual practice in specialty mental health care (21) and some of the analytical sample may have had less time to accrue four clinical visits in the last 12 month period. Secondly, we rerun the regressions with four visits as the cutoff for retention once again, but remove cases with subthreshold depression from the sample. Subthreshold depression may be associated with mental health services use patterns that differ between primary care and specialty care and as compared to cases of major depression (38). Variance estimation of logistic regression model coefficients are adjusted for the sampling design through a first-order Taylor series approximation, and significance tests are performed using design-adjusted Wald tests (35,39,40). For the regression analyses, we report odds ratios and 95% confidence intervals.

Results

Differences in Demographics and Treatment Sector Use by Race/Ethnicity

Racial-ethnic differences in the analytical sample were found in immigration status, proficiency in English, poverty, and prescription of medication for depression. The Latino and Asian sample are 48% and 54% foreign born respectively as compared to non-Latino Whites (2%) and African Americans which are exclusively US born ($p < 0.001$). Latinos and Asians were more likely to speak English poorly or fairly (39%, 28% respectively) as compared to non-Latino whites and African Americans which were all English proficient ($p < 0.001$). Latinos and African Americans were most likely to be under the poverty threshold (34%, 33% respectively) as compared to non-Latino Whites and Asians (17%, 24% respectively; $p < 0.001$). Asians were least likely to be prescribed medications (46%) followed by African Americans (51%), then Latinos (67%) and finally non-Latino whites (75%) were most likely to be prescribed medications for depression ($p < 0.01$). There were no racial-ethnic differences in the treatment sector used for depression with approximately

two-thirds of the total sample treated in specialty mental health care (non-Latino Whites 65%, Latinos 70%, African Americans 72%, and Asians 75%). There was also no difference in reported satisfaction with treatment across race and ethnicity, with 73% of the sample reporting they were satisfied with the care they received for depression from their provider.

Characteristics of Respondents by Depression Treatment Retention Status

Table 1 compares the characteristics of individuals who attended less than four formal mental health visits for depression to those who attended greater than or equal to four visits (for all respondents with depressive disorders in the past 12 months). Characteristics of the total analytical sample are shown in the third column. The two characteristics which are significantly different by retention status are sector of care treated and whether medication was prescribed. Having seen a mental health specialist and having been prescribed medication in the past 12 months are both significant and positively associated ($p < 0.001$) with attending four visits or more mental health visits. When using a cutoff of three visits or more to define retention in treatment and examining the same independent variables (not shown), having been seen by a mental health specialist was still significantly associated with retention ($p < 0.01$) but having been prescribed medication was no longer significant.

Correlates of Retention in Depression Care

Table 2 shows a staged regression model and the odds for retention in care. We find that African Americans with depression within the last 12 months are the only group to be significantly less likely to be retained in depression care as compared to their non-Latino white counterparts. African Americans with past year depression have an odds of 0.39 of remaining in formal depression treatment as compared to their non-Latino White counterparts ($p < 0.05$) in the final fully adjusted model. Having some college education or beyond is significantly associated with retention without type of provider and satisfaction variables added to the model. In the final model, the type of provider seen is the variable most highly correlated with retention in care. For the entire sample, seeing a generalist health provider as opposed to a mental health specialist was associated with the greatest decrease in the odds of retention in depression treatment. We did not find any significant interactions of insurance status/type, type of provider seen, treatment satisfaction or number of psychiatric diagnoses with race/ethnicity.

Using a retention cut-off of three visits or more visits (data not shown) there were no longer racial-ethnic differences with retention in care. Female gender (OR = 2.0; $p < .05$), lower role functioning as measured by the WHO-DAS (OR = 0.5; $p < .05$), and being seen by a specialist as compared to a generalist were associated with retention in care (OR = 0.4; $p < .001$).

The sample included individuals with full major depression disorder (89%), subthreshold major depression disorder (5%), dysthymia, (26%) or subthreshold dysthymia (73%). Individuals could meet criteria for both major depression and dysthymia categories. After removing cases with subthreshold depressions only from the regression sample and keeping four visits as the cutoff for retention, being African American (OR = 0.4; $p < .05$) and being seen by a generalist (OR = 0.05; $p < .001$) continued to be associated with a lower odds of retention as compared to being non-Latino White or being seen by a specialist respectively.

Discussion

Our results suggest that among racial and ethnic minorities, African Americans are particularly unlikely to be retained in care for depression as compared to Non-Latino Whites. Despite our adjusting for several factors known to influence retention for ethnic

minorities, African Americans continue to demonstrate lower retention in depression treatment. This is despite over seventy-percent of the African American sample accessing specialty mental health services, which overall was associated with treatment retention.

Previous studies have examined reasons for low mental health services use among minority populations and have considered the influence of experienced mistreatment and social exclusion from health care among African Americans (41,42). Ward (14) found that African-American clients in counseling engage in an ongoing assessment process beginning in the first session. If the assessment is negative, Ward (14) also found that African American clients are more likely to engage in superficial disclosing and to terminate counseling quickly. Anglin et al. (43) found that while African Americans were more likely than non-Latino Whites to believe that mental health professionals could help individuals with major depression, they were also more likely to believe mental health problems would improve on their own. Additional explanations could be the lack of racial concordance between patient and provider in the clinical encounter which might be a more salient issue for Blacks who prefer to be seen by a provider of their same race (11). Given the low percentage of Black psychiatrists (3%) and psychologists (2%) in the US (44), racial concordance seems like an unlikely event that may increase the opportunities for drop out.

Surprisingly, we find that Asians and Latinos are not significantly less likely to be retained in care as compared to their non-Latino White counterparts. In this regard, the ethnic racial differences in treatment retention in this paper vary from what has been previously reported in other studies regarding lower rates of retention in treatment for Latinos and other ethnic racial minorities (10,29,45-47). Few studies have compared treatment adherence or retention across race and ethnicity. A review of the literature conducted by Lanouette et al. (47) examining racial variations in adherence to psychotropic medications demonstrated that many studies have found lower adherence by both Latino and African American patients as compared to non-Latino Whites. Their findings were based mostly on regional studies with only three nationally representative studies available for inclusion in the review. However, risk factors for non-adherence noted in that review included being monolingual Spanish speaking, lacking health insurance, experiencing access barriers to high-quality care, and having lower socio-economic status. We adjusted for many of these same potential barriers in evaluating treatment retention in our study sample. Close to sixty-percent of the Latino and Asian sample were English proficient. In addition, 70% of Latinos and 75% of Asians in our sample had been seen in specialty mental health care. Le Meyer et al. (48) found that for US born Asian Americans who are English proficient, use of primary care services is significantly associated with utilization of specialty mental health services, while immigrant and non English proficient patients in primary care do not tend to access or use specialty mental health services. The combination of English proficiency and access to specialty care may have assisted in treatment retention for Asians and Latinos in our study.

The sector of mental health care in which minorities are treated is one of the most important factors associated with retention in depression treatment. We found this to be the case even after adjusting for number of co-occurring psychiatric diagnoses, level of impairment and many factors known to be associated with poor treatment access and retention including poverty, education and insurance status. Even when we removed subthreshold depression, which may lend to potential diagnostic uncertainty and thus lead to variations in services use, we continue to find less retention for African Americans and by generalist care. The care available in specialized mental health services differs from what is usually available in primary care. The availability of collaborative services (i.e. combined therapy, psychopharmacology, and case management) within specialized mental health services may assist in retaining patients because of coordination of services and more intensive delivery of therapeutically effective treatment (31,49). It also emphasizes that mental health care in

primary care clinics may not be optimal. Research has found that individuals who seek mental health treatment in the primary care sector receive only two minutes on average of mental health treatment for depression during a primary care visit (50). This may not be sufficient time to assess need for depression treatment (whether subthreshold or threshold depression) or to engage patients for ongoing treatment, especially ethnic minorities who already face multiple barriers and disparities in treatment. It is important to note that when we conducted our sensitivity analysis using three visits as a cutoff for retention, we no longer found ethnic-racial differences. This is a more relaxed criterion for retention which may be more attainable across race and perhaps even in primary care settings, but as discussed previously these fewer visits are not necessarily associated with any evidence of adequacy of care.

Limitations

We are not able to establish causality based on the cross-sectional nature of the study and were only able to include individuals who were symptomatic according to the CIDI and had at least one treatment visit in the last 12 months. That is, we were not able to include individuals who may have been diagnosed with depression and completed treatment in a time period previous to the last 12 months. Small sample size may have limited power to detect differences for the Asian sample which demonstrated a trend towards less retention in care but did not reach significance. Although, we were able to examine satisfaction with treatment we were unable to further examine or address treatment expectations. Despite these limitations we were able to detect important variations by race and to identify the influence of type of treatment provider on retention in treatment in a nationally representative sample.

Conclusion and Clinical Implications

Receiving depression treatment from a mental health specialist as compared to receiving care from a generalist provider is the strongest correlate of retention in care across ethnic/racial groups in this study. Improving depression care for minority communities within primary care could include promoting access and referral to specialized and/or comparable services when clinically indicated. We found that the prescription of medication is associated with more clinical visits and possibly improved retention. This association of medication with retention in depression care may be related to more frequent and closely scheduled appointments, and improvement in depression symptoms which further engages patients. However, the findings of this study and the cumulative literature suggest the need for a critical examination of how we address the treatment of depression for specific ethnic/racial minority groups even within specialty mental health services (23) and with particular attention to the needs and experiences of African Americans.

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Table 1
Characteristics of NLAAS/NCS-R respondents with 12 month Depressive Disorder by Retention Status

	<4 Visits Depression Treatment in past 12 months	>=4 Visits Depression Treatment in past 12 months	Total sample (Any past year depression)	Chi- sq tests
	N=227 (%)	N=337 (%)	N=564 (%)	
Race/ethnicity				
Non-Latino White	130(81.6)	193(82.2)	323(81.9)	ns
Latino	38(8.0)	85(10.9)	123(9.6)	
Asian	18(1.4)	19(1.4)	37(1.4)	
African American	41(9.0)	40(5.6)	81(7.1)	
Immigration				
US-born	189(94.3)	270(92.2)	459 (93.1)	ns
Immigrant	38(5.7)	67(7.8)	105 (6.9)	
Language of Proficiency in English				
Poor/fair	21(3.2)	45(4.6)	66 (4.0)	ns
Good/excellent	206(96.8)	292(95.4)	498 (96.0)	
Age Category				
18-34 years	77(28.5)	105(35.8)	182 (38.9)	ns
35-49 years	93(44.7)	144(38.6)	237 (36.9)	
50-64 years	46(23.2)	71(21.5)	117 (18.5)	
65 years or more	11(3.5)	17(4.1)	28 (5.7)	
Sex				
Male	65(34.8)	103(34.2)	168 (34.5)	ns
Female	162(65.2)	234(65.8)	396 (65.5)	
Marital Status				
Married/cohabiting	112(46.6)	134(41.1)	246 (43.5)	ns
Divorced/separated/widowed	62(27.8)	123(32.1)	185(30.2)	
Never married	53(25.6)	80(26.8)	133 (26.3)	
College Education				
High school or less	116(54.0)	166(46.5)	282 (49.8)	ns
Some college or more	111(46.0)	171(53.5)	282 (50.3)	
Poverty				
Above poverty threshold	179(83.6)	243(78.5)	422 (80.7)	ns
Below poverty threshold	48(16.4)	94(21.5)	142 (19.3)	
Number of Chronic Conditions				
0	33(11.2)	38(8.2)	71(9.5)	ns
1	34(13.4)	49(14.1)	83 (13.8)	

	<4 Visits Depression Treatment in past 12 months	>=4 Visits Depression Treatment in past 12 months	Total sample (Any past year depression)	Chi- sq tests
2+	160(75.4)	250(77.6)	410 (76.6)	
WHO-DAS Disability Assessment				
Cognition>0	82(41.2)	148(40.9)	230 (41.0)	Ns
Mobility>0	71(35.6)	131(33.7)	202 (34.5)	Ns
Self-care>0	26(9.4)	50(11.3)	76(10.5)	Ns
Social Functioning>0	52(26.2)	99(27.7)	151(27.0)	Ns
Role Functioning>0	149(69.8)	238(66.3)	387	Ns
Number of Psychiatric illness, not including depression (NEW)				
0	95(40.7)	120(39.2)	214 (39.7)	Ns
1	68(31.6)	93(25.8)	161(28.3)	
2+	64(27.6)	124(35.0)	189 (32.0)	
Insurance (NEW)				
Not insured	33(13.2)	35(12.2)	68 (12.6)	Ns
Insured	192(86.8)	302(87.8)	494 (87.4)	
Region				
Northeast	45(22.9)	77(21.3)	122 (22.0)	Ns
Midwest	54(22.8)	71(22.9)	125 (22.9)	
South	73(30.6)	108(30.0)	181(30.2)	
West	55(23.7)	81(25.8)	136(24.9)	
Providers seen during last 12 months *				
Specialist	87(37.5)	299(87.5)	386 (66.0)	***
Generalist only	140(62.5)	38(12.5)	178 (34.0)	
Satisfaction with Mental Health Provider				
No	79(30.5)	79(24.0)	158 (26.8)	ns
Yes	148(69.5)	258(76.0)	406 (73.2)	
Use of Any Medication				
No	90(37.1)	72(20.0)	162(27.3)	***
Yes	137(62.9)	265(80.0)	402 (72.7)	

* p < 0.05

** p < 0.01

*** p < 0.001

Table 2
Odds of retention in any depression treatment among individuals with 12 month depression (n=564)

OVERALL SAMPLE	Model 1	Model 2	Model 3	Model 4
Outcome: Retention\geq4 visits				
Race/ethnicity				
Non-Latino White	1	1	1	1
Latino	1.15(0.54,2.43)	1.17(0.55,2.50)	1.12(0.51,2.46)	1.14(0.57,2.26)
Asian	0.69(0.24,1.95)	0.76(0.26,2.19)	0.72(0.23,2.26)	0.74(0.18,3.11)
African American	0.57(0.33,0.97)*	0.63(0.35,1.12)	0.62(0.35,1.10)	0.39(0.18,0.86)*
Immigration				
US-born	1	1	1	1
Immigrant	1.22(0.50,3.01)	1.16(0.47,2.84)	1.34(0.55,3.22)	1.25(0.59,2.63)
Language of Proficiency in English				
Poor/fair	1	1	1	1
Good/excellent	0.91(0.27,3.06)	0.85(0.25,2.89)	0.92(0.28,3.04)	1.01(0.24,4.32)
Age Category				
18-34 years	1	1	1	1
35-49 years	0.63(0.38,1.06)	0.61(0.37,1.00)	0.62(0.37,1.02)	0.79(0.49,1.27)
50-64 years	0.65(0.30,1.42)	0.64(0.29,1.44)	0.64(0.28,1.44)	1.06(0.47,2.39)
65 years or more	0.79(0.28,2.25)	0.78(0.26,2.39)	0.76(0.25,2.33)	1.09(0.38,3.12)
Sex				
Male	1	1	1	1
Female	0.94(0.57,1.56)	0.96(0.58,1.60)	0.99(0.58,1.70)	1.4(0.82,2.41)
Marital Status				
Married/cohabiting	1	1	1	1
Divorced/separated/widowed	1.31(0.75,2.29)	1.24(0.71,2.18)	1.29(0.71,2.32)	1.29(0.59,2.79)
Never married	0.94(0.49,1.80)	0.91(0.45,1.81)	0.93(0.48,1.82)	0.66(0.28,1.53)
College Education				
High school or less	1	1	1	1
Some college or more	1.51(1.04,2.20)*	1.58(1.07,2.32)*	1.58(1.03,2.42)*	1.18(0.68,2.07)
Poverty				
Above poverty threshold	1	1	1	1
Below poverty threshold	1.55(0.81,2.96)	1.49(0.75,2.93)	1.55(0.75,3.20)	1.56(0.67,3.65)
Number of Chronic Conditions				
0		1	1	1
1		1.47(0.55,3.95)	1.44(0.54,3.87)	1.39(0.57,3.35)
2+		1.67(0.80,3.48)	1.66(0.80,3.44)	1.67(0.75,3.76)
WHO-DAS Disability Assessment				

OVERALL SAMPLE	Model 1	Model 2	Model 3	Model 4
Outcome: Retention\geq4 visits				
No impairment (WHODAS scores=0)		1	1	1
Cognition>0		0.98(0.60,1.60)	0.96(0.58,1.58)	0.81(0.32,2.04)
Mobility>0		0.89(0.47,1.68)	0.9(0.49,1.67)	1.14(0.47,2.74)
Self-care>0		1.16(0.50,2.70)	1.12(0.50,2.52)	0.88(0.33,2.39)
Social Functioning>0		1.08(0.58,1.99)	1.06(0.57,1.95)	1.24(0.54,2.85)
Role Functioning>0		0.8(0.51,1.26)	0.79(0.51,1.24)	1.05(0.51,2.14)
Number of Psychiatric illness besides depression				
0		1	1	1
1		0.9(0.48,1.69)	0.92(0.51,1.69)	0.71(0.33,1.54)
2+		1.4(0.81,2.40)	1.46(0.86,2.49)	0.74(0.38,1.47)
Type of Insurance				
Not insured			1	1
Insured			1.21(0.60,2.43)	1.08(0.53,2.19)
Region				
Northeast			1	1
Midwest			1.13(0.45,2.81)	1.22(0.44,3.41)
South			1.04(0.50,2.16)	1.35(0.58,3.17)
West			1.05(0.47,2.37)	1.41(0.54,3.65)
Providers seen during last 12 months				
Specialist				1
Generalist only				0.06(0.03,0.12)***
Satisfaction with Mental Health Provider				
No				1
Yes				1.17(0.66,2.05)

*
p < 0.05**
p < 0.01***
p < 0.001