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Psychiatric comorbidity and HEDIS measures of alcohol and other drug treatment initiation and engagement across seven health systems

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Abstract

Background: Psychiatric comorbidity is common among patients with alcohol and other drug (AOD) use disorders. To better understand how psychiatric comorbidity influences AOD treatment access in health systems, the present study examined treatment initiation and engagement among a large, diverse sample of patients with comorbid psychiatric and AOD use disorders.

Methods: This study utilized data from a multisite observational study examining Healthcare Effectiveness Data and Information Set (HEDIS) measures of initiation and engagement in treatment (IET) among patients with AOD use disorders from seven health systems. Participants

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were age 18 or older with at least one AOD index diagnosis between October 1, 2014 and August 15, 2015. Data elements extracted from electronic health records and insurance claims data included patient demographic characteristics, ICD-9 diagnostic codes, and procedure codes. Descriptive analyses and multivariate logistic regression models were used to examine the relationship between patient-level factors and IET measures.

Results: Across health systems, out of a total of 86,565 patients who had at least one AOD index diagnosis during the study period, 66.2% (n = 57,335) patients also had a comorbid psychiatric disorder. Among patients with a comorbid psychiatric disorder, 34.9% (n = 19,998) initiated AOD treatment, and, of those, 10.3% (n = 2,060) engaged in treatment. After adjusting for age, gender, and race/ethnicity, patients with comorbid psychiatric disorders were more likely to initiate (OR = 3.20, 95% CI = 3.08, 3.32) but no more likely to engage (OR = 0.56 95% CI = 0.51, 0.61) in AOD treatment, compared to those without a comorbid psychiatric disorder.

Conclusions: Findings suggest that identification of comorbid psychiatric disorders may increase initiation in AOD treatment. However, innovative efforts are needed to enhance treatment engagement both generally and especially for individuals without diagnosed psychiatric conditions.

Keywords

substance-related disorders; quality indicators; mental health; comorbidity; health services research; treatment

INTRODUCTION

Psychiatric comorbidity is common among patients with alcohol and other drug (AOD) use disorders. Results from the 2015 *National Survey on Drug Use and Health* (NSDUH) estimate that, of the 20.8 million people who met criteria for an AOD use disorder during the past year, about 13 percent had both an alcohol use and another substance use disorder, and 41 percent met criteria for a psychiatric disorder.¹ Notably, among patients with AOD use disorders, the presence of a co-occurring psychiatric disorder can influence both initiation and engagement in AOD treatment.^{2–5} For example, in nationally representative survey samples, although individuals with alcohol use disorders were more likely to receive mental health care than AOD treatment,^{3, 4} psychiatric comorbidity increased the odds of receiving AOD treatment,^{2–4} in part because these individuals accessed integrated treatment addressing both mental health and AOD use problems.^{3, 4} Identifying patient-level factors—such as the presence of psychiatric comorbidity—that can impact AOD treatment initiation and engagement is critical to improving system-level processes to address gaps between treatment need and receipt.

Health care systems are now required to measure AOD treatment initiation and engagement using the Healthcare Effectiveness Data and Information Set (HEDIS) AOD Initiation and Engagement in Treatment (IET) performance measures.^{6, 7} However, very few studies have examined to what extent patient AOD care meets these standards for those with co-morbid psychiatric disorders. One study of Veterans Administration patients found that 20% of eligible patients with co-occurring psychiatric and AOD use disorders initiated AOD

treatment, and 60% of those who initiated engaged in treatment.⁸ However, this study did not examine whether patients with comorbid psychiatric and AOD disorders were more likely to access AOD treatment compared to those without a comorbid psychiatric disorder, nor did it examine factors associated with AOD treatment initiation and engagement among patients with a comorbid psychiatric disorder.

Among patients diagnosed with AOD use disorder and comorbid psychiatric disorders, previous studies have identified several patient characteristics that may influence AOD treatment initiation and engagement, including age,⁹ gender,^{9–13} type and severity of comorbid psychiatric disorder,^{4, 10} and presence of multiple AOD use disorders.⁵ In a sample of older adults, patients who initiated treatment had more severe symptoms of AOD abuse and depression, compared with patients who did not initiate treatment.¹⁴ Among a sample of patients with both severe mental illnesses and AOD use disorders, women were more likely to initiate treatment;¹⁰ patients with severe mental illness, such as schizophrenia, were less likely to initiate treatment.¹⁰ In another sample of patients with co-occurring AOD and psychiatric disorders seeking private residential treatment, women were more likely to remain in treatment.⁹ Among men, older age was also associated with treatment retention.⁹ A study utilizing a nationally representative sample of US adults found that those with multiple past-year AOD use disorders were more likely to have comorbid mood or personality disorders and were less likely to seek treatment.⁵ Thus, based on the limited literature in this area, it appears that women and older adults may be more likely than other subgroups to access AOD care and to remain in treatment; while those with multiple AOD use disorders may be less likely to utilize treatment. Overall, although previous studies have endeavored to better understand patient-level factors associated with AOD treatment initiation and engagement for patients with comorbid psychiatric disorders, there remain gaps in the literature. In particular, previous study samples have not included large or diverse patient populations.

Understanding how psychiatric comorbidity is related to accessing AOD treatment in health systems could help to identify patients most and least likely to initiate and engage in care. A better understanding of care patterns may also inform approaches to supporting patients in need of critical services. The primary aim of the present study was to determine whether psychiatric comorbidity may influence service utilization outcomes based on HEDIS AOD IET measures. We hypothesized that among patients with an AOD diagnosis, those with a comorbid psychiatric disorder diagnosis in the year prior to the index AOD diagnosis would be more likely to both initiate and engage in AOD treatment than those with AOD diagnosis only. We also examined the effects of specific psychiatric disorders, including anxiety, depression, and psychosis, as well as prior AOD use disorders (given the high level of comorbidity typically observed within AOD use disorders^{15, 16}), on initiation and engagement.

METHODS

The present study used health care system data from a multisite study (NIDA CTN-0072-OT: Examine Patient and System-Level Factors Associated with HEDIS AOD-IET Measure Performance across Health Systems) examining HEDIS AOD-IET measures among patients

with an index AOD diagnosis assigned between October 1, 2014 and August 15, 2015. Seven health systems in the Health Systems Node of the National Drug Abuse Treatment Clinical Trials Network participated in the main study (5UG1DA040314–03). These systems have diverse geographic, patient demographic, and organizational characteristics. All health care systems shared a common Virtual Data Warehouse (VDW) consisting of harmonized data elements from both electronic health record (EHR) and insurance claims data, which facilitated multisite research by allowing programs written at one site to be distributed and efficiently run at other health care systems. All data were extracted from the VDW. See the main paper by Weisner et al. (in press) for a detailed description of data sources and extraction methods.¹⁷ Participants were adults (age ≥ 18) with at least one HEDIS-qualifying AOD use disorder diagnosis during the study period. This research was reviewed and approved by the Kaiser Permanente Northern California Institutional Review Board. This study met requirements for a waiver of informed consent.

Measures

Patient demographic characteristics.—Measures included age, sex, and race/ethnicity.

Comorbidity.—Comorbid psychiatric disorder diagnoses in the year prior to index identification date were based on International Classification of Diseases (ICD)-9 diagnosis codes. Presence of any psychiatric disorder diagnosis in the past year was dichotomously coded. Separate indicators for past-year psychiatric disorder were created for several diagnostic subcategories: depressive disorder (yes/no), anxiety disorder (yes/no), and psychotic disorder (yes/no), as well as an indicator for presence of a prior AOD use disorder diagnosis in the year prior to the index diagnosis but not within 60 days of the index diagnosis (yes/no).

Outcomes: Initiation and engagement.—Treatment initiation was defined as a subsequent AOD treatment service (excluding emergency department [ED] visit or detoxification) within 14 days of the ED or outpatient claim/encounter index identification date. An inpatient index identification setting (excluding those for detoxification only, which account for 2% of inpatient index encounters) was considered to be initiation of treatment per HEDIS definition, whereas an ED or outpatient claim/encounter index identification diagnosis required a subsequent AOD service (not including detoxification or ED visits) within 14 days of the index diagnosis in order to be considered initiation. Engagement was defined as having two or more AOD-related services within 30 days following treatment initiation. Data elements required for calculating each of the treatment initiation and engagement variables included ICD-9 diagnosis codes (alcohol, opioid, barbiturate, cocaine, cannabis, amphetamine, hallucinogen, and unspecified), department, and dates of service. Initiation and engagement rates were calculated only for adult patients who had a “new” index diagnosis (as defined by having no AOD use disorder diagnoses in the 60 days before the index diagnosis) associated with an AOD abuse or dependence diagnosis between October 1, 2014 and August 15, 2015,¹⁸ and were continuously enrolled in the health system two months prior to through 44 days following the index date. Index diagnoses included diagnoses given at an ED, outpatient claim/encounter or inpatient discharge encounter. Type

of AOD use disorder diagnosis and care setting for the index diagnosis were identified for each patient.

Analytic plan

Descriptive analyses examined individual characteristics (e.g., age, sex, race/ethnicity), prior psychiatric disorder diagnoses (any psychiatric disorder, as well as specific subcategories of anxiety disorders, depressive disorders, psychotic disorders), and prior AOD use disorder diagnoses among patients with an AOD index diagnosis (n= 86,565). Bivariate comparisons examined characteristics of patients who initiated AOD treatment among those with and without a comorbid psychiatric disorder in the year prior to their index diagnosis. Then, among those patients who initiated AOD treatment, bivariate comparisons of characteristics of patients who engaged in AOD treatment were examined for those with and without a comorbid psychiatric disorder diagnosis in the year prior to index. Chi-square and t-tests were used to examine differences between groups with regard to initiation and engagement.

Generalized linear models with a logit link, clustered on health care system with random intercept effect, were used to investigate the relationship between any psychiatric disorder diagnosis and AOD treatment initiation and engagement, and diagnostic subcategories (anxiety disorders, depressive disorders, psychotic disorders, prior AOD use disorders) and AOD treatment initiation and engagement. Univariate models investigated the effect of each psychiatric disorder diagnosis on AOD-IET. Multivariate models controlling for other covariates including age, sex, and race/ethnicity were also examined (Model 1 in Table 3). Specific diagnostic subcategories of prior psychiatric disorders were then added to the final multivariate models controlling for covariates (Model 2 in Table 3). Given previous research suggesting that factors affecting AOD treatment may differ for women and for men,⁹⁻¹³ gender differences in AOD treatment initiation and engagement were examined in sensitivity analyses. All analyses were performed using SAS 9.4 (SAS Institute, Inc., Cary, NC).

RESULTS

Patient characteristics

In this sample of 86,565 individuals with a new AOD use disorder diagnosis, the majority of patients (n = 57,335; 66.2%) had a comorbid psychiatric disorder diagnosis in the year prior to their index AOD diagnosis, including 41.7% (n = 36,079) who had a prior AOD use disorder diagnosis more than 60 days before the AOD index diagnosis, 27.4% (n = 23,705) with an anxiety disorder, 30.4% (n = 26,293) with a depressive disorder, and 11.4% (n = 9,879) with a psychotic disorder. Among patients with a comorbid psychiatric disorder, 34.9% (n = 19,998) initiated AOD treatment (see Table 1), and, of those who initiated treatment, 10.3% (n = 2,060) engaged in treatment (see Table 2). Most patients with a comorbid psychiatric disorder initiated treatment through inpatient settings (n = 14,367; 71.8%), while most patients who engaged in treatment received the index diagnosis in an outpatient setting (n = 1,144; 55.5%).

Although men comprised a larger proportion of patients with an index AOD diagnosis (60.4% men vs 39.6% women), women were more likely to have a comorbid psychiatric

disorder (74.9% vs 60.6%, $p < 0.0001$). Among patients who had a comorbid psychiatric disorder, a higher proportion of men initiated AOD treatment compared to women (p -value < 0.0001); however, there was no difference between men and women regarding engagement (p -value = 0.6416).

Multivariate analyses

Controlling for demographic characteristics (age, sex, and race/ethnicity), logistic regression analyses revealed that patients with a comorbid psychiatric disorder were more likely to initiate AOD treatment compared to those without a comorbid psychiatric disorder (OR = 3.20, 95% CI = 3.08, 3.32), but were less likely to engage in AOD treatment (OR = 0.56, 95% CI = 0.51, 0.61). When adjusting for all psychiatric disorder diagnoses a year prior to AOD index diagnosis, patients with comorbid depressive (OR=1.12, 95% CI=1.07, 1.16), psychotic (OR=1.40, 95% CI=1.34, 1.47), or prior AOD use disorders (OR=3.66, 95% CI=3.54, 3.79) had higher odds of initiation compared to those without the respective disorders. Patients with comorbid anxiety (OR = 1.21, 95% CI = 1.10, 1.33) or depressive disorders (OR = 1.20, 95% CI = 1.09, 1.32) were more likely to engage in AOD treatment. Presence of a prior AOD use disorder diagnosis was associated with increased odds of initiating AOD treatment (OR = 3.66, 95% CI = 3.54, 3.79) but decreased odds of engaging in treatment (OR = 0.44, 95% CI = 0.40, 0.48). See Table 3.

DISCUSSION

The present study examined HEDIS AOD use disorder treatment initiation and engagement among those with and without a comorbid psychiatric disorder, among patients receiving care in seven large health care systems in the U.S. We expected that patients with a comorbid psychiatric disorder in the year prior to receiving an AOD index diagnosis would be more likely to both initiate and engage in AOD treatment compared to those without comorbid psychiatric disorders. Those with a comorbid psychiatric disorder were indeed more likely to initiate treatment, but rates of engagement did not differ compared to those without a comorbid psychiatric disorder. When we examined specific categories of psychiatric disorders, those with anxiety disorders were no more likely to initiate treatment compared to patients with other comorbid psychiatric disorders or those without comorbid psychiatric disorders, but they were more likely to engage in treatment once they initiated. Patients with comorbid depressive disorders were somewhat more likely to initiate and engage. Those with psychotic disorders were more likely to initiate treatment but less likely to engage. In particular, patients who had previously been diagnosed with an AOD use disorder prior to the index diagnosis were most likely to initiate treatment but least likely to engage in treatment. Overall, these findings suggest that patients with comorbid psychiatric disorders are more likely to initiate AOD treatment but may encounter other barriers to engaging in treatment, and engagement may be particularly challenging for those with multiple AOD use disorders. Therefore, patients with certain comorbid conditions may require tailored efforts to support initiation and engagement in AOD treatment.

In the present study, most patients with comorbid psychiatric disorders received their AOD index diagnosis through inpatient settings; however, most patients who went on to engage in

AOD treatment received their index diagnosis in an outpatient setting. These findings have important implications for how health systems identify and support patients in need of treatment for both psychiatric and AOD use disorders. Of note, identification and proper diagnosis of comorbid psychiatric and AOD use disorders can be complex due to symptom overlap and more acute issues such as intoxication and withdrawal. As a result, assessment and accurate diagnosis may take more time than may be available during a single ED or outpatient visit.

Previous research has demonstrated that patients with psychiatric and AOD use disorders often seek treatment in mental health settings rather than specialty AOD care settings.³ Patients with comorbid psychiatric disorders may have established relationships with mental health providers treating their psychiatric conditions, thus enhancing the likelihood they would be interested in initiating AOD treatment, or perhaps facilitating referrals for specialty AOD care if needed. Ideally, treatment for comorbid psychiatric and AOD use disorders should be considered together during a treatment plan and addressed concurrently in a dual diagnosis or co-occurring disorders treatment program, given the large number of AOD patients also presenting with a comorbid psychiatric condition and/or multiple AOD use disorders. Unfortunately, providers in mental health settings often do not effectively identify AOD problems nor recommend that patients reduce AOD use or initiate specialty AOD care.¹⁹ Consequently, although having a comorbid psychiatric disorder may motivate patients to seek care, AOD use disorders may still be under-identified in settings serving patients with mental health problems. Further, among patients without an established mental health provider, such as the subset of those identified as having an AOD use disorder in an inpatient setting, our findings may reflect the health system's difficulty engaging patients with comorbid psychiatric and AOD use disorders in AOD treatment.

Individuals with comorbid psychiatric and AOD use disorders have more healthcare needs,²⁰ and therefore may be more likely to make healthcare visits compared to individuals with AOD disorders only. Integrated AOD screening and treatment can help to identify patients in need of AOD treatment and enhance referrals to specialty AOD care.²¹ Our findings underscore the importance of regular screening for both psychiatric and AOD use disorders in outpatient settings and providing immediate brief intervention, such as screening, brief intervention and referral to treatment (SBIRT), which can improve access to specialty AOD care.²²

Importantly, while identification of a comorbid psychiatric disorder may increase the chances that an individual will initiate AOD treatment, rates of initiation and engagement in AOD treatment remain low overall. Nonetheless, special focus may be needed to enhance initiation and engagement in AOD treatment, especially for individuals without a comorbid psychiatric disorder, given the lower treatment uptake among this group.

Some prior studies have found gender differences in AOD treatment initiation and engagement,⁹⁻¹³ whereas others have not found such differences.²³ We found that, among patients with comorbid psychiatric disorders, men were more likely to initiate AOD treatment, but there were no gender differences in AOD treatment engagement. As others have noted, the relationship between AOD treatment initiation and engagement and gender

is likely complex.²³ Future research should consider structural and other barriers related to accessing AOD treatment, including parsing out the multifaceted issues related to AOD treatment access for men and women, and how health systems can better address these issues to support patients with comorbid psychiatric and AOD use disorders who could benefit from treatment.

Limitations

Data used in the present study are from EHR systems and reflect only diagnoses and encounter events coded by providers. As such, it is possible that some patients were misdiagnosed due to complexities in distinguishing between substance-induced disorders and idiopathic psychiatric disorders, for example. All AOD use disorders were grouped into a single category; however, it is possible that specific AOD use disorders may be associated with a unique pattern of comorbid disorders and treatment initiation and engagement. A limited number of subcategories of psychiatric diagnoses were available to examine separately from the overall category of any psychiatric disorder; therefore, the relative contributions of other diagnoses, such as personality disorders, were not examined. Although this reflects real world practice, our data may not fully represent all patients with comorbid psychiatric and AOD use disorders receiving care within these seven health systems. In addition, some patients may have chosen to seek care outside of health systems examined in the study (e.g., self-help groups or care at outside facilities); our data would not reflect such visits. Further, each healthcare system is organized differently with a diverse set of resources and providers, which can therefore lead to variations in EHR coding across health systems; although our investigators across health systems attempted to address this.

Future Directions

Future investigations are needed to better understand system- and patient-level factors impacting AOD treatment initiation and engagement for patients with comorbid psychiatric and AOD use disorders.

Conclusion

Our study examined AOD treatment initiation and engagement following an AOD index diagnosis among patients with and without comorbid psychiatric disorders who were receiving care through seven health systems. Findings suggested that identification of a comorbid psychiatric disorder may increase initiation of AOD treatment but may not impact engagement in AOD treatment. Innovative efforts are needed to enhance AOD treatment initiation, especially for individuals without diagnosed psychiatric conditions, and engagement more generally.

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TABLE 1.

Initiation - Patient characteristics stratified by prior psychiatric disorders (n= 86,565)

	Initiation					
	No (n = 62,377)			Yes (n = 24,188)		
	w/o PD (n = 25,040)	with PD (n = 37,337)	<i>p-value</i>	w/o PD (n = 4,190)	with PD (n = 19,998)	<i>p-value</i>
Age			<0.0001			<0.0001
mean (SD)	43.47 (17.81)	48.67 (17.60)		49.23 (18.43)	50.55 (18.68)	
Sex			<0.0001			<0.0001
Female	7,459 (29.79)	17,087 (45.76)		1,151 (27.47)	8,571 (42.86)	
Male	17,581 (70.21)	20,250 (54.24)		3,039 (72.53)	11,427 (57.14)	
Race / Ethnicity			<0.0001			<0.0001
White	14,337 (57.26)	26,523 (71.04)		2,682 (64.01)	13,989 (69.95)	
Black or African American	2,359 (9.42)	3,644 (9.76)		360 (8.59)	2,250 (11.25)	
Asian	1,193 (4.76)	1,056 (2.83)		211 (5.04)	595 (2.98)	
Native Hawaiian / Pacific Islander	199 (0.79)	185 (0.50)		32 (0.76)	111 (0.56)	
American Indian / Alaskan Native	275 (1.10)	591 (1.58)		50 (1.19)	302 (1.51)	
Others	149 (0.60)	192 (0.51)		29 (0.69)	100 (0.50)	
Unknown	6,528 (26.07)	5,146 (13.78)		826 (19.71)	2,651 (13.26)	
Encounter Type			<0.0001			<0.0001
Ambulatory Visit	15,760 (62.94)	26,855 (71.93)		1,742 (41.58)	3,552 (17.76)	
Emergency Department Visit	9,232 (36.87)	10,155 (27.20)		612 (14.61)	2,057 (10.29)	
Inpatient Setting ^a	25 (0.10)	268 (0.72)		1,826 (43.58)	14,367 (71.84)	
Others	23 (0.09)	59 (0.16)		10 (0.24)	22 (0.11)	
Anxiety disorder^b			-			-
No	25,040 (100.00)	21,336 (57.14)		4,190 (100.00)	12,294 (61.48)	
Yes	-	16,001 (42.86)		-	7,704 (38.52)	
Depressive disorder^b			-			-
No	25,040 (100.00)	20,046 (53.69)		4,190 (100.00)	10,996 (54.99)	
Yes	-	17,291 (46.31)		-	9,002 (45.01)	
Psychotic disorder^b			-			-
No	25,040 (100.00)	31,442 (84.21)		4,190 (100.00)	16,014 (80.08)	
Yes	-	5,895 (15.79)		-	3,984 (19.92)	
Prior AOD use disorder^b			-			-
No	25,040 (100.00)	16,932 (45.35)		4,190 (100.00)	4,324 (21.62)	
Yes	-	20,405 (54.65)		-	15,674 (78.38)	

^aA total of 293 patients who were at inpatient setting but not initiate AOD treatment due to detoxification^bDiagnosis a year prior to index AOD diagnosis

Note: PD = psychiatric disorder; AOD = alcohol and other drug

TABLE 2.

Engagement - Patient characteristics stratified by prior psychiatric disorders for those who initiated AOD treatment (n= 24,188)

	Engagement (among those who initiated AOD treatment)					
	No (n = 21,406)			Yes (n = 2,782)		
	w/o PD (n = 3,468)	with PD (n = 17,938)	<i>p-value</i>	w/o PD (n = 722)	with PD (n = 2,060)	<i>p-value</i>
Age			0.2250			<0.0001
mean (SD)	50.86 (18.7)	51.28 (18.87)		41.4 (14.81)	44.17 (15.46)	
Sex			<0.0001			<0.0001
Female	961 (27.71)	7,698 (42.91)		190 (26.32)	873 (42.38)	
Male	2,507 (72.29)	10,240 (57.09)		532 (73.68)	1,187 (57.62)	
Race / Ethnicity			<0.0001			<0.0001
White	2,223 (64.1)	12,481 (69.58)		459 (63.57)	1,508 (73.20)	
Black or African American	318 (9.17)	2,111 (11.77)		42 (5.82)	139 (6.75)	
Asian	180 (5.19)	539 (3.00)		31 (4.29)	56 (2.72)	
Native Hawaiian / Pacific Islander	30 (0.87)	97 (0.54)		2 (0.28)	14 (0.68)	
American Indian / Alaskan Native	39 (1.12)	278 (1.55)		11 (1.52)	24 (1.17)	
Others	23 (0.66)	85 (0.47)		6 (0.83)	15 (0.73)	
Unknown	655 (18.89)	2,347 (13.08)		171 (23.68)	304 (14.76)	
Encounter Type			<0.0001			<0.0001
Ambulatory Visit	1,172 (33.79)	2,408 (13.42)		570 (78.95)	1,144 (55.53)	
Emergency Department Visit	512 (14.76)	1,756 (9.79)		100 (13.85)	301 (14.61)	
Inpatient Setting	1,775 (51.18)	13,756 (76.69)		51 (7.06)	611 (29.66)	
Others	9 (0.26)	18 (0.1)		1 (0.14)	4 (0.19)	
Anxiety disorder^a			-			-
No	3,468 (100.00)	11,210 (62.49)		722 (100.00)	1,084 (52.62)	
Yes	-	6,728 (37.51)		-	976 (47.38)	
Depressive disorder^a			-			-
No	3,468 (100.00)	10,010 (55.80)		722 (100.00)	986 (47.86)	
Yes	-	7,928 (44.20)		-	1,074 (52.14)	
Psychotic disorder^a			-			-
No	3,468 (100.00)	1,4340 (79.94)		722 (100.00)	1,674 (81.26)	
Yes	-	3,598 (20.06)		-	386 (18.74)	
Prior AOD use disorder^a			-			-
No	3,468 (100.00)	3,659 (20.40)		722 (100.00)	665 (32.28)	
Yes	-	14,279 (79.60)		-	1,395 (67.72)	

^aDiagnosis a year prior to index AOD diagnosis

Note: PD = psychiatric disorder; AOD = alcohol and other drug

TABLE 3.

Univariate and multivariate logistic regression analysis for risk of diagnosis of psychiatric disorder a year prior to AOD index associated with AOD treatment initiation and engagement

	Initiation			Engagement		
	Univariate OR 95% CI	Multivariate Model 1 ^a AOR 95% CI	Multivariate Model 2 ^b AOR 95% CI	Univariate OR 95% CI	Multivariate Model 1 ^a AOR 95% CI	Multivariate Model 2 ^b AOR 95% CI
Any psychiatric disorder	3.26 (3.14, 3.39)	3.20 (3.08, 3.32)	—	0.53 (0.49, 0.59)	0.56 (0.51, 0.61)	—
Anxiety disorder	1.38 (1.33, 1.42)	1.42 (1.37, 1.47)	0.97 (0.94, 1.01)	1.17 (1.08, 1.27)	1.09 (1.00, 1.18)	1.21 (1.10, 1.33)
Depressive disorder	1.57 (1.52, 1.62)	1.54 (1.49, 1.60)	1.12 (1.07, 1.16)	1.06 (0.98, 1.16)	1.06 (0.98, 1.16)	1.20 (1.09, 1.32)
Psychotic disorder	1.90 (1.82, 1.98)	2.02 (1.93, 2.11)	1.40 (1.34, 1.47)	0.82 (0.73, 0.92)	0.67 (0.59, 0.75)	0.77 (0.68, 0.86)
Prior AOD use disorder	4.01 (3.89, 4.14)	3.89 (3.77, 4.02)	3.66 (3.54, 3.79)	0.47 (0.43, 0.51)	0.45 (0.42, 0.49)	0.44 (0.40, 0.48)

^aAdjusted for age, sex, and race/ethnicity

^bAdjusted for age, sex, race/ethnicity, anxiety disorder, depressive disorder, psychotic disorder, and prior AOD use disorder diagnoses

Note: AOD = alcohol and other drug