Healthcare Effectiveness Data and Information Set (HEDIS) measures of alcohol and drug treatment initiation and engagement among people living with the human immunodeficiency virus (HIV) and patients without an HIV diagnosis

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Abstract

Background: Problematic use of alcohol and other drugs (AOD) is highly prevalent among people living with the human immunodeficiency virus (PLWH), and untreated AOD use disorders

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have particularly detrimental effects on human immunodeficiency virus (HIV) outcomes. The Healthcare Effectiveness Data and Information Set (HEDIS) measures of treatment initiation and engagement are important benchmarks for access to AOD use disorder treatment. To inform improved patient care, we compared HEDIS measures of AOD use disorder treatment initiation and engagement and health care utilization among PLWH and patients without an HIV diagnosis.

Methods: Patients with a new AOD use disorder diagnosis documented between October 1, 2014, and August 15, 2015, were identified using electronic health records (EHR) and insurance claims data from 7 health care systems in the United States. Demographic characteristics, clinical diagnoses, and health care utilization data were also obtained. AOD use disorder treatment initiation and engagement rates were calculated using HEDIS measure criteria. Factors associated with treatment initiation and engagement were examined using multivariable logistic regression models.

Results: There were 469 PLWH (93% male) and 86,096 patients without an HIV diagnosis (60% male) in the study cohort. AOD use disorder treatment initiation was similar in PLWH and patients without an HIV diagnosis (10% vs. 11%, respectively). Among those who initiated treatment, few engaged in treatment in both groups (9% PLWH vs. 12% patients without an HIV diagnosis). In multivariable analysis, HIV status was not significantly associated with either AOD use disorder treatment initiation or engagement.

Conclusions: AOD use disorder treatment initiation and engagement rates were low in both PLWH and patients without an HIV diagnosis. Future studies need to focus on developing strategies to efficiently integrate AOD use disorder treatment with medical care for HIV.

Keywords

Alcohol and other drugs; engagement; HEDIS; HIV; treatment initiation

Introduction

Alcohol and other drug (AOD) use disorders are highly prevalent among people living with (PLWH).[1-3] An estimated 8%–18% of PLWH persons in the United States have an alcohol use disorder.[1,2] Over 50% of PLWH report ever having used illicit drugs,[3] and about 25% report symptoms of substance abuse.[4] Many studies have reported deleterious effects of AOD use disorders on adherence to human immunodeficiency virus (HIV) treatment and clinical outcomes.[5-14] Even among PLWH in a fully integrated HIV medical care program, diagnosis of AOD use disorders is associated with excess mortality.[15,16] Moreover, PLWH with AOD use disorders frequently have comorbid mental health disorders[15,17] and are at increased risk of engaging in HIV transmission risk behaviors (e.g., through condomless sex or needle sharing).[18-23]

As in other AOD use populations, relatively few PLWH with AOD use disorders receive addiction treatment services. A previous multisite study in the United States reported that less than half of PLWH with AOD use disorders and chronic mental health disorders received any addiction services during 2000–2002.[9] In a study of PLWH receiving care within Kaiser Permanente Northern California, 15% of patients diagnosed with an AOD use disorder initiated outpatient treatment within 1 year of diagnosis.[24] PLWH appear either to

have insufficient access or to make inadequate use of behavioral health services. The Andersen behavioral model of health care utilization[25] has contributed to the understanding of AOD use disorder treatment initiation in prior studies.[24,26] Treatment initiation may be determined by predisposing (e.g., demographic factors), need (e.g., diagnosis, comorbidity), and enabling (e.g., insurance, social variables) factors. It is particularly important to study these factors among PLWH because how these factors influence their care seeking may vary from the general population and there may be important implications for tailored interventions that would draw PLWH to services. Previous studies have assessed the utilization of AOD use disorder treatment among PLWH compared with patients without an HIV diagnosis. One small study reported similar adherence to methadone maintenance treatment among PLWH compared with HIV-uninfected patients in China,[27] whereas another study using a national sample of substance abuse treatment programs in the United States suggested that HIV infection was associated with decreased odds of waiting more than 1 month for AOD use disorder treatment entry.[28] Healthcare Effectiveness Data and Information Set (HEDIS) AOD Initiation and Engagement of Treatment (IET) measures are used to evaluate care quality in health care systems. Documented visits with associated AOD use disorder diagnoses can serve as proxies for quality measures. However, data on the HEDIS AOD-IET measures are lacking among PLWH, and little is known about whether performance on these measures differs between PLWH and patients without an HIV diagnosis in large health care systems.

Also lacking are data describing health care utilization among PLWH with AOD use disorders compared with those without an HIV diagnosis. HIV medical care generally follows an HIV specialty model, with support provided by other staff, including HIV specialty nurses, case managers, and clinical pharmacists. PLWH engaged in HIV medical care have routine visits to primary care or HIV specialty care for antiretroviral medication monitoring, preventive care services, and laboratory tests. However, previous studies demonstrated that PLWH with AOD use disorders utilize primary care and preventive health services at suboptimal rates, and they are more likely to have disproportionately high hospitalization rates and more emergency department (ED) visits compared with PLWH without AOD use disorders.[29-31] Understanding health care utilization patterns among PLWH with AOD use disorders can help identify care gaps and inform targeted intervention efforts.

The current study is part of a larger study on organizational and patient factors associated with HEDIS AOD-IET measures presented by Weisner et al.[32] in this same issue of this journal. Although HIV status was embedded in a measure of medical comorbidity in the parent study, it was not specifically investigated. In the current study, we examined whether HIV status is associated with HEDIS AOD-IET performance measures and health care utilization within 45 days immediately following a new diagnosis of AOD use disorder in a diverse patient population in the United States.

Methods

Study setting

This study was conducted in 7 health care delivery systems of the Health Systems Node of the National Institute on Drug Abuse's Clinical Trials Network, with participants identified through electronic health records (EHR) and claims data. The 7 health care systems are members of the Health Care System Research Network (HCSRN).[33] Each health care system utilizes a system-wide EHR and provides comprehensive medical care. These health care systems serve diverse patient populations with different demographic, insurance (commercial, Medicaid, and Medicare plans), and geographic (urban, suburban, and rural areas) characteristics; organizational characteristics differ across the systems as well (e.g., health care systems that contract out AOD use disorder services and those that provide them internally). EHR and insurance claims data at the study sites have been restructured into a common, standardized format called the "Virtual Data Warehouse" (VDW), which facilitates multisite collaborative research by allowing programs written at one site to be distributed and efficiently run at other sites with minimal site-specific customization.

Study population

The study sample included adult patients (age 18) who qualified for the HEDIS AOD-IET measures identified between October 1, 2014, and August 15, 2015, at the 7 study sites. Per HEDIS definitions, adult patients with a "new" AOD use disorder index diagnosis, defined as having no AOD use disorder diagnoses in the 60 days before the index diagnosis, were included in the denominator. The first "new" AOD use disorder diagnosis code was captured as the index diagnosis in the analysis if a patient had more than 1 AOD use disorder diagnosis code given at the same encounter. In addition, we required that patients be continuously enrolled in the health care system 2 months prior to the index diagnosis date through 44 days after the index date to capture the patient's history of previous AOD use disorder diagnosis and allow adequate follow-up to assess AOD use disorder treatment engagement measure per HEDIS definition. PLWH were defined as having a documented International Classification of Diseases, Ninth Revision (ICD-9), code for HIV infection (ICD-9: 042) at or within 1 year prior to the date of the index AOD use disorder diagnosis.

HEDIS AOD-IET measures

The HEDIS AOD-IET measures were defined following the National Committee for Quality Assurance (NCQA) Measure Technical Specifications.[34,35] All health care encounters with an index AOD use disorder diagnosis at an outpatient (including urgent care), ED, or inpatient setting were captured. For each index identification, the type of diagnosis (alcohol, opioid, barbiturate, cocaine, cannabis, amphetamine, hallucinogen, and unspecified), care setting, and specialty department of the encounter were identified. According to the HEDIS AOD-IET definition, an index diagnosis given at an inpatient setting (excluding those ICD-9 procedure codes for detoxification only, which account for 2% of inpatient encounters in this study) was considered to be initiation of treatment per HEDIS definition, whereas an index diagnosis given at an emergency department or outpatient encounter required a subsequent AOD use disorder service visit (not including detoxification or emergency department visits) within ( ) 14 days of the index diagnosis in order to be considered initiation. Treatment

engagement is defined as having 2 or more AOD use disorder treatment encounters (including inpatient admission, outpatient visits, intensive outpatient visits, or partial hospitalizations) within ( ) 30 days after initiating treatment. Each inpatient admission was considered 1 encounter regardless of the length of the hospital stay. For members who initiated treatment via an inpatient stay, the discharge date was used as the start of the 30-day engagement assessment period. Consistent with the HEDIS definition, the engagement rate was calculated among all patients who initiated treatment regardless of the care setting for the index episode diagnosis.

Outpatient health care utilization

Frequencies of all outpatient visits to primary care, ED, psychiatry/addiction treatment services, and any other specialty care visits (including HIV care visits in infectious disease department) made in the 45 days immediately after the index diagnosis were extracted from EHR and claims data; hospitalizations were not counted because of the short follow-up period.

Covariates

Patients' demographic characteristics (age at index AOD use disorder diagnosis, sex, race/ ethnicity), length of health care system membership in the year prior to the index date (allowing for an up to 30 days' gap), HIV status, insurance type (commercial, Medicare, or Medicaid), location and type of the index AOD use disorder diagnosis, and location of the treatment initiation visit were ascertained. AOD use disorder diagnoses assigned to few patients were categorized as "Others" in the analysis. Co-occurring medical and psychiatric conditions (including anxiety and depression) and history of AOD use disorders based on ICD-9 diagnosis codes in the year prior to index were also extracted. These measures included the 18 main categories from the Healthcare Cost and Utilization Project (HCUP) clinical classifications.[36] Treatment for AOD use disorder including detoxification received in a year prior to the index episode was also captured. The Charlson comorbidity index, with weight for human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/ AIDS) excluded, was calculated for all patients based on diagnosis codes made in the year prior to the index episode.[37] An indicator variable for different health care systems was created to allow adjustment for potential intracluster effect in analysis.

Statistical analysis

We calculated the proportion of patients who initiated AOD use disorder treatment among those who had an eligible encounter during the study period. Among those who initiated treatment, we calculated the proportion of patients who met the HEDIS criteria for engagement in the treatment. The rates of treatment initiation and engagement were calculated in the overall sample and by HIV infection status at the time of index diagnosis. Health care utilization patterns were evaluated by calculating the distribution of the number of all visits to primary care, ED, psychiatry or AOD use disorder treatment services, and other outpatient specialty care (including outpatient visits to any specialty care setting other than psychiatry and addiction treatment services) within 45 days following the index episode.

We conducted chi-square test or Fisher's exact test (for categorical variables) to compare the distribution of demographic and clinical characteristics and health care utilization between PLWH and patients without an HIV diagnosis. We used Wilcoxon-Mann-Whitney test to compare the distribution of length of health care system membership. Bivariable and multivariable logistic regression models were used to identify the crude and adjusted association between HIV infection and other factors associated with initiation and engagement of AOD use disorder treatment.

We included index diagnosis only at outpatient and ED settings in statistical models to assess factors associated with treatment initiation, because an index diagnosis made at an inpatient setting was considered to be initiation of treatment per HEDIS definition. All patients who initiated treatment (regardless of the care setting for the index diagnosis) were included in the statistical models examining factors associated with treatment engagement.

All multivariable analyses on the effect of HIV infection on AOD use disorder treatment initiation and engagement were adjusted for membership length, index diagnosis, other medical conditions diagnosed in the prior year, department for the index episode, AOD detoxication in the prior year, and mental health disorder diagnoses in the prior year. Study site was also adjusted to account for potential intracluster effect in multivariable models. Variable selection for the models was based on the Andersen behavioral model of health care utilization.[25] In addition, a subanalysis was conducted to identify factors associated with treatment initiation and engagement among PLWH only. All analyses were performed using SAS version 9.3 (SAS Institute, Cary, North Carolina).

This research was reviewed and approved by the institutional review board at Kaiser Permanente Northern California (the lead site). This study met requirements for a waiver of informed consent.

Results

A total of 86,565 adult patients who had at least 1 "new" AOD use disorder diagnosis who met the inclusion criteria between October 1, 2014, and August 15, 2015, were identified, including 469 PLWH and 86,096 patients without an HIV diagnosis. The demographic and clinical characteristics of these 2 cohorts at the index identification are presented in Table 1. Most patients were white (60%) and middle aged, with variation in distribution of patient demographics by study sites. But the majority of PLWH were between 30 and 64 years of age (86.5%) and 93% of PLWH were men, compared with 60% male among patients without an HIV diagnosis, reflecting the demographics of the HIV epidemic in the health care systems studied. The most prevalent index AOD use disorder diagnosis among patients without an HIV diagnosis was alcohol use disorder (52%). However, over 68% of PLWH had an index AOD of a drug use disorder, including dependence/abuse of opioid, amphetamine, cannabis, and other drugs, with 22.8% of PLWH diagnosed with amphetamine dependence/abuse at the index AOD, compared with about 3.5% among patients without an HIV diagnosis ($P < .01$). A greater proportion of patients without an HIV diagnosis had an index opioid dependence/abuse (13.6% vs. 8.7% among PLWH, $P < .01$), and cannabis dependence/abuse rates appeared similar among the 2 groups (14.1% vs.

15.1% among PLWH, $P = .52$). A greater proportion of PLWH had a history of nicotine dependence/abuse compared with patients without an HIV diagnosis (32.8% vs. 22.3%, $P < .01$). The mean Charlson comorbidity score calculated from history of comorbid medical conditions in the prior year (not including HIV status) was higher among PLWH compared with patients without an HIV diagnosis (mean 1.2 vs. 1.0, $P < .01$), and about 12.8% of PLWH had a diagnosis of hepatitis C virus (HCV) infection compared with 2.6% among patients without an HIV diagnosis ($P < .01$).

Within 45 days after the index AOD use disorder diagnosis, PLWH had more visits to ED and other outpatient specialty care ($P < .01$) whereas utilization of primary care and psychiatry/addiction services was similar between the 2 groups (Table 2). Among all patients with an eligible index diagnosis in any care setting during the study period, unadjusted treatment initiation rate was 28% (24,188/86,565). PLWH had a similar initiation rate compared with patients without an HIV diagnosis ($P = .54$) (Table 3). However, after excluding the index diagnosis encounters at an inpatient setting, the overall adjusted treatment initiation rate was reduced to 10% among PLWH and 11% among patients without an HIV diagnosis (Table 3). Among all the patients who initiated treatment per HEDIS measure definition (regardless of care setting for the index diagnosis), the treatment engagement rate was 11.5%. Although it was not statistically significant ($P = .31$), fewer PLWH engaged in treatment compared with patients without an HIV diagnosis (8.8% vs. 11.5%).

In multivariable models, after adjustment of patient's demographics, location and type of the index AOD use disorder diagnosis, Charlson comorbidity score, and mental health disorders in prior year, HIV status was not statistically significantly associated with the HEDIS AOD use disorder measures of treatment initiation (odds ratio [OR]: 0.75, 95% confidence interval [CI]: 0.53–1.07) (Table 4) or engagement (OR: 1.02, 95% CI: 0.54–1.92). However, HIV infection was independently associated with lower odds of having a visit to primary care (OR: 0.89, 95% CI: 0.80–0.99) or ED (OR: 0.93, 95% CI: 0.90–0.97) within 45 days after the index AOD use disorder diagnosis, although HIV infection was not significantly associated with number of visits to psychiatry and behavioral health services department (OR: 1.03, 95% CI: 0.92–1.14) and other outpatient specialty care (OR: 0.95, 95% CI: 0.87–1.04).

In the multivariable analysis, after adjustment for HIV status, patients who were 65 years or older, being Asian, black/African American, or Hispanic, or being insured through Medicare or Medicaid programs were less likely to initiate treatment; male patients were more likely to initiate treatment compared with female patients (Table 4). Compared with those with an index diagnosis of alcohol use disorder, patients with an index diagnosis of cannabis use disorder were less likely to initiate treatment (OR: 0.50, 95% CI: 0.46–0.55), whereas patients with an index diagnosis of opioid use disorder were more likely to initiate treatment (OR: 1.15, 95% CI: 1.06–1.24). Patients with a depression diagnosis and those who had a history of detoxification treatment in the prior year were more likely to initiate treatment (OR: 1.20, 95% CI: 1.13–1.28 and OR: 1.74, 95% CI: 1.46–2.08, respectively). Compared with patients who received an index diagnosis in primary care settings, those who received an index diagnosis in the ED, a psychiatry and behavioral health services department, or

other specialty care setting were more likely to initiate treatment (Table 4). Factors significantly associated with poor AOD use disorder treatment engagement included being 65 years or older, black race, and having Medicare or Medicaid insurance coverage (Table 4). Patients who were 30–49 years old were more likely to engage in AOD use disorder treatment. Having received detoxification treatment in the prior year was associated with better engagement (OR: 1.36, 95% CI: 1.02–1.80). Compared with patients who received the index AOD use disorder diagnosis in a primary care setting, patients who received the diagnosis in ED or inpatient settings were less likely to engage in treatment (OR: 0.77, 95% CI: 0.66–0.90 and OR = 0.23, 95% CI: 0.20–0.27, respectively), whereas patients who received the diagnosis in a psychiatry or behavioral health services department were more likely to engage in treatment (OR: 3.46, 95% CI: 3.02–3.96).

To identify specific factors associated with AOD use disorder treatment initiation and engagement in PLWH, we conducted a subanalysis of the 369 PLWH with an index diagnosis in outpatient or ED settings. Among those, 38 patients (10.3%) initiated treatment per HEDIS definition. PLWH who initiated treatment were more likely to have less than 12-month membership prior to the index AOD use disorder diagnosis (28.9%) compared with those who did not initiate treatment (11.2%) (OR: 0.31, 95% CI: 0.14–0.67). Among 137 PLWH who initiated AOD use disorder treatment (regardless of care setting for the index AOD use disorder diagnosis), 12 patients (8.8%) engaged in treatment per HEDIS definition. The Charlson comorbidity score was similar between treatment initiators and noninitiators, whereas PLWH who engaged in AOD use disorder treatment had a lower average Charlson comorbidity score of 6.5 (standard deviation [SD]: 0.8) compared with those who did not engage in treatment (7.8, SD: 2.5) ($P = .02$). Due to the small sample size of PLWH in the subanalysis, multivariable models did not converge; only the results of bivariate analyses were produced for risk factors associated with HEDIS AOD-IET measures. AOD use disorder treatment initiation was not statistically associated with demographics or index AOD use disorder diagnosis, but it was inversely associated with length of health plan membership (OR: 0.31, 95% CI: 0.14–0.67). Compared with those diagnosed at primary care, PLWH were more likely to initiate AOD use disorder treatment if he/she received the index AOD use disorder diagnosis in the ED (OR: 2.46, 95% CI: 1.03–5.85) or in a psychiatry and behavioral health service department (OR: 2.76, 95% CI: 1.02–7.48). In the bivariate analysis, a higher Charlson comorbidity score was associated with a lower likelihood of engagement (OR: 0.61, 95% CI: 0.40–0.94). There was no other factor statistically significantly associated with engagement in the subanalysis.

Discussion

This large multisite population-based study examined the association of HIV status with HEDIS AOD-IET measures and identified differences in characteristics of patients diagnosed with AOD use disorders by HIV status. We found that PLWH were more likely to have a drug dependence/abuse diagnosis as the index AOD use disorder, a higher Charlson comorbidity score, and a much higher prevalence of HCV diagnosis in the year prior to the index diagnosis, compared with patients without an HIV diagnosis. The much higher prevalence of HCV infection among PLWH compared with patients without an HIV diagnosis emphasizes the need to manage chronic comorbidities among PLWH.

Despite the higher proportion of PLWH with a history of AOD use disorder and had a mental disorder diagnosis in the year prior to the index AOD use disorder diagnosis, utilization of psychiatry services was low, whereas utilization of ED was high among PLWH within 45 days after the index episode. Among patients who initiated treatment, only a small fraction of the patients engaged in AOD use disorder treatment in both groups. As depression often has a detrimental effect on patient treatment engagement, the relatively lower engagement rate observed in PLWH may be partially attributable to the higher depression rate among PLWH in our study sample.

Comparison of rates of treatment initiation in this study with those based on other studies is challenging due to variability in time frame and treatment measurement. However, our observed rates are similar to those found in prior studies in general population, in which a minority of patients (approximately 15%–30%) with AOD use disorders received specialty care treatment.[38-40] Our rates are also similar to those in prior studies of PLWH,[9,26] demonstrating the significant health care gap between clinical need and receipt of addiction treatment in PLWH.

The observed lower AOD use disorder treatment initiation rate in primary care suggests that the process of AOD use disorder treatment referral and care coordination between primary care and AOD use disorder specialty care settings may need to be enhanced and integration of AOD use disorder specialty care in primary care settings may have great potential in improving AOD use disorder treatment initiation and engagement. Previous studies have suggested that enhancing AOD use disorder screening in primary care and integrating AOD use disorder screening and treatment services with primary care may help patients obtain critical treatment. For example, one study found that patients with both AOD use disorders and chronic medical conditions had better alcohol and drug use outcomes when primary medical care was integrated with addiction treatment services.[41] Future studies focusing on identifying and addressing barriers to care linkage, coordination, and integration will likely improve the AOD use disorder treatment initiation rate in primary care settings. Although those receiving an index AOD use disorder diagnosis in ED were more likely to initiate treatment and patients with an index AOD use disorder diagnosis given in an inpatient setting were considered to be initiating of treatment per HEDIS definition, the lower engagement rates among patients receiving ED and inpatient care for AOD use disorder are concerning. It suggests that those patients may have a different health care–seeking pattern in general from those who were diagnosed in primary care and psychiatry or behavioral health services department. Those patients may not engage in primary care and may use ED and inpatient care to address severe diseases and symptoms that require intensive treatment. This finding underscores the need for getting patients connected with appropriate AOD use disorder treatment care teams prior to discharge in ED and inpatient settings. We also observed that patients who received detoxification in the past year were more likely to both initiate and engage in treatment, which may suggest that patients who have received a previous AOD use disorder intervention are more receptive to a future AOD use disorder treatment. Furthermore, the higher prevalence of drug use disorders in PLWH and observed association between a higher Charlson comorbidity score and poorer engagement among PLWH warrant further studies to identify better strategies to integrate AOD use disorder treatment and comorbidity management with routine HIV primary care.

Limitations

This was an observational study based on EHR and claims data to identify coded AOD use disorder diagnosis. There may have been misclassification of treatment initiation and engagement due to incomplete capture of outside claims data in some study sites. There was also some variation in coding of "department" across the sites. To keep the definition of this variable consistent in the analysis, psychiatry and addiction department were combined in the analyses, as some study sites provided addiction treatment within psychiatry department. Most of the PLWH receive HIV primary care in infectious disease department, which was categorized as "other specialty care," which may partially contribute to the higher utilization of other specialty care among PLWH compared with patients without an HIV diagnosis in this study sample. Data on insurance status were missing for one study site, because insurance information was not included in the VDW Enrollment table for sites that did not have traditional plan-based enrollment information. Since AOD use disorder is typically underdiagnosed in general medical care settings and we relied on ICD-9 codes recorded in the EHR to identify patients with an index diagnosis, we may have missed some cases due to undercoding. Because the follow-up period was very short (45 days after the index AOD use disorder diagnosis) for the HEDIS measures, we only included outpatient encounters in the analysis for health care utilization after the index AOD use disorder diagnosis. Most PLWH in this study population were men and white, limiting generalizability of the findings among female PLWH or other HIV-infected minority patients. The sample size for PLWH in our study population was small, which impeded multivariable analysis on factors associated with initiation and engagement stratified by HIV infection status and HIV-specific clinical information.

Conclusions

HEDIS-defined AOD use disorder treatment initiation and engagement rates were low in both PLWH and patients without an HIV diagnosis. Given the many negative effects of untreated AOD use disorder on HIV disease management and onward transmission risk, future studies need to focus on developing strategies to efficiently integrate AOD use disorder screening and treatment with HIV medical care.

Acknowledgments

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Table 1.

Demographic and clinical characteristics at the index AOD use disorder diagnosis episode among individuals with and without an HIV diagnosis.

Characteristic	PLWH $N = 469$ (100%)	Patients without an HIV diagnosis $N = 86,096$ (100%)	Total $N = 86,565$ (100%)	P value
Age, years				<.01
18–29	28 (6%)	19,120 (22.2%)	19,148 (22.1%)	
30–49	176 (37.5%)	24,964 (29.0%)	25,140 (29.0%)	
50–64	230 (49.0%)	25,169 (29.2%)	25,399 (29.3%)	
65	35 (7.5%)	16,843 (19.6%)	16,878 (19.5%)	
Sex				<.01
Female	33 (7%)	34,235 (39.8%)	34,268 (39.6%)	
Male	436 (93%)	51,861 (60.2%)	52,297 (60.4%)	
Race/ethnicity				<.01
Hawaii/Pacific Islanders	3 (0.6%)	524 (0.6%)	527 (0.6%)	
Native American/Alaska Native	3 (0.6%)	1,215 (1.4%)	1,218 (1.4%)	
Asian	3 (0.6%)	3,052 (3.5%)	3,055 (3.5%)	
Black/African American	78 (16.6%)	8,535 (9.9%)	8,613 (9.9%)	
Hispanic	82 (17.5%)	16,730 (19.4%)	16,812 (19.4%)	
White	292 (62.3%)	51,604 (59.9%)	5,1896 (60%)	
Other/unknown	8 (1.7%)	4,436 (5.2%)	4,444 (5.1%)	
Index AOD use disorder diagnosis				<.01
Alcohol dependence/abuse	149 (31.8%)	44,901 (52.2%)	45,050 (52%)	<.01
Cannabis dependence/abuse	66 (14.1%)	13,030 (15.1%)	13,096 (15.1%)	.52
Opioid dependence/abuse	41 (8.7%)	11,708 (13.6%)	11,749 (13.6%)	<.01
Amphetamine dependence	107 (22.8%)	3,049 (3.5%)	3,156 (3.7%)	<.01
Cocaine dependence	9 (1.9%)	1,069 (1.2%)	1,078 (1.3%)	.19
Others/nonspecified drugs	97 (20.7%)	12,339 (14.4%)	12,436 (14.4%)	<.01
Medical conditions in prior year				
Charlson comorbidity score[a], mean (standard deviation)	1.2 (1.8)	1.0 (1.7)	1.0 (1.8)	<.01
HCV infection (yes)	60 (12.8%)	2,231 (2.6%)	2,291 (2.6%)	<.01
History of any alcohol and/or drug dependence/abuse				
Alcohol dependence/abuse	80 (17.1%)	12,480 (14.5%)	12,560 (14.5%)	.12

Characteristic	PLWH N = 469 (100%)	Patients without an HIV diagnosis N = 86,096 (100%)	Total N = 86,565 (100%)	P value
Nicotine dependence/abuse	154 (32.8%)	19,164 (22.3%)	19,318 (22.3%)	<.01
Cannabis dependence/abuse	51 (10.9%)	7,401 (8.6%)	7,452 (8.6%)	.08
Opioid dependence/abuse	40 (8.5%)	7,947 (9.2%)	7,987 (9.2%)	.60
Mental health disorder in prior year				
Anxiety	143 (30.5%)	23,562 (27.4%)	23,705 (27.4%)	.13
Depression	225 (48%)	26,068 (30.3%)	26,293 (30.4%)	<.01
Health plan membership length				
Median (IQR)	12.0 (12.0–12.0)	12.0 (12.0–12.0)	12.0 (12.0–12.0)	.65
<12 months	67 (14.3%)	13,071 (15.2%)	13,138 (15.2%)	.59
12 months	402 (85.7%)	73,025 (84.8%)	73,427 (84.8%)	

Note. AOD = alcohol and other drugs; PLWH = people living with HIV; IQR = interquartile range.

[a]Calculation of the Charlson comorbidity score excluded HIV as a comorbidity.

Table 2.

Health care utilization within 45 days after the index AOD use disorder diagnosis.

Health care utilization	PLWH $N = 469$ (100%)	Patients without an HIV diagnosis $N = 86,096$ (100%)	Total $N = 86,565$ (100%)	P value
Primary care, n				.15
0	262 (55.9%)	46,838 (54.4%)	47,100 (54.4%)	
1	105 (22.4%)	20,648 (24.0%)	20,753 (24.0%)	
2	39 (8.3%)	9,086 (10.6%)	9,125 (10.5%)	
3+	63 (13.4%)	9,524 (11.1%)	9,587 (11.1%)	
Emergency department, n				<.01
0	387 (82.5%)	75,326 (87.5%)	75,713 (87.5%)	
1	47 (10.0%)	7,382 (8.6%)	7,429 (8.6%)	
2	20 (4.1%)	2,114 (2.5%)	2,134 (2.5%)	
3+	15 (3.2%)	1,274 (1.5%)	1,289 (1.5%)	
Psychiatry and behavioral health services, n				.95
0	375 (80.0%)	68,020 (79.0%)	68,395 (79.0%)	
1	31 (6.6%)	5,799 (6.7%)	5,830 (6.7%)	
2	15 (3.2%)	3,115 (3.6%)	3,130 (3.6%)	
3+	48 (10.2%)	9,162 (10.6%)	9,210 (10.6%)	
Other specialty, n				<.01
0	265 (56.5%)	58,475 (67.9%)	58,740 (67.9%)	
1	88 (18.8%)	13,116 (15.2%)	13,204 (15.2%)	
2	50 (10.7%)	6,273 (7.3%)	6,323 (7.3%)	
3+	66 (14.1%)	8,232 (9.6%)	8,298 (9.6%)	

Note AOD = alcohol and other drugs; PLWH = people living with HIV.

Table 3.

HEDIS measures of AOD use disorder treatment initiation and engagement.

Initiation/engagement	PLWH	Patients without an HIV diagnosis	Total	P value
Unadjusted initiation	n = 469 (100%)	n = 86,096 (100%)	N = 86,565 (100%)	.54
No	332 (70.8%)	62,045 (72.1%)	62,377 (72.1%)	
Yes	137 (29.2%)	24,051 (27.9%)	24,188 (27.9%)	
Adjusted initiation [a]	n = 369 (100%)	n = 69,710 (100%)	N = 70,079 (100%)	.50
No	331 (89.7%)	61,753 (88.6%)	62,084 (88.6%)	
Yes	38 (10.3%)	7,957 (11.4%)	7995 (11.4%)	
Engagement [b]	n = 137 (100%)	n = 24,051 (100%)	N = 24,188	.31
No	125 (91.2%)	21,281 (88.5%)	21,406 (88.5%)	
Yes	12 (8.8%)	2,770 (11.5%)	2,782 (11.5%)	

Note. AOD = alcohol and other drugs; PLWH = people living with HIV.

[a] Initiation rate calculated after exclusion of index episode encounters in an inpatient setting.

[b] Treatment engagement was measured among the 137 PLWH and 24,051 patients without an HIV diagnosis who initiated AOD use disorder treatment.

Table 4.

Factors associated with AOD use disorder treatment initiation and engagement.

Factor	Initiation[a] Adjusted OR (95% CI)[c]	Engagement[b] Adjusted OR (95% CI)[d]
HIV infection		
Patients without an HIV diagnosis	Reference	Reference
PLWH	0.75 (0.53–1.07)	1.02 (0.54–1.92)
Age, years		
18–29	Reference	Reference
30–49	1.02 (0.96–1.09)	1.14 (1.01–1.29)
50–64	0.97 (0.90–1.04)	0.88 (0.77–1.01)
65	0.84 (0.74–0.94)	0.60 (0.47–0.76)
Sex		
Male vs. female	1.21 (1.14–1.27)	0.99 (0.90–1.09)
Race/ethnicity		
White	Reference	Reference
Hawaii/Pacific Islanders	0.86 (0.63–1.18)	0.94 (0.54–1.65)
Native American/Alaska Native	0.94 (0.75–1.17)	1.05 (0.71–1.56)
Asian	0.81 (0.71–0.93)	0.88 (0.69–1.14)
Black/African American	0.89 (0.81–0.97)	0.66 (0.55–0.78)
Hispanic	0.79 (0.74–0.84)	0.91 (0.81–1.03)
Other/unknown	0.99 (0.89–1.10)	1.24 (1.03–1.50)
Insurance		
Commercial	Reference	Reference
Medicare	0.78 (0.72–0.86)	0.69 (0.57–0.82)
Medicaid/state subsidized	0.70 (0.64–0.77)	0.59 (0.49–0.71)
Clinical characteristics		
Index AOD use disorder diagnosis		
Alcohol dependence/abuse	Reference	Reference
Cannabis dependence/abuse	0.50 (0.46–0.55)	1.51 (0.77–2.96)
Opioid dependence/abuse	1.15 (1.06–1.24)	1.33 (0.71–2.49)
Other/nonspecified drug	1.06 (0.99–1.14)	0.97 (0.53–1.77)

Factor	Initiation[a] Adjusted OR (95% CI)[c]	Engagement[b] Adjusted OR (95% CI)[d]
Mental health disorder in prior year		
Anxiety	1.01 (0.95–1.08)	1.11 (1.00–1.22)
Depression	1.20 (1.13–1.27)	N/A[e]
Detox treatment in prior year	1.74 (1.46–2.07)	1.36 (1.03–1.80)
Department for the index episode diagnosis		
Primary care	Reference	Reference
ED	1.77 (1.66–1.89)	0.77 (0.66–0.90)
Psychiatry/behavioral health	3.43 (3.20–3.67)	3.47 (3.03–3.97)
Other outpatient setting	1.28 (1.16–1.42)	0.87 (0.67–1.12)
Inpatient	N/A	0.23 (0.20–0.27)

Note. AOD = alcohol and other drugs; PLWH = people living with HIV; ED = emergency department; OR = odds ratio; CI = confidence interval.

[a] Excluded patients who received index diagnosis in an inpatient setting.

[b] Analysis was restricted among patients who initiated AOD use disorder treatment per HEDIS definition.

[c] Multivariable logistic regression adjusted for membership length, index AOD use disorder diagnosis, comorbid medical conditions in prior year, type of visit and department for the index AOD use disorder episode, AOD detox in prior year, and mental health disorder in prior year. Study site was also adjusted to account for potential intracluster effect.

[d] Multivariable logistic regression adjusted for membership length, index AOD use disorder diagnosis, comorbid medical conditions in prior year, type of visit and department for the index AOD use disorder episode, and AOD detox in prior year. Study site was also adjusted to account for potential intracluster effect.

[e] Multivariable model could not converge.