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Negative consequences of alcohol use among people living with HIV

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Abstract

Among people living with HIV (PLWH), alcohol use can have negative impacts beyond HIV-related outcomes. The objectives of this study are to identify the most common alcohol-related consequences among PLWH in Florida and describe factors associated with experiencing more alcohol-related consequences. Data were collected from PLWH in the Florida Cohort study who drank at least monthly in the past year (n=397). Self-reported consequences were assessed by the 15-item Short Inventory of Problems Revised (SIP-2R). Nonparametric tests and a generalized estimating equation model with inverse probability of exposure weighting were used to evaluate associations between the total SIP-2R score and socio-demographics, mental health, and substance use while controlling for alcohol use. Over half (56%) endorsed at least one consequence and 29% endorsed 5 or more consequences. The most common consequences were doing something they regretted and taking foolish risks (both endorsed by 37% of participants), both in the impulse control domain. After controlling for alcohol use and other covariates, homelessness and injection drug use remained significantly associated with greater SIP-2R scores. PLWH who are experiencing homelessness or injecting drugs could benefit from receiving additional screening for alcohol-related consequences if they report any alcohol use.

Keywords

Alcohol consumption; HIV; binge drinking; drinking behavior; homeless persons; drug abuse

Introduction

Alcohol use is common among people living with HIV (PLWH) in the United States, and is associated with decreased care engagement, suboptimal medication adherence, and failure to achieve viral suppression (Cook et al., 2017; Crane et al., 2017; Hendershot et al., 2009; Vagenas et al., 2015; Williams et al., 2019). Achieving these steps in the HIV

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care continuum is important for individuals to have the best health outcomes and to protect public health by reducing HIV transmission (Eisinger et al., 2019; The INSIGHT START Study Group, 2015). Due to the pervasiveness of alcohol use in PLWH and the increased risk of not achieving key HIV-related health outcomes, the majority of previous studies on alcohol use in PLWH have focused on these outcomes. However, the negative impacts of alcohol consumption on interpersonal relationships, self-esteem, and finances may be of more or equal importance to some individuals compared to the impact on their HIV-related health. Few studies have looked at how alcohol use has affected the lives of PLWH in other ways, such as financial strains, damage to relationships with friends and family, and lessening views of themselves, so the picture of the impact of alcohol use on this population is incomplete. Understanding the full extent of these impacts may help identify persons who should undergo more extensive alcohol use assessments and persons who could benefit from interventions to reduce alcohol use but may be missed by traditional screening methods and inform future interventions.

Those who drink more are more likely to experience negative consequences from alcohol use, while reducing alcohol use also decreases the number of negative consequences they experience (Cook et al., 2019; François et al., 2015; Kraemer et al., 2002). However, this relationship between the amount of alcohol consumed and number of negative consequences experienced is not a linear one, so it is valuable to study both (Gruenewald et al., 2010; Gruenewald & Mair, 2015). Reported experiences of negative consequences tend to be higher among women, compared to men, African Americans compared to whites, among those with mental health conditions, and among people of lower socioeconomic status (SES) (Collins, 2016; Kiluk et al., 2013; Popovici & French, 2013; Rossheim et al., 2018; Zapolski et al., 2014). Individuals experiencing homelessness seem especially vulnerable to negative consequences of drinking when compared to the general population, as alcohol use is more prevalent and resources to mitigate alcohol's impacts are constrained (Collins, 2016; Doran et al., 2018; Holtyn et al., 2017). In college students, drug use was associated with experiencing more consequences when compared to those who only used alcohol, and in young adults, simultaneous marijuana and alcohol use was likewise associated with greater consequences (Lee et al., 2020; Mallett et al., 2013; Schepis et al., 2019). Marginalized communities, such as sexual, racial, and ethnic minorities, carry a disproportionate burden of HIV due largely to historical and ongoing exclusion from opportunities and resources, so PLWH more likely to be disadvantaged than the general public (Pellowski et al., 2013). Due to these differences between the population of PLWH in the United States and the general population, findings from previous research may not be generalizable to PLWH (Pellowski et al., 2013; Wong et al., 2014).

The purpose of the present study is to 1) identify the most commonly experienced domains and individual negative consequences of drinking among a sample of PLWH who currently use alcohol in Florida; and 2) to determine whether certain socio-demographic groups or persons with specific mental health conditions experience more negative consequences while controlling for the amount of alcohol consumed. This information can help identify populations who may benefit from more detailed and varied screening for alcohol use and related consequences that go beyond quantity or frequency assessments. Information on the most common consequences can help guide provider conversations with PLWH

regarding their alcohol use. It could also aid in adapting current interventions, especially those using motivational interviewing, to focus on particular consequences to encourage alcohol reduction.

Materials and Methods

Study population

The Florida Cohort is a National Institute for Alcohol Abuse and Alcoholism-funded longitudinal study that enrolled over 900 PLWH from eight counties (Alachua, Broward, Columbia, Hillsborough, Miami-Dade, Orange, Seminole, and Sumter counties) in the state of Florida with the goal of obtaining a representative sample of PLWH. Participants enrolled in the Florida Cohort were demographically similar to the overall population of PLWH in Florida, but were more likely to be engaged in care, to take antiretroviral therapies (ART), and be virally suppressed compared to the general population (Table 1) (Ibañez et al., 2020).

Enrollment took place between 2014 and 2018. Participants were recruited from health departments, private clinics, and community settings. Study staff left flyers at partnering clinics and sites for potential participants to contact the study team, or participants were referred by clinic staff to recruiters. Interested persons were eligible for the Florida Cohort if they were over the age of 18, were living with HIV, and could communicate in English or Spanish. Additional screening criteria were introduced later in the study to increase enrollment among those aged 60 and older and among Hispanics. Participants could complete the questionnaires independently on paper or online, or a research assistant could administer the battery to them. Medical records were abstracted for most of the participants in the cohort. More details on recruitment and methods in the Florida Cohort are reported elsewhere (Ibañez et al., 2020). The data used in these analyses were collected during the baseline visit, and the analysis only includes participants who reported drinking at least once per month in the 12 months prior to the baseline assessment (n=397).

Socio-demographic predictors

Participants reported their current age, gender identity, race, and ethnicity. Race and ethnicity were categorized into Hispanic, Non-Hispanic Black, Non-Hispanic White, and other (including those who were multi-racial, Asian, and Native American). Highest level of education was categorized into “less than high school”, “high school or equivalent”, or “more than high school”. Participants were classified as homeless if they indicated they had lived in a homeless shelter, car, street, or abandoned building in the last 12 months (General Definition of Homeless Individual, 2011). Participants were classified as employed if they were engaged in full- or parttime wage labor, and unemployed if they were out of work or disabled and unable to work.

Mental health predictors

Symptoms of anxiety and depression were assessed in the 2 weeks preceding the baseline visit using the Generalized Anxiety Disorder 7-item scale (GAD-7) and the Patient Health Questionnaire-8 (PHQ-8), respectively (Kroenke et al., 2001; Spitzer et al., 2006). Participants who scored 10 or higher on the GAD-7 were classified as having symptoms of

anxiety, and those scoring a 10 or higher on the PHQ-8 were classified as having depressive symptoms (Kroenke et al., 2009; Spitzer et al., 2006).

Alcohol and other substance use

Alcohol consumption was measured with a modified Alcohol Use Disorders Identification Test Alcohol Consumption Questions (AUDIT-C), which assessed the frequency of alcohol use and the usual quantity of alcohol consumed (Bush et al., 1998). The average number of drinks per week consumed was calculated by multiplying the participants' response from "how often did you have a drink containing alcohol?" with their response from "how many standard drinks would you have on a typical day when you are drinking?" The scoring of the responses to these questions has been described elsewhere (Cook et al., 2017). Hazardous use was defined as reporting heavy use (consuming >7 or >14 drinks per week for women and men, respectively) or binge drinking (consuming ≥4 drinks for women and ≥5 drinks for men on one occasion) once a month or more (Cook et al., 2017; NIAAA, 2011). Marijuana use in the three months before baseline was categorized into no use, occasional use for those who used less than once a week, and regular use for those who used weekly or more. Injection and non-injection drug use were assessed over the 12 months preceding baseline and were dichotomized into any use and no use. Non-injection drug use, other than marijuana, included illicit substance use, pain medications, and some drugs that could be prescribed as anti-depressants. For the prescription drugs, the question did not specify whether the use of these drugs only referred to illicit use.

Outcome

The Short Inventory of Problems (SIP-2R) is a validated, self-reported, 15-item shortened version of the 50-item Drinker Inventory of consequences (DrInC) (Feinn et al., 2003; Miller, Tonigan, & Longabaugh, 1995). The measure is designed to assess the consequences of drinking alcohol, independent of the amount consumed, in the three months preceding the assessment. The consequences assessed encompass five domains: impulse control, social responsibility, interpersonal, intrapersonal, and physical. In this study, the overall SIP-2R score is reported as the main outcome. In the baseline survey, SIP-2R data was changed from a 0–3 scale to a dichotomized 0–1 (Yes/No) scale, to reduce participant burden. Therefore, SIP-2R scores in this study range from 0–15 overall.

Statistical analyses

To identify the most common domains and consequences in this population, we reported the percent of participants who endorsed each domain and individual negative consequence. The data were highly skewed towards 0, so we report the median SIP-2R scores with the interquartile range. The relationships between overall SIP-2R score, treated as count data, and hazardous drinking, age, gender, race and ethnicity, level of education, living conditions, mental health, and other substance use were first assessed using Wilcoxon Rank Sum tests. Bivariate associations between overall SIP-2R score and the predictors that reached a significance level of 0.05 were included in a multivariable model. The multivariable models used inverse probability of exposure weighting to mitigate the effects of confounding variables (Robins et al., 2000). Logistic regression models were created for each individual predictor that was significant in the bivariate analyses. In these models the significant

predictor was treated as the outcome to estimate the probability of having that predictor value while accounting for all other significant covariates. The inverse of these probabilities was then taken and applied as weights in generalized estimating equation (GEE) models with a log-link function and a negative binomial distribution. Similar to the logistic models, separate GEE models were created for each significant predictor. All analyses were carried out using SAS 9.4 (SAS Institute, Cary, NC).

Ethics

The Florida Cohort was approved by the local Institutional Review Boards and informed consent was obtained from all participants.

Results

The study population was largely male (71%), non-Hispanic black (54%), and aged 45 or older (61%). Over half (58.7%) of the participants reported hazardous drinking. Although medical records were available for most (80.6%) of the participants, only 22 had documented alcohol abuse or dependence diagnoses. Overall, the mean number of endorsed consequences was 3.4 (range 0–15). Forty-four percent of participants (n=173) reported experiencing zero negative consequences in the 3 months preceding baseline. The most commonly endorsed consequences were in the impulse control domain, and 45.3% of participants endorsed at least one of these consequences (Figure 1). Of the remaining domains, 35.8% endorsed at least one social responsibility consequence, 33.8% endorsed at least one physical consequence, 31.2% endorsed at least one intrapersonal consequence, and 26.0% endorsed at least one interpersonal consequence. Additionally, 13.1% of participants reported experiencing all three social responsibility consequences.

When looking at individual consequences, the two most common overall were “I have done impulsive things” and “I have taken foolish risks” (Figure 2). Each was endorsed by 36.8% of participants and both are in the impulse control domain. “Had an accident”, the third in the impulse control domain, was endorsed by 11.1% of participants. About a quarter of participants (25.9%) endorsed “spent too much or lost money” in the social responsibility domain, and “physical health has been harmed” (25.9%) and “have not eaten properly” (24.7%) in the physical domain. The most commonly endorsed consequence in the intrapersonal domain was “have been unhappy” (22.9%). “My family has been hurt” (19.4%) and “a relationship has been damaged” (18.9%) were the most commonly endorsed in the interpersonal domain.

In the bivariate analyses, overall SIP-2R scores were not significantly associated with current gender, race and ethnicity, age, or employment (Table 2). Higher SIP-2R scores were significantly associated ($p<0.05$) with having less than a high school (or equivalent) education, homelessness, symptoms of anxiety or depression, and injection or non-injection (i.e., other than marijuana) drug use (Table 2). Having more drinks per week was also significantly associated with higher scores.

The multivariate analysis included all predictors that were significantly associated ($p<0.05$) with SIP-2R score. In the multivariate analyses, homelessness, injection drug use, and

hazardous drinking were significantly associated with higher overall SIP-2R scores (Table 3). The average SIP-2R scored increased by a factor of 1.66 among persons experiencing homelessness compared to more stably housed persons. Among those who reported injecting drugs in the past year, the average SIP-2R score increased by a factor of 2.63 when compared to those who did not inject drugs.

Discussion

The purpose of this study was to identify the most common consequences of alcohol use and traits that are independently associated with endorsing a higher number of consequences among PLWH in Florida. We found that the most commonly endorsed negative consequences among this sample of PLWH were taking foolish risks and doing something impulsive that they later regretted. Both of these are in the impulse control domain, which was the most frequently endorsed domain. Questions about these common consequences could be used by providers to start conversations about a patient's alcohol use for all individuals who report current alcohol use. Discussing specific consequences experienced due to their alcohol use, instead of focusing on the amount that they drink, could help the patient focus on more immediate and salient detriments of alcohol use and encourage them to consider reducing their alcohol use or quitting.

Although less common than consequences in the impulse control domain, consequences in other domains were still reported by a substantial number of participants. These consequences could likewise play a role in provider conversations around alcohol use and some of these may be better motivators for behavior change than consequences related to impulse control. Blume and colleagues found that individuals who reported experiencing more intrapersonal consequences were more likely to have higher scores in the contemplation scale and lower score in the precontemplation scale (Blume et al., 2006). So, conversations that increase the patient's awareness of these types of consequences may be useful in shifting patients' views on their alcohol use and increase their desire to reduce their use.

Screening for alcohol use usually focuses on measures of quantity and frequency of alcohol use and binge drinking to assess whether the patient meets the criteria for hazardous drinking (Bush et al., 1998; NIAAA, n.d.). While the number of endorsed consequences was higher in those with hazardous drinking compared to those who drank below this threshold, lower levels of use did not mean that consequences were absent. Providers could add the short 15-item SIP to the screening process for everyone who reports drinking and use the responses to guide further discussions about alcohol use. By screening for negative consequences as well as alcohol use, providers may capture more patients who are candidates for brief interventions than by screening for alcohol use alone.

This study also found that of those who drink at hazardous levels, those who were experiencing homelessness, and people who injected drugs (PWID) are more likely to report experiencing negative consequences of drinking. Alcohol use tends to be more prevalent among those who are homeless compared to the general population, and the detrimental effects of alcohol use are also increased among this population (Collins, 2016; Doran et al.,

2018; Neisler et al., 2019; Tsai et al., 2014). This relationship has been consistent when looking at outcomes varying from alcohol-related mortality and health-related consequences to the financial and social consequences, as assessed in this study (Murphy et al., 2014). Individuals who are homeless are in a vulnerable position, with reduced access to resources to mitigate the impacts of substance use, which places them at greater risk for experiencing negative outcomes even after controlling for the amount of alcohol consumed (Collins, 2016). Studies have rarely focused on the relationship between injection drug use and negative consequences of alcohol use. Many studies have found that alcohol use among PWID increases their likelihood of contracting HIV and of engaging in risky sexual or injection behaviors, so it appears that alcohol and injection drug use together produce greater negative outcomes in conjunction with each other (Fairbairn et al., 2016; Noroozi et al., 2018; Trenz et al., 2016; Welch-Lazoritz et al., 2017; Young et al., 2016). The relationship between injection drug use and negative consequences could be due to the difficulty in separating the consequences of alcohol use from the consequences of injection drug use when using them concurrently.

We did not find any bivariate associations between gender, race and ethnicity, age category, or marijuana use and increased endorsement of negative consequences. Additionally, we found that education and employment status, components of SES measured in the Florida Cohort, were not associated with increased endorsement of negative consequences while taking mental health conditions and the amount of alcohol consumed into account in an adjusted model. This appears to contradict findings from other studies (Collins, 2016; Kiluk et al., 2013; Patrick et al., 2020; Popovici & French, 2013; Zapolski et al., 2014). However much of the literature focuses on young adults and not an older population living with HIV: the population under study here. PLWH tend to be more economically disadvantaged and come from a marginalized group, so understanding the consequences and correlates of these consequences is important for guiding provider conversations and interventions to meet the unique needs of PLWH.

This study is not without limitations. The SIP-2R assumes that all negative consequences are of equal severity (Kirouac & Witkiewitz, 2018). For example, someone who only reported feeling guilty about their drinking and someone who only reported getting into an accident would both have a score of one, but most would argue that these events are not of equal severity. In this study, the dichotomized SIP-2R cannot measure how often a consequence was experienced in the preceding 3 months, so we cannot assess how those with more frequent negative experiences differ from those who may experience these consequences with less frequency. In addition, all alcohol use variables were assessed via self-report, which is subject to social desirability bias (Adong et al., 2019; Latkin et al., 2017). Very few participants had diagnoses of alcohol abuse or dependence in their charts, so we were unable to draw comparisons based on these data. Medical charts likely under report alcohol-related conditions, as many HIV providers do not regularly or formally assess alcohol use and these conditions are not commonly documented in medical charts (Chichetto, et al., 2019; Mitchell, et al., 2012). Finally, as these data are from a cross-sectional sample, we cannot address causal relationships between the predictor variables and the main outcome.

This study has many strengths. The sample in this study is demographically and geographically similar to the population living with HIV in the state of Florida, so the results are likely generalizable at the state level (Florida Department of Health, n.d.). Florida has seven of the 48 counties selected in the national Ending the HIV Epidemic Plan and the state overall has one of the highest incidence rates of HIV in the United States (CDC, 2020). This study is among the first to examine the negative consequences of drinking among PLWH to provide a more holistic view of how alcohol use impacts their lives outside of their HIV-related care.

In conclusion, the most commonly reported negative consequences of drinking among a representative sample of PLWH in Florida were related to impulse control. PLWH who had symptoms of anxiety, were experiencing homelessness, or who used injection drugs were more likely to endorse a greater number of negative consequences. This information may help guide provider conversations about alcohol use with PLWH to assess the broader impacts of alcohol use and the development of formal interventions. It may also help in identifying individuals who could benefit from interventions to reduce drinking who may not be identified by traditional methods of that focus on the quantity and frequency of alcohol use.

Disclosure of Interest

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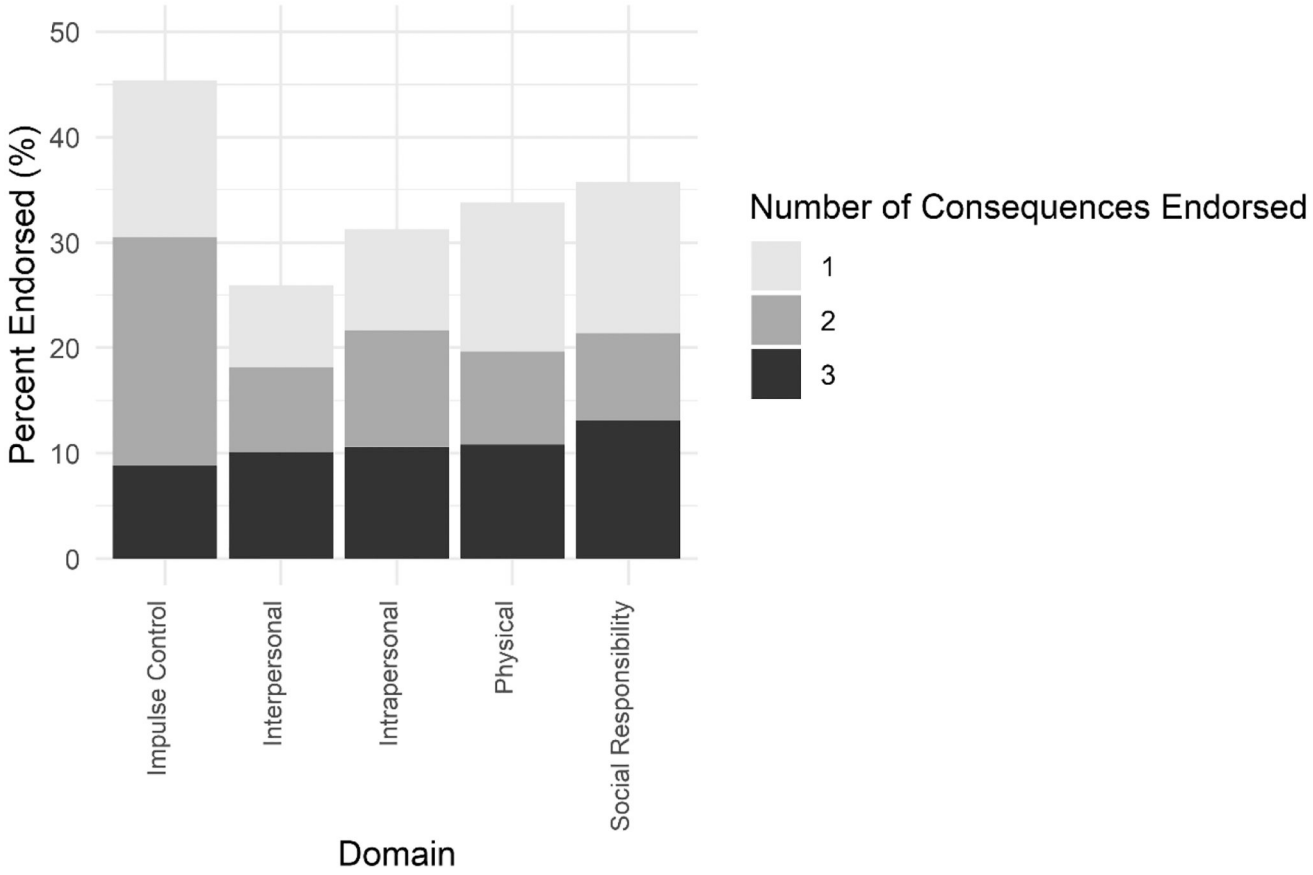

Figure 1.
Number of endorsed negative consequences by domain among persons living with HIV who reported drinking at least monthly (n=397)

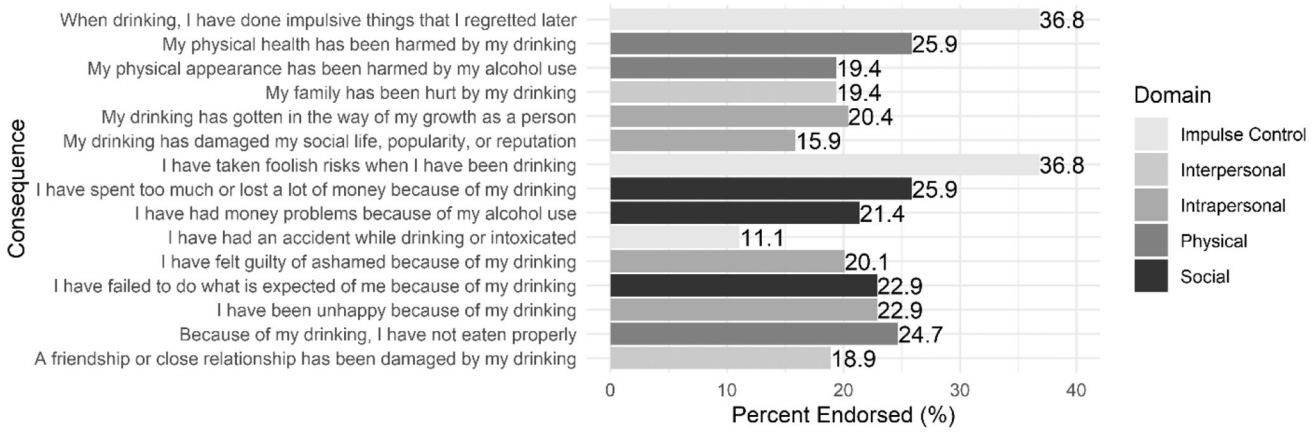

Figure 2.

Most commonly endorsed individual negative consequences of alcohol use (n=397)

Table 1.

PLWH in the State of Florida and Enrolled in the Florida Cohort Study

	Florida Cohort (N= 923)	State of Florida 2018 (N= 119,661)*
Current Gender		
Male	64.5%	72.7%
Female	33.6%	27.0%
Transgender	1.8%	0.3%
Age Group		
18–34	17.0%	15.9%
35–44	19.5%	17.9%
45–54	39.8%	28.4%
55+	23.7%	37.3%
Race and Ethnicity		
Hispanic	20.3%	23.9%
Non-Hispanic White	20.8%	28.8%
Non-Hispanic Black	55.2%	45.2%
Other	3.8%	2.2%

*Data on PLWH in Florida is publicly available (Florida Department of Health, 2019)

Table 2.

Bivariate Associations between SIP-2R Scores and Sociodemographic, Mental Health, and Substance Use Variables in a Sample of PLWH with Current Alcohol Use

	N (%) (N=397)	Total SIP-2R Score Median (IQR)	Total SIP-2R Score Mean (sd)	p-value
Current Gender				0.33
Male	283 (71.3%)	1 (0–5)	3.5 (4.61)	
Female	101 (25.4%)	0 (0–6)	3.2 (4.76)	
Transgender	10 (2.5%)	0.5 (0–2)	1.7 (2.58)	
Race/Ethnicity				0.43
Hispanic	81 (20.4%)	1 (0–5)	3.1 (4.38)	
Non-Hispanic White	85 (21.4%)	0 (0–5)	2.8 (4.21)	
Non-Hispanic Black	214 (53.9%)	1 (0–6)	3.7 (4.87)	
Other	17 (4.3%)	3 (0–5)	3.6 (4.08)	
Age Group				0.06
18–34	80 (20.2%)	1 (0–4)	2.8 (3.82)	
35–44	74 (18.6%)	1 (0–7)	3.8 (4.86)	
45–54	152 (38.8%)	1 (0–8)	4.1 (5.14)	
55+	89 (22.4%)	1 (0–3)	2.3 (3.78)	
Education				0.005
Less than High School	137 (34.5%)	2 (0–8)	4.6 (5.35)	
High School or GED	111 (28.0%)	1 (0–4)	2.8 (4.10)	
More than High School	149 (37.5%)	1 (0–4)	2.7 (3.97)	
Employment Status				0.38
Employed	110 (27.7%)	1 (0–4)	2.6 (3.71)	
Unemployed	282 (71.0%)	1 (0–6)	3.6 (4.90)	
Homeless				<0.0001
Yes	76 (19.1%)	5 (1–11)	6.1 (5.31)	
No	320 (80.6%)	1 (0–4)	2.7 (4.18)	
Anxiety Symptoms				<0.0001
Yes	135 (34.0%)	3 (0–8)	4.7 (5.04)	
No	249 (62.7%)	0 (0–3)	2.5 (4.08)	
Depressive Symptoms				0.0003
Yes	142 (35.8%)	2 (0–7)	4.3 (5.08)	
No	246 (62.0%)	0 (0–4)	2.7 (4.15)	
Injection Drug Use				0.0005
Yes	28 (7.1%)	5 (1–9)	6.1 (5.08)	
No	352 (88.7%)	1 (0–5)	3.1 (4.46)	
Non-Injection Drug Use				<0.0001
Yes	167 (42.1%)	2 (0–8)	4.5 (5.03)	
No	212 (53.4%)	0 (0–3)	2.4 (3.98)	
Marijuana Use				0.26

	N (%) (N=397)	Total SIP-2R Score Median (IQR)	Total SIP-2R Score Mean (sd)	p-value
Regular Use	70 (17.6%)	1 (0–4)	3.0 (4.21)	
Occasional Use	107 (27.0%)	1 (0–7)	3.8 (4.71)	
No	192 (48.4%)	1 (0–5)	3.0 (4.63)	
Hazardous Drinking				<0.0001
Yes	233 (58.7%)	3 (0–8)	4.7 (5.09)	
No	155 (39.0%)	0 (0–2)	1.5 (2.98)	

*Nonparametric Wilcoxon Rank Sum tests were used to determine whether there was a difference in median SIP-2R scores across socio-demographic, mental health, and substance use variables.

Table 3.

Adjusted Associations between SIP-2R Scores and Sociodemographic, Mental Health, and Substance Use Variables

	Adjusted Ratio of Expected SIP-2R Score (95% CI)
Hazardous Drinking	
Yes	**2.27 (1.44, 3.60)**
No	ref
Education Level	
Less than High School	0.87 (0.60, 1.27)
High School or equivalent	0.83 (0.56, 1.22)
More than High School	ref
Homelessness	
Yes	**1.66 (1.10, 2.50)**
No	ref
Symptoms of Anxiety	
Yes	0.87 (0.43, 1.78)
No	ref
Symptoms of Depression	
Yes	0.72 (0.39, 1.33)
No	ref
Injection Drug Use	
Yes	**2.63 (1.92, 3.60)**
No	ref
Non-Injection Drug Use	
Yes	0.99 (0.64, 1.53)
No	ref

Adjusted GEE models with IPW were created for each of the variables that were associated with SIP-2R scores, where the weights accounted for all other variables that were significant in the bivariate analyses.