AIDS PATIENT CARE and STDs
Volume 34 Number 6, 2020

DOI: 10.1089/apc.2020.0021

HIV Stigma, Depressive Symptoms, and Substance Use

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Abstract

Substance use problems undermine HIV treatment and secondary prevention efforts. Research is needed to better understand predictors of substance use among people living with HIV (PLWH). We examined whether internalized stigma and enacted HIV stigma are associated with three indicators of substance use among PLWH, including numbers of (1) substances used, (2) substances used at moderate to high risk, and (3) times substances were used before sex, through the mediator of depressive symptoms. Participants included 358 PLWH aged 18–35 years from Georgia, United States. At baseline, participants completed measures of internalized and enacted stigma, depressive symptoms, and substance use severity. Substance use was additionally tested with urinalysis. Following baseline, participants reported their use of substances before sex for 28 days through daily text messaging. Data were analyzed using path analysis in R. On average, participants tested positive for 1.24 (range: 0–6) substances used, reported moderate to high risk on 2.01 (range: 0–8) substances, and reported using substances 1.57 (range: 0–20) times before sex over 28 days. Internalized stigma and enacted stigma were associated with greater depressive symptoms, and depressive symptoms were associated with all three indicators of substance use. Moreover, the indirect effects between internalized and enacted stigma with indicators of substance use were significant, suggesting that depressive symptoms partially mediated associations between stigma and substance use. Interventions may be needed to address both stigma and depressive symptoms among PLWH to reduce substance use and support HIV treatment and prevention efforts.

Keywords: addiction, depression, HIV, substance use, stigma

Introduction

In the United States, people living with HIV (PLWH) are affected by substance use problems at higher rates than people not living with HIV.[1] In addition to harming overall mental and physical health,[2] substance use problems undermine HIV treatment and secondary prevention efforts. Cannabis, alcohol, and opioid use problems are associated with lower adherence to antiretroviral therapy,[3–5] tobacco use with coinfections such as bacterial pneumonia and tuberculosis,[6,7] and cocaine use with faster HIV progression.[8] Alcohol and methamphetamine use is associated with behaviors that increase risk of HIV transmission such as condomless sex and sexual marathons.[9,10] Research identifying risk factors for substance use among PLWH is needed to strengthen HIV treatment and prevention efforts.

HIV stigma plays a role in a wide range of negative health behaviors and outcomes among PLWH[11–14] and may play a role in substance use. Internalized stigma, or endorsing negative beliefs and feelings associated with HIV and applying them to the self, is related to greater avoidant coping and feelings of helplessness, longer gaps in HIV care, and lower likelihood of antiretroviral therapy initiation.[15,16] Enacted stigma, or experiencing discrimination from others due to one's HIV, is related to greater stress and more missed HIV clinic appointments.[17,18] Growing literatures have established associations between sexual and gender minority[19–22] and race-based[23–25] stigma with substance use. In comparison, fewer studies have

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examined associations between HIV stigma and substance use. Quantitative studies to date show associations of internalized HIV stigma with hazardous drinking[26] and enacted HIV stigma with frequency of illicit drug use.[27] Yet, other work on associations between HIV stigma and substance use has been mixed.[28,29] To build a more comprehensive understanding of HIV stigma and substance use, additional research is needed to explore associations between multiple stigma mechanisms and multiple indicators of substance use.

There have been increasing calls to identify modifiable psychosocial variables that mediate associations between stigma and negative health behaviors among PLWH[14] because they can be intervened upon to disrupt the impact of stigma on health. Depressive symptoms may mediate associations between HIV stigma and substance use given evidence demonstrating that both internalized stigma and enacted stigma are associated with greater depressive symptoms[30–32] and that depressive symptoms are associated with greater substance use.[33] Evidence of this pathway additionally comes from qualitative work wherein PLWH have reported engaging in substance use to cope with the negative mental health effects of stigma.[34]

In the current study, we examined whether internalized and enacted HIV stigma are associated with three key indicators of substance use among PLWH, including numbers of (1) substances used, (2) substances used at moderate to high risk, and (3) times substances were used before sex over the course of a month. Additionally, we explored whether depressive symptoms mediated these associations.

Methods

Participants and procedures

The current study was conducted as part of a lead-in study for a larger behavioral intervention trial to improve access to health care. PLWH were recruited through social media advertisements, flyers at social service agencies, and participant referrals. Interested individuals contacted a study recruiter through instant message or phone. Individuals were eligible to enroll if they were 18–35 years old (inclusive), living with HIV, and have a cell phone. They provided documentation of HIV status through medical records or by providing a saliva sample for rapid antibody testing. Written informed consent was provided. At baseline, participants completed self-report measures and submitted a urine sample for toxicology testing. For the following 28 days, they reported on their sexual behaviors in response to daily text messages. Study procedures received Institutional Review Board approval from the University of Connecticut. The current analyses focus on 358 participants from the lead-in study.

Measures

Three measures of substance use were collected and coded to indicate substance use. First, two toxicology tests were conducted on urine samples collected at baseline. The Reditest Panel-Dip from Redwood Toxicology Laboratory[35] assessed for 12 substances used in the past 6 h to 4 weeks (range varied by substance), including cannabis, cocaine, methamphetamine, amphetamine, benzodiazepine, ecstasy, opioids, oxycodone, phencyclidine, methadone, propoxyphene, and barbiturates. The EtG Alcohol Urine Test Dip Card (300 ng/mL cutoff) from Medical Dimensions[36] assessed for alcohol used in the past 80 h. A sum of positive results spanning both tests was created for each participant, indicating the number of substances used. Second, participants completed the World Health Organization's Alcohol, Smoking, and Substance Involvement Screening Test 3.0 (ASSIST).[37,38] The ASSIST screens for substance use severity in the past 3 months, including cannabis, tobacco, alcohol, cocaine, inhalants, amphetamine, sedatives, hallucinogens, opioids, and other drugs. Participants were additionally screened for severity of methamphetamine and erectile dysfunction medication use for a total of 12 substances screened. The World Health Organization recommends brief intervention or more intensive treatment for participants scoring at moderate or high risk, respectively. A sum of substances used at moderate or high risk was therefore created for each participant. Third, participants responded to daily text messages regarding their substance use and sexual behaviors for a period of 28 days following baseline. Each day, they reported whether they drank or used drugs before having sex on the previous day. A sum of times substances were used before sex in the previous month was created.

Participants additionally responded to self-report measures at baseline. Measures of internalized and enacted stigma were adapted from the HIV Stigma Mechanism Measure,[15] with additional items generated based on preliminary data. Internalized stigma was measured with six items, including ''I think less of myself because I have HIV.'' Response options ranged from *strongly disagree* (1) to *strongly agree* (6). A mean score was created (Cronbach's $\alpha = 0.91$). Enacted stigma was measured with 24 items, including ''How often have people treated you differently because of your HIV status?'' Response options ranged from *never* (0) to *often* (3). A mean score was created (Cronbach's $\alpha = 0.94$). Depressive symptoms were measured with the 20-item Center for Epidemiologic Studies Depression Scale (CES-D).[39] Items included ''I was bothered by things that usually don't bother me,'' and response options included 0 days (0), 1–2 days (1), 3–4 days (2), and 5–7 days (3). A sum score was created (Cronbach's $\alpha = 0.80$). Scores above 16 are considered clinically significant in identifying depression. Participants also indicated several sociodemographic and HIV-related characteristics, including their gender identity, race/ethnicity, and number of years living with HIV.

Analysis strategy

First, descriptive statistics were explored to characterize participants' sociodemographic characteristics, experiences of stigma, depressive symptoms, and substance use severity. Second, bivariate correlations between stigma, depressive symptoms, and indicators of substance use severity were examined. Third, hypotheses were tested using path analysis in R[40] with the OpenMX package.[41] Path analysis accounts for associations between multiple indicators of substance use (which were expected to be correlated) and provides estimates of indirect effects between independent and dependent variables through mediating variables.[42] We determined the parameter estimates with diagonally weighted least squares (DWLS) due to the non-normality and count nature of our data. The DWLS procedure uses the full weight matrix to

compute robust standard errors (SEs) and a mean- and variance-adjusted test statistic.[43,44] The adequacy of model fit was determined by several statistics: comparative fit index (CFI) >90, Tucker–Lewis index (TLI) >90, and root mean square error of approximation (RMSEA) <0.06.

Table 1. Participant Characteristics, $N = 358$

	% (n)	M (SD)	Range
Sociodemographics			
Gender identity			
Man	89.1 (319)		
Woman	7.3 (26)		
Transgender man	0.6 (2)		
Transgender woman	2.2 (8)		
Other	0.9 (3)		
Race/ethnicity			
White	2.2 (8)		
African American or black	86.6 (310)		
Hispanic or Latino(a)	9.2 (33)		
Asian or Pacific Islander	2.0 (7)		
Years living with HIV		6.60 (5.33)	0–32
Substance use			
# Substances used		1.24 (1.13)	0–6
Cannabis	57.9 (208)		
Alcohol	24.2 (87)		
Cocaine	11.4 (41)		
Methamphetamine	9.7 (35)		
Amphetamine	8.1 (29)		
Benzodiazepine	4.2 (15)		
Ecstasy (MDMA)	3.1 (11)		
Opioids	1.9 (7)		
Oxycodone	1.4 (5)		
Phencyclidine (PCP)	0.6 (2)		
Methadone	0.6 (2)		
Propoxyphene	0.0 (0)		
Barbiturates	0.0 (0)		
# Substances used at moderate or high risk		2.01 (1.60)	0–8
Cannabis	57.9 (208)		
Tobacco	54.0 (194)		
Alcohol	33.4 (120)		
Cocaine	16.2 (58)		
Inhalants	13.1 (47)		
Methamphetamine	8.9 (32)		
Amphetamine	7.5 (27)		
Sedatives	2.8 (10)		
Erectile dysfunction medication	2.8 (10)		
Other	1.7 (6)		
Hallucinogens	1.1 (4)		
Opioids	0.9 (3)		
# Times substances were used before sex in a month		1.57 (2.95)	0–20
Stigma			
Internalized		2.74 (1.58)	1–6
Enacted		0.45 (0.51)	0–2.83
Depressive symptoms		23.29 (8.98)	0–46

SD, standard deviation.

Results

As shown in Table 1, most participants identified as men and African American or black and had been living with HIV for an average of 6.60 years (standard deviation [SD] = 1.13). Participants tested positive for an average of 1.24 substances used (SD = 1.13, range: 0–6), reported moderate to high risk on an average of 2.01 substances (SD = 1.60, range: 0–8), and reported using substances an average of 1.57 times before sex over 28 days (SD = 2.95, range: 0–20). On average, participants reported low internalized stigma, infrequent experiences of enacted stigma, and depressive symptoms above the threshold for clinical significance.

As shown in Table 2, internalized stigma and enacted stigma were positively correlated with each other and depressive symptoms. Depressive symptoms were positively correlated with the numbers of substances used and substances used at moderate to high risk. Depressive symptoms were positively correlated with the number of times substances were used before sex, but this correlation did not reach statistical significance ($p = 0.08$). Moreover, all indicators of substance use were correlated with each other.

As shown in Fig. 1, internalized stigma and enacted stigma were associated with greater depressive symptoms. In turn, depressive symptoms were associated with greater numbers of substances used, substances used at moderate or high risk, and times substances were used before sex. Positive and statistically significant indirect effects through depressive symptoms were observed between internalized stigma and numbers of substances used [B (SE) = 0.02 (0.01), $p = 0.03$] and substances used at moderate or high risk [B (SE) = 0.02 (0.01), $p = 0.02$]. A positive, but nonsignificant, indirect effect was observed between internalized stigma and the number of times substances were used before sex [B (SE) = 0.01 (0.01), $p = 0.06$]. Additionally, positive and statistically significant indirect effects were observed through depressive symptoms between enacted stigma and numbers of substances used [B (SE) = 0.12 (0.04), $p \leq 0.01$], substances used at moderate or high risk [B (SE) = 0.13 (0.04), $p \leq 0.01$], and times substances were used before sex [B (SE) = 0.09 (0.04), $p = 0.01$]. Of the sociodemographic variables included in the path analysis as controls (i.e., gender

Table 2. Correlations Between Study Variables

	1	2	3	4	5	6
1. Internalized stigma	—					
2. Enacted stigma	0.49**	—				
3. Depressive symptoms	0.31**	0.39**	—			
4. # Substances used at moderate or high risk	0.08	0.15**	0.21**	—		
5. # Substances used	–0.05	0.03	0.14**	0.52**	—	
6. # Times substances were used before sex	–0.02	0.03	0.09^{+}	0.41**	0.29**	—

$^{+}p < 0.10$; $^{**}p < 0.01$.

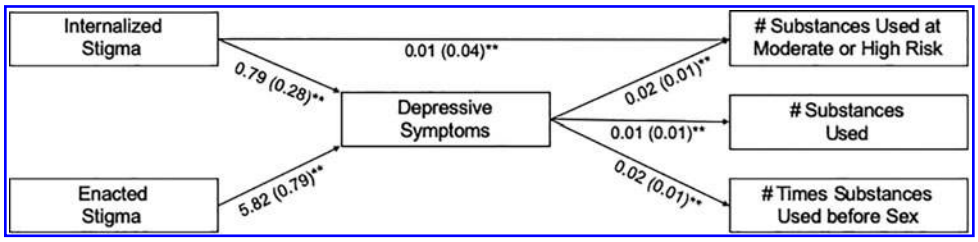

FIG. 1. Results of path analysis. *B* (standard error) displayed; $^{**}p < 0.01$; analyses controlled for gender identity, race/ethnicity, and years living with HIV.

identity, race/ethnicity, and years living with HIV), only male gender identity was associated with a variable included in the model. Participants identifying as men reported a greater number of substances used at moderate or high risk [*B* (SE) = 0.51 (0.22), $p = 0.02$]. All other associations with sociodemographic variables were nonstatistically significant. The path model demonstrated adequate fit to the data (RMSEA = 0.10, $p = 0.02$; CFI = 0.97, TLI = 0.93). Model fit was slightly diminished due to the inclusion of nonstatistically significant control variables within the model.

Discussion

Results of the current study suggest that HIV stigma is related to substance use among PLWH. Specifically, internalized and enacted HIV stigma were associated with greater numbers of substances used and substances used at moderate or high risk, and enacted stigma was associated with a greater number of times substances were used before sex. Moreover, results provide insight into the processes whereby HIV stigma relates to substance use. Depressive symptoms partially mediated associations between both internalized stigma and enacted stigma with indicators of substance use.

Strengths of the study involve the inclusion of two HIV stigma mechanisms and three indicators of substance use. Stigma mechanisms span stigma directed toward the self and experienced from others, and substance use indicators span those with implications for HIV treatment (i.e., substances used at moderate to high risk) and prevention (i.e., substances used before sex). Indicators of substance use included a biological measure and a prospective measure, strengthening confidence in the validity of results. Taken together, results suggest that the association between HIV stigma and substance use is both robust and multifaceted. Future work may expand on these findings by including additional measures of HIV stigma mechanisms (e.g., anticipated stigma), accounting for intersectionality of stigma experiences (e.g., racism), and adopting more nuanced indicators of substance use (e.g., latent profiles indicating severity of substance use).

Limitations of the study involve the cross-sectional measurement of HIV stigma with depressive symptoms and two indicators of substance use. Past longitudinal studies suggest that experiences of HIV stigma predict subsequent depressive symptoms[30,31] and depressive symptoms predict subsequent substance use.[45] Yet, longitudinal studies also suggest that substance use may predict subsequent depressive symptoms[46] and depressive symptoms may predict subsequent internalized stigma.[47] Cyclical relationships between stigma, depressive symptoms, and substance use may exist. Future work examining these associations should adopt scientifically rigorous longitudinal approaches to elucidate causal, and possible cyclical, paths between them. Longitudinal studies should also include additional measures of substance use, such as the amount and types of substances used per day. The sample included mostly black men living with HIV. This is an important population to study given that black men are disproportionately affected by HIV in the United States. Yet, future studies should include more diverse samples, including people who may not own a cell phone, to explore the generalizability of these findings.

The current study draws attention to the role of HIV stigma in substance use. It may be important to address HIV stigma within interventions to prevent and treat substance use problems among PLWH. Researchers have identified efficacious strategies to reduce stigma that targets PLWH (e.g., expressive writing and cognitive behavioral therapy), community members (e.g., intergroup contact and education), and structures and organizations (e.g., policy change and mass media campaigns).[48,49] In the midst of a substance use crisis in the United States, research is needed to continue to understand why substance use problems develop among PLWH, how they affect HIV treatment and prevention efforts, and how to best intervene in them.

Author Disclosure Statement

No competing financial interests exist.

Funding Information

This work was supported by the National Institute on Drug Abuse (NIDA; R01DA043068, K01DA042881, K01DA047918), National Institute of Allergy and Infectious Diseases (T32AI102623), and National Institute on Alcohol Abuse and Alcoholism (K24AA022136). Funders were not involved in the study design; collection, analysis, or interpretation of data; write up of the report; or decision to submit the article for publication.

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