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Unhealthy Substance Use Behaviors as Symptom-Related Self-Care in HIV/AIDS

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Abstract

The prevalence of symptoms in HIV disease can be associated with HIV disease itself, comorbid illness, and/or antiretroviral therapy. Unhealthy substance use behaviors, particularly substance-use behaviors including heavy alcohol intake, marijuana use, other illicit drug use, and cigarette smoking, are engaged in by many HIV-positive individuals, often as a way to manage disease-related symptoms. This study is a secondary data analysis of baseline data from a larger randomized-controlled trial of an HIV/AIDS Symptom Management Manual. In the present study, the prevalence and characteristics of unhealthy substance use behaviors in relation to HIV/AIDS symptoms are examined. Subjects were recruited from a variety of settings which provide HIV/AIDS care and treatment. The mean age of the sample (n=775) was 42.8 years (SD=9.6) and nearly thirty-nine percent (38.5%) of the sample was female. The racial demographics of the sample were: 28% African American, 28% Hispanic, 21% White/Caucasian, 16% African from Kenya or South Africa, 1% Asian, and 5% self-described as "Other." The mean number of years living with HIV was reported to be 9.1 years (*SD*=6.6).Specific self-reported unhealthy substance-use behaviors were use of marijuana (n= 111; 14.3%), cigarette smoking (n=355; 45.8%), heavy alcohol use (n= 66; 8.5%), and illicit drugs (*n*= 98; 12.6%). A subset of individuals who identified high levels of specific symptoms also reported significantly higher substance use behaviors including amphetamine and injection drug use in addition to heavy alcohol use, cigarette smoking, and marijuana use. Implications for clinical practice include assessment of self-care behaviors, screening for substance abuse, and education of persons related to self-management across the trajectory of HIV disease.

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Keywords

symptoms; symptom management; HIV/AIDS; self-care; self-management; unhealthy substance use behaviors; substance use

Introduction

Unhealthy substance use behaviors in HIV disease are known to complicate HIV/AIDS care and negatively impact disease outcomes. Alcohol, tobacco and illicit drug use are common among HIV-infected patients (Brion, 2000; Samet, Walley, and Bridden, 2007). In addition, substance use among HIV-infected individuals is related to transmission risk (Kalichman, Simbayi, Cain, and Jooste, 2007) and contributes to lower utilization of, and adherence to antiretroviral therapy (Golin et al., 2002). In their study, Golin and colleagues found that nearly all patients' adherence levels were suboptimal and that interventions that assess and treat substance abuse and incorporate adherence aids may be particularly helpful to optimize care. Cook et al. (2008) found that the use of crack cocaine was associated with faster progression of HIV disease.

In their recent study of HIV-infected patients, Benard et al. (2007) found that unhealthy substance use behaviors often coexist and regular cigarette smokers are often codependent on marijuana and alcohol. Depressive symptoms were also highly prevalent among subjects in their study. Since depression is common in HIV disease, the relationships among comorbid, unhealthy substance use behaviors and disease-related symptoms is an important area for study.

A recent systematic review of twenty-one studies in sub-Saharan Africa published between 2000 and 2008 suggests that the association between alcohol use and HIV infection is an important link with increased risk of HIV acquisition and prevalence. Alcohol use is the most prevalent risk factor for poor adherence to HIV medications and that alcohol consumption was associated with lower CD4 counts and that alcohol abuse may accelerate HIV disease progression and immune dysfunction (Pithey & Parry, 2009; Samet et al., 2007).

Background

Unhealthy Substance Use Behaviors and Symptoms

Since HIV disease is a chronic and complex illness that requires medication adherence and symptom management across the HIV/AIDS trajectory, the impact of, and relationships among unhealthy substance-use behaviors and the presence and severity of disease-related symptoms requires exploration. HIV-related symptoms occur due to disease progression and often due to the effects of antiretroviral medication; these symptoms may also be linked to comorbid unhealthy substance-use behaviors. It is known that medical providers have difficulty routinely addressing unhealthy substance use behaviors and substance use, in particular, is often not addressed with patients in HIV treatment settings (Metsch et al., 2008).

Recent literature suggests that substance-use disorders are associated with higher rates of symptoms (Berger-Greenstein et al., 2007). Braithwaite and colleagues (2007) suggest that non-hazardous alcohol use (<5 standard drinks on drinking days) decreased survival by more than one year if the frequency of use was once per week or more, and by 3.3 years with daily use. Hazardous alcohol use (> 5 drinks on drinking days) decreased overall survival by more than 3 years if frequency of consumption was once per week or more, and by 6.4 years with daily use.

Symptom Burden in HIV

Symptom burden is another area of important investigation in HIV disease. In their analysis of the symptom experience of HIV-infected adults, Lee and colleagues (2009) found that symptom burden was significantly higher in those individuals with AIDS and those individuals on antiretroviral therapy also had higher symptom burden scores. African Americans reported fewer symptoms than Caucasians or other races and women reported greater symptom burden scores. Lee et al. suggest that because high symptom burden is more likely to precipitate self-care strategies that may potentially be ineffective—including unhealthy substance use behaviors—that strategies for symptom management should be better guided by tailored interventions from health care providers. Recent literature on symptom clusters in HIV disease also suggests that the multitude of HIV symptoms often are associated with HIV symptom intensity and burden (Voss, Portillo, Holzemer, & Dodd, 2007).

In their study on psychiatric and substance abuse comorbidity among HIV seropositive and HIV seronegative prisoners in Malaysia, Zahari and colleagues (2010) found that a public health approach that addresses psychiatric illnesses, substance abuse, and HIV infection is needed in both the correctional and the community settings in order to provide adequate care for HIV-infected patients. Despite the knowledge that substance use is both a precursor to risky sexual behaviors and linked with HIV infection, there is a lack of systematic reviews or meta-analyses that address unhealthy or substance-use behaviors in those living with HIV disease.

The literature on HIV symptoms and symptom management has yielded several important findings. In particular, symptoms are known to occur early in HIV disease and continue across the trajectory of illness (Holzemer, 2002). Gaps in the literature exist in that symptom frequency, burden, and intensity are understudied, yet frequently negatively impact on the individual's quality of life. Thus, the present study contributes to the body of research on unhealthy substance-use behaviors associated with symptom burden, frequency, intensity, and symptom self-management.

Theoretical Framework

To guide our data collection and analysis, the constructs of interest are framed within Social Action Theory (Ewart, 1991; Johnson, Carrico, Chesney, & Morin, 2008). Social Action Theory (SAT) was developed as a framework to address individual level factors and external environmental factors that affect both individual health and public health priorities. In SAT, the self-care of the individual is positioned within the context of environmental factors in

their joined influence on health and health behaviors. The overarching goal in using SAT is to identify individual and environmental factors that can promote health and/or hinder healthy behaviors and habits.

The current analysis links the variables of unhealthy substance use, symptoms in HIV disease, sociodemographic and illness variables, and symptom burden (Figure 1). Based on our model, the combination of these variables highlights the influences of alcohol and substance use on symptom burden for those living with HIV/AIDS. Using this model, relevant outcomes are defined as HIV symptom frequency and symptom burden. The pertinent action state is the frequency of HIV symptoms and the patient perception of symptom burden. The focus of this analysis is on the main regulatory factors of substance use including alcohol, tobacco, and illicit drug use and their impact on symptom frequency and burden in an HIV infected sample. Environmental and contextual factors include age, race, gender, and years living with HIV and use of antiretroviral medication.

Purpose of the Study

The purpose of the present study was to examine the prevalence and characteristics of unhealthy substance use behaviors including the use of excessive alcohol, illicit drugs, marijuana and cigarette smoking in relation to the prevalence and severity of symptoms in people living with HIV disease.

The research questions were: 1) What is the prevalence of unhealthy substance use behaviors (heavy alcohol use, tobacco use, marijuana use, illicit drug use) in a sample of HIV-infected individuals, and 2) Is there an association between disease-related symptoms, substance use, and symptom burden in this sample?

Methods

Design and Settings

The larger study was a randomized controlled trial of the use of an HIV/AIDS symptom management manual (Wantland et al., 2008), while the present study reports only baseline data related to unhealthy substance use behaviors, prevalence of symptoms, and symptom burden. Data were collected in 14 sites in Africa, Puerto Rico, and the United States. The settings included community-based organizations, university-based AIDS clinics, private practices, public and for-profit hospitals, residential and day care facilities, and home care services. Institutional Review Board approval was obtained at each study site in all cities and in the African sites (South Africa and Kenya). Certificates of Confidentiality were obtained when requested by institutional review boards at specific sites.

Sample

The total sample included 775 HIV-infected men and women from the U.S. (Boston, 9.0%, Chicago 2.0%, Philadelphia, 13.8%, California 13.8%, Texas 24.5%, Salt Lake City 9.0%, Puerto Rico (two sites) 12.6%, Pretoria, South Africa (6.2%), and Nairobi, Kenya (9.2%). Inclusion criteria for the study were that participants had to be (a) at least 18 years of age, (b) receiving AIDS-related care at their respective facility, (c) able to provide informed

consent, and (d) able to complete the questionnaire independently or with the assistance of a research assistant. The instruments were available in English and Spanish. The instruments were forward- and back-translated by individuals who were bilingual in Spanish to achieve cross-cultural equivalency. In Africa, the questionnaires were administered in English since it is widely spoken among the populations in the two countries (South Africa and Kenya) where data were collected.

Procedure

After informed consent was obtained, the participants completed a self-report survey that included sociodemographic questions, HIV and comorbid illness information, a symptom self-report instrument, a drug and alcohol use survey, and self-care symptom assessment. Participants received remuneration upon completion of the study.

Instrumentation

Demographic survey—A 13-item self-report survey developed by the investigator was utilized to collect demographic information and illness background data for the study. Questions addressed personal and environmental characteristics including age, gender, years of education, adequacy of income, whether they had children, among other variables. In addition, data on biological/physiological factors, such as whether participants had received an AIDS diagnosis or had any co-morbidities, were also collected.

The Revised Sign and Symptom Checklist for Persons with HIV Disease (SSC-HIV rev)—The Sign and Symptom Checklist seeks to identify the symptoms and their intensity being experienced by people living with HIV on the day of data collection. The SSC-HIVrev has three parts: Part I consists of 45 HIV-related physical and psychological symptoms, clustered into eleven factor scores along with a total score, with reliability estimates ranging from 0.76 o 0.91: Part II consists of 19 HIV-related symptoms that do not cluster into factor scores but may be of interest from a clinical perspective; and Part III consists of eight items related to gynecological symptoms for women. In several studies including the instrument development study, the reliability estimates are consistently high (Cronbach's alpha = 0.97) (Holzemer et al., 1999). For the purpose of analysis in the present study, the 72 physical and psychological symptoms of the SSC-rev were treated as a dichotomous variable (0= absent or mild, 1= moderate or severe) and were combined to reduce the set to 25 symptom categories, (as displayed in table 2) including the 11 factors identified in Part I of the instrument. This dichotomous approach to recoding was based on the statistical plan to examine the symptoms as absent/mild versus moderate/severe and is similar to our analyses using this instrument in other studies. Since most participants reported either absent or moderate to severe symptoms, the dichotomized variable seems appropriate for this study.

For categories other than the eleven factors in the SSC-HIVrev, symptoms were either used independently (i.e. constipation, swollen glands, swollen feet) or in groups of like symptoms (i.e. Sore throat, painful swallowing, mouth ulcers, white spots in mouth/thrush were combined to create the category "oral symptoms). The reliability and validity of the instrument have been reported previously (Holzemer et al., 2001).

Drug and Alcohol Use Scale (DAS)

This 35-item scale was derived from the Addiction Severity Index (ASI), which is the most widely used standardized instrument in assessing substance use (McLellan et al. 1992). The DAS is the component of the ASI that focused on history of drug and alcohol use. Test-retest reliability coefficients of .83 over a 2-day period have been demonstrated with the instrument (McLellan et al., 1992). The 35-item Drug and Alcohol Scale was transformed from a semi-structured format to a self-report questionnaire for use in this study. This scale inquires about lifetime use patterns and drug use episodes specifically in the last 30 days. Administration time for the drug and alcohol scale has been estimated to be 5 minutes. The psychometric properties of the ASI have been reported in several studies and with several different populations (Cacciola et al., 2007; McLellan et al., 1992). Test–retest and interrater reliability coefficients have been shown to be similar to that reported by McLellan et al., 1992). Reliability estimates were high in several studies using the ASI in populations under study and seem to be less robust when used with the chronically mentally ill (Alterman, Bovasso, Cacciola & McDermott, 2001; Bovassa, Alterman, Cacciola, & Cook, 2001; Zanis, McLellan, & Corse, 1997).

Level of substance use is determined by the number of times participants report using specific drugs in the past 30 days. The instrument addresses use of substance (yes/no), duration of substance use over the past 30 days, number of years using substance, and route of substance use. For the purposes of this study, we defined heavy alcohol users as those subjects who indicated drinking to intoxication on at least 4 occasions in the last 30 days, a rate which approximates weekly intoxication. Illicit drug use, marijuana use, and cigarette smoking were dichotomized to differentiate between subjects who did and did not report any use of those specific substances over the past 30 days.

Data Analyses

Standard descriptive statistics were used to describe the demographic characteristics, illness background, symptom prevalence and burden, and use of medications and substances as self-care management strategies of the sample. All bivariate analyses were conducted using either Chi-square or t-tests, as appropriate. Association between substance use behaviors and self-report of symptoms was approached in a two-step process. First, all pairwise substance use by symptom associations were assessed using the Chi-square statistic since these were categorical variables. If a significant association (at the p=.05 level) was observed, then adjusted logistic regression analyses were conducted. The outcome (dependent) variable was one of the substance use dichotomous measures, and the independent variable of interest as one of the symptom measures. Covariates of age, race, gender, income, working status, education, and years with HIV were included in the analyses since the literature suggests that these variables are linked with substance use behaviors. Alpha level for significance was set at .05 and SAS (Cary, NC) version 9.1 was used for all analyses.

Results

Sociodemographic and Illness Characteristics of the Sample

Demographic and illness background data are presented in Table 1. The sample was comprised of 59.6% (n=462) males, 40.4% (n=313) females. (For this study, 17 self-identified transgender subjects (2.2%) were categorized as female). Ages ranged from 20-72 and the mean age was 42.8 (SD 9.6 years). The largest racial groups represented were African National and African American (43.6%, n=335), Hispanic/Latino (27.8%, n=214) and White/Anglo (21.2%, n=163). Most of the participants had at least a high school education (70.9%, n=544) although 78.2% (n=604) indicated that their income was, at best, barely adequate. Forty-two percent (n=322) of the participants had an AIDS diagnosis The mean years HIV positive was 9.1.and the majority of participants were currently taking HIV medications (70.4%, n=537) and had been taking antiretroviral medications for a mean of 6.7 years. Their most recent CD4 counts ranged from 0-1200 with a mean of 407; 62.7% (n=470) reported that they had other medical conditions in addition to HIV/AIDS.

Correlation Analyses

The correlation coefficients among sociodemographic characteristics (age, gender, education, race/ethnicity, income, employment), substance use (alcohol, illicit drugs, marijuana use, tobacco), and symptom burden are displayed in Table 2. Significant positive correlations were observed between older age and education (r=.082, p<.022), income (r=.076, p<.034), and years living with HIV (r=.388, p<.0001). For those who used alcohol, significant correlations were found with illicit drug use (r=.231; p<.0001), marijuana use (r=.205, p<.0001), tobacco use (r=.183, p<.0001), race (Caucasian) (r=−.072, p<.045), and symptom burden (r=.138, p<.0001). For those who used drugs, significant correlations were found with marijuana use (r=.277, p<.0001), tobacco use (r=.219, p<.0001), males (r=.091, p<.010), years living with HIV (r=.076, p<.032), and symptom burden (r=.156, p<.0001). It is interesting to note that symptom burden was significantly correlated with all substance use behaviors and years living with HIV disease (r=.122, p<.0006).

Chi-square Analyses of the Most Frequently Reported HIV Symptoms

In the bivariate analysis, several symptoms were significantly associated with unhealthy substance use behaviors (Table 3). In particular, fatigue and confusion/distress were significantly associated with all four substance use behaviors (alcohol use, illicit drug use, marijuana, and tobacco). Of note, is that nearly half of the sample (45.8%, n = 355) reported tobacco use and nearly 15% reported marijuana use (n = 111, 14.3%). Illicit drug use was self-reported by 12.6% of the sample (n = 98), and heavy alcohol use by 8.5% (n = 66). Other significant relationships between symptoms and substance use behaviors are noted in Table 3.

The majority of participants noted that symptom prevalence and intensity on the day of data collection were high for many of the participants. Confusion/distress (52.3%%, n = 405), anxiety/insomnia (46.5%, n = 360), fatigue (41.0%, n = 314), arthralgia/weakness (49.4%, n = 383), dry mouth/thirst (41.8%, n = 324), and GI (41.9%, n = 325) were all prevalent and each affected over 40% of the sample. Neuropathy was rated by the respondents as having

the highest intensity as a symptom (6.37 on 0 to 10 scale), yet was not found to be significantly associated with unhealthy substance-use behaviors. Fatigue (6.18; SD 2.75) and depression (6.02; SD 2.69) were also rated as high in symptom intensity and were linked with substance use behaviors.

Adjusted Logistic Regression Analyses for Symptoms and Substance-Use Behaviors

The adjusted logistic regression analysis for the association between symptoms and substance use are presented in Table 4. Only those associations with significant adjusted odds ratios between symptoms and substance use are presented. Two symptom categories (fatigue and confusion/distress) were significantly associated with all four unhealthy substance use behaviors, while two others (nausea/vomiting and anxiety/insomnia) were significantly associated with three of four unhealthy substance use behaviors. Illicit drug use was significantly associated with the most symptom categories (12) while tobacco use, although the most prevalent unhealthy substance use behavior, was significantly associated with the fewest symptom categories (6). Of note, neuropathy, which was reported by 39% (n = 302, gynecologic symptoms, which were reported by 32% of females (n = 96), and shortness of breath, which was reported by 34% (n = 264), were not significantly associated with any of the four unhealthy substance use behaviors.

Table 5 presents the results of comparing participants who reported the use of unhealthy substance use behaviors to those who did not (non-users). Significant differences were found to exist between these two groups on selected demographic variables. There were no differences between the users and non users regarding age or income level, however three were significant differences on substance use variables related to race, gender, and educational level. Male respondents were significantly more likely to report the use of illicit drugs, marijuana, and tobacco. Marijuana use was noted to be higher in those with greater education than those with high school or less education. Symptom occurrence (count, intensity) was lower in Africa than in the US and Puerto Rico. Hispanics receiving treatment in the US had the highest reports of symptoms and also the greatest impact by using self-care strategies.

The results of t-tests presented in Table 5 suggest that symptom burden was significantly higher for those who reported use versus nonuse of alcohol (p<.001), tobacco (p<.001), illicit drugs (p<.0001), and marijuana (p<.004). Mean symptom burden related to heavy alcohol use was 9.0 for users, compared to a reported a symptom burden of 6.6 (p<.001) for those not reporting heavy use. For illicit drugs, mean symptom burden for users was 9.1, while non-users reported a mean of 6.5 (p<.0001). Marijuana users reported a symptom burden of 8.3 and non-users had a mean score of 6.5 (p<.004); tobacco users reported a mean symptom burden score of 7.6 and nonusers had a score of 6.1 (p<.001).

Discussion

HIV disease has become a treatable, chronic condition for most persons living with HIV however symptoms due to HIV and medications often affect quality of life. In addition, symptom management may require the use of medications to alleviate symptoms and self-care strategies. Some of those living with HIV utilize unhealthy substances to ameliorate

symptoms. A large number of those living with HIV in our study indicated that they utilized unhealthy substances for symptom management.

Research on unhealthy substance use behaviors in HIV disease has demonstrated that there is a link to non-adherence to medications and healthy treatment regimens. These unhealthy substance use behaviors were found to be common in our sample. This may be related to the fact that unhealthy substance use behaviors are known to be risk factors for HIV acquisition as well as progression of HIV disease (Pithy & Parry, 2009). In particular, tobacco use was found to be highly prevalent in our sample and may contribute to other chronic co-morbid illnesses. Because many HIV medication regimens and long-term HIV disease also contribute to increased cardiovascular risk, it is essential to address the high prevalence of tobacco use in those with HIV disease.

The possible impact of unhealthy substance use behaviors on the pharmacokinetics of antiretroviral medications is also important to address. Research suggests that unhealthy substance use behaviors deplete the immune system, thus adding to the physiological burden of HIV disease. Recent studies (Golin et al., 2002; Kalichman, Simbayi, Cain, and Jooste, 2007; Kalichman, Simbayi, Jooste, Vermaak, & Cain, 2008) found that there is poorer adherence to antiretroviral therapy and additional associated comorbid illness for those who are substance users. In the present study, 70% of the sample were taking prescribed antiretroviral medications thus the interaction of these medications along with substance use requires further examination.

This study has clearly demonstrated the relationship between the presence and severity of HIV-related symptoms and unhealthy substance-use behaviors in a sample of people living with HIV. Because of the direct and indirect threats such behaviors pose to the health of these patients, it is critical that healthcare providers intervene as early as possible with appropriate strategies to address unhealthy substance use behaviors. Symptom management and unhealthy substance use behaviors must be comprehensively addressed to understand the importance of nursing assessment and intervention across the trajectory of HIV disease.

In addition, it is important to note that there were significantly higher rates of symptom burden for all categories of substance use. Symptom prevalence and intensity was reported as high on the day of data collection, thus supporting the findings in the literature of high prevalence of symptoms in HIV disease. The complex relationship of symptom self-report by study respondents and the difficulty living with HIV across the trajectory of disease are important areas for nursing assessment and intervention. In several resource-limited areas, substance use is common because of the lack of appropriate medications for symptoms such as depression, pain, and anorexia. In addition, for those individuals with other chronic illnesses, symptoms were greater and for those individuals who reported higher mean number of symptoms, there were significantly higher symptom burden scores and greater use of all four unhealthy substance behaviors.

Limitations

Limitations of the study include the lack of generalizability of the sample due to selection bias or response bias; the cross-sectional nature of the study analyses, thus determining

whether substance use exacerbates or ameliorates symptoms is not known; and that symptoms described by study respondents may represent symptoms of HIV, side effects of medications, or unhealthy substance use behaviors. In our analyses, we did not analyze the correlations of medications and symptom burden or intensity, however future studies should investigate this relationship. In addition, cultural and economic differences may also exist since some data were collected in resource-limited settings in the US, Africa, and Puerto Rico.

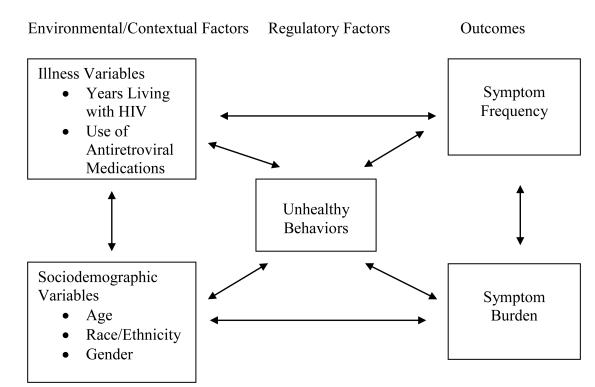### Implications for clinical practice and nursing research

Clinicians in nursing practice must address the difficult issues related to assessment, intervention, and management of unhealthy substance-use behaviors. Since substance use exists but is often not adequately assessed by HIV clinicians, initial assessment and follow-up evaluation are critical. Unhealthy substance use behaviors may increase transmission risk behaviors, limit adherence, and negatively impact outcomes of therapy, thus it is essential that nurses engage in a thorough assessment during each client encounter. Understanding unhealthy substance-use behaviors and their consequences across the trajectory of HIV disease may improve the health of those living with HIV disease. Future nursing research should explore the symptom experience, symptom burden and the relationship with unhealthy substance use in HIV disease.
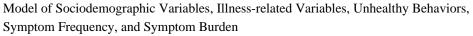
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Environmental/Contextual Factors   Regulatory Factors   Outcomes

Illness Variables
- Years Living with HIV
- Use of Antiretroviral Medications

Unhealthy Behaviors

Symptom Frequency

Sociodemographic Variables
- Age
- Race/Ethnicity
- Gender

Symptom Burden

Figure 1.
Model of Sociodemographic Variables, Illness-related Variables, Unhealthy Behaviors, Symptom Frequency, and Symptom Burden

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Table 1

Demographics of HIV-infected Individuals Reporting Substance Use Behaviors

Gender		
Male	462	59.6%
Female*	313	40.4%
Age	42.8 years	SD= 9.6 (Range 20-72)
Race		
Asian/Pacific Islander	11	1.4%
African National and American/black	335	43.6%
Hispanic/Latino	214	27.8%
Native American Indian	8	1.0%
White/Anglo	163	21.2%
(non-Hispanic)	37	4.8%
Other		
Highest Education		
Grade School	223	29.1%
High School	318	41.5%
Technical/vocational	143	18.6%
school	59	7.7%
College	20	2.6%
Master's	4	0.5%
Doctorate		
# Children at home		
0	139	37.9%
1	81	22.1%
2	80	21.8%
3	31	8.4%
>4	36	9.8%
Data Collection Sites		
USA (10)		
California (3)	107	13.8%
Texas (3)	190	24.5%
Massachusetts (1)	69	9.0%
Utah (1)	69	9.0%
Illinois (1)	16	2.0%
Pennsylvania (1)	107	13.8%
Africa (2)		

South Africa (1)	48	6.2%
Kenya (1)	71	9.2%
Puerto Rico (2)		
San Juan (1)	70	9.0%
Vega Baja (1)	28	3.6%
AIDS diagnosis		
Yes	322	42.0%
No	408	53.2%
Don't know	37	4.8%
Taking HIV Meds now		
Yes	537	70.4%
No	226	29.6%
Other Medical Conditions		
Yes	470	62.7%
No	280	37.3%
Years HIV Positive	9.1 years	SD±6.6 (Range: 0-26)
Recent CD4 Count (if known)	407	SD±268 (Range: 0-1200)
Viral Load "Undetectable"	251	33.4%
Viral Load (Greater than 50 copies/ml) (n=146)	50368	SD±135000 (Range 50-750000)
Years on ARV Medications	6.7 years	SD±5.2 (Range: 0-20)

[*]
female includes 17 subjects who identified as transgender

Table 2

Correlation Coefficients of Substance Use Behaviors and Major Study Variables (n = 775)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Age												
2. Alcohol Use	−0.00805 0.8229											
3. Illicit Drugs	0.02768 0.4417	0.23164 <.0001*										
4. Marijuana Use	0.02086 0.562	0.20517 <.0001*	0.27667 <.0001*									
5. Tobacco	0.02759 0.4431	0.18341 <.0001*	0.21903 <.0001*	0.149 <.0001*								
6. Gender/Male	0.13378 0.0002*	0.0156 0.6646	0.09162 0.0107*	0.11883 0.0009*	0.11809 0.001*							
7. High School Graduate	0.08204 0.0224*	0.01268 0.7246	−0.01215 0.7357	0.09214 0.0103*	0.01437 0.6895*	0.17777 <.0001*						
8. Race/Black	−0.03331 0.3544	−0.0718 0.0457*	−0.00481 0.8936	−0.11344 0.0016*	−0.05939 0.0985	−0.15859 <.0001*	−0.1187 0.0009*					
9. Income	0.076 0.0344*	−0.04661 0.1949*	−0.0283 0.4314	−0.00696 0.8466	0.03763 0.2954	0.05155 0.1516	0.07202 0.045*	−0.07729 0.0314*				
10. Employed	−0.01713 0.6339	0.018 0.6168	−0.05889 0.1014	−0.05089 0.157	−0.0706 0.0494*	0.05374 0.135	0.1175 0.001*	−0.00753 0.8342	0.01802 0.6165			
11. Years with HIV	0.38846 <.0001*	0.0499 0.1652	0.07687 0.0324*	0.11932 0.0009*	0.16939 <.0001*	0.23789 <.0001*	0.12859 0.0003*	−0.18061 <.0001*	0.10811 0.0026*	−0.12406 0.0005*		
12. Symptom Burden	0.0245 0.4959	0.13821 0.0001*	0.15627 <.0001*	0.13022 0.0003*	0.12857 0.0003*	−0.02229 0.5356	−0.0001 0.9979	−0.25493 <.0001*	0.00622 0.8627	−0.15334 <.0001*	0.12253 0.0006*	

Prob > |r| under H0: Rho=0

Table 3

Chi-square Analyses: Association Between Most Frequently Reported HIV-Related Symptoms and Substance Use Behaviors

		Substance Use							
		Alcohol 8.5% (n=66/775)		Illicit drugs 12.6% (n=98/775)		Marijuana 14.3% (n=111/775)		Tobacco 45.8% (n=355/775)	
Symptom		(%) Use	P value	(%) Use	P value	(%) Use	P value	(%) Use	P value
Arthralgia/ Weakness	Y=383	10.2	.10	16.7	.008*	19.3	.0001*	51.4	.002
	N=392	6.9		8.7		9.4		40.3	
Fatigue	Y=314	11.2	.03*	16.2	.012*	19.1	.002*	51.3	.01
	N=461	6.7		10.2		11.1		42.1	
Dry Mouth/ Thirst	Y=324	10.8	.05*	15.7	.028*	18.8	.002*	51.5	.007
	N=451	6.9		10.4		11.1		41.7	
Confusion/ Distress	Y=405	12.4	.0001*	18.0	.0001*	19.5	.0001*	53.1	.0001
	N=370	4.3		6.8		8.7		37.8	
Peripheral Neuropathy	Y=302	78.0	.65	14.2	.28	16.2	.25	49.3	.11
	N=473	8.9		11.6		13.1		43.6	
GI	Y=325	10.2	.17	16.0	.016*	18.5	.005*	49.2	.10
	N=450	7.3		10.2		11.3		43.3	
Anxiety/ Insomnia	Y=360	11.7	.003*	17.2	.0004*	19.4	.0001*	50.0	.03*
	N=415	5.8		8.7		9.9		42.2	

Table 4

Symptoms with Substance-Use Behaviors Adjusted for Covariates

	Substance-Use Behaviors			
	Alcohol 8.5% (n=66/775)	Illicit drugs 12.6% (n=98/775)	Marijuana 14.3% (n=111/775)	Tobacco 45.8% (n=355/775)
Symptom	OR (95% CI) P Value	OR (95% CI) P Value	OR (95% CI) P Value	OR (95% CI) P Value
Arthralgia/ Weakness		2.11 (1.33, 3.34) .002*	1.98 (1.27, 3.07) .002*	
Fatigue	1.68 (1.00, 2.83) .049*	1.69 (1.09, 2.63) .018*	1.72 (1.13, 2.62) .011*	1.39 (1.04, 1.88) .03*
Dry mouth/ Thirst			1.55 (1.01, 2.36) .043*	
Confusion/ Distress	2.95 (1.62, 5.38) .0004*	3.16 (1.92, 5.20) <.0001*	2.17 (1.38, 3.40) .001*	1.75 (1.29, 2.37) .0003*
GI		1.63 (1.05, 2.51) .029*	1.55 (1.02, 2.35) .04*	
Anxiety/ Insominia	2.02 (1.17, 3.49) .012*	2.28 (1.44, 3.62) .0004*	1.96 (1.26, 3.02) .003*	

Table 5

Demographics by Substance Use

Characteristic		Alcohol 8.5% (n=66/775)		Illicit drugs 12.6% (n=98/775)		Marijuana 14.3% (n=111/775)		Tobacco 45.8% (n=355/775)	
		Use N=66	Not user n=709	Use N=98	Not user n=677	Use N=111	Not user n=664	Use N=355	Not user n=420
Age	Mean	42.8	42.7	43.3	42.8	43.1	42.8	42.9	42.8
	p-value	.87		.57		.68		.83	
		(%) Use	P value	(%) Use	P value	(%) Use	P value	(%) Use	P value
Gender	Female n=313	8.0	.66	9.0	.01	9.3	.0009*	38.7	.001*
	Male n=462	8.9		15.2		17.8		50.7	
Race	White n=165	9.1	.11	13.3	.95	20.6	.003*	52.1	.12*
	Black n=337	6.2		12.5		9.8		42.4	
	Other n=273	11.0		12.5		16.1		46.2	
Education	< High School graduation n=226	8.0	.72	13.3	.73	9.3	.01*	44.7	.69
	High School graduation + n=549	8.7		12.4		16.4		46.3	
Income	Inadequate or barely adequate n=609	9.2	.19	13.1	.43	14.5	.84	44.8	.29
	Enough n=166	6.0		10.8		13.9		49.4	
	N=473	8.9		11.6		13.1		43.6	
Symptom Burden	Mean Symptoms: user	9.0	.001*	9.1	.0001*	8.3	.004*	7.6	.001*
	Mean Symptoms: non-user	6.6		6.5		6.5		6.1	

*
Race p-value reflects the 2 df test for General Association