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ALCOHOL CONSUMPTION PATTERNS IN HIV-INFECTED ADULTS WITH ALCOHOL PROBLEMS

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Abstract

Objective—To understand patterns of alcohol consumption and baseline factors associated with favorable drinking patterns among HIV-infected patients.

Methods—We studied drinking patterns among HIV-infected patients with current or past alcohol problems. We assessed drinking status in 6 month intervals. Based on National Institute on Alcohol Abuse and Alcoholism guidelines a favorable drinking pattern was defined as not drinking risky amounts at each assessment or decreased drinking over time. All other patterns were defined as unfavorable. Logistic regression models were used to identify baseline factors associated with a favorable pattern.

Results—Among 358 subjects, 54% had a favorable drinking pattern with 44% not drinking risky amounts at every assessment, and 11% decreasing consumption over time. Of the 46% with an unfavorable pattern, 4% drank risky amounts each time, 5% increased, and 37% both decreased and increased consumption over time. Current alcohol dependence and recent marijuana use were negatively associated with a favorable pattern, while older age and female gender, and having a primary HIV risk factor of injection drug use were positively associated with a favorable pattern.

Conclusion—Many HIV-infected adults with alcohol problems have favorable drinking patterns over time, and alcohol consumption patterns are not necessarily constant. Identifying HIV-infected adults with a pattern of risky drinking may require repeated assessments of alcohol consumption.

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Keywords

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1. INTRODUCTION

Alcohol use is common among human immunodeficiency virus (HIV)-infected adults and has negative health consequences. Over a third of HIV-infected veterans drink amounts associated with health consequences (Samet et al., 2007). In another study, almost half of HIV-infected patients initiating primary care reported a high probability of having an alcohol use disorder (had two of more positive answers to the CAGE screening tool) (Mayfield et al., 1974; Samet et al., 2004b). Unhealthy alcohol use (the spectrum from drinking risky amounts through alcohol dependence) is more prevalent among HIV-infected patients than it is in the general population (Lefevre et al., 1995; Conigliaro et al., 2003; Samet et al., 2004b; Chander et al., 2006). Drug and unhealthy alcohol use have been linked to HIV-disease progression, HIV risk behaviors, and decreased adherence to antiretroviral therapy (Samet et al., 2007; Samet et al., 2007). In adults with alcohol use disorders, social and personal factors (e.g., male gender, major depression, heroin use, cocaine use, divorce, and less education) have been linked to a worse prognosis (Moss et al., 2007). The environment has an impact on the course of drinking too (e.g., social pressure to drink has been linked with relapse among individuals with alcohol dependence) (Zywiak et al., 2006a; Zywiak et al., 2006b).

There is sufficient evidence to date (though not specifically among those with HIV infection) to conclude that brief counseling in the primary care setting for nondependent unhealthy alcohol use can lead to a decrease in drinking (Bertholet et al., 2005; Kaner et al., 2007), including among injection drug users (Stein et al., 2002). Nevertheless, alcohol use disorders are often chronic conditions characterized by recurrent episodes, and few prospective studies have explored alcohol consumption over time. Since the treatment of HIV infection requires longitudinal care, it gives clinicians repeated opportunities to address alcohol use. A greater understanding of consumption over time in HIV-infected individuals with alcohol use disorders could help clinicians and researchers better address these problems. Therefore, in a prospective cohort of HIV-infected adults with current or past alcohol problems (HIV-Longitudinal Interrelationships of Viruses and Ethanol [HIV-LIVE]), we studied patterns of alcohol consumption and factors associated with those patterns.

2. METHODS

Participants were recruited between August 2001 and July 2003 with follow-up every 6 months through 2005. Recruitment occurred from a previous cohort study (HIV-Alcohol Longitudinal Cohort), an intake clinic for HIV-infected patients, HIV primary care and specialty clinics, a homeless respite facility, a methadone program, study flyers, and referrals from physicians, other participants and social service agencies (Samet et al., 2004a). Individuals were eligible if they had a documented HIV antibody test by ELISA (confirmed by Western blot) and ≥2 positive answers to the CAGE alcohol screening questionnaire (Mayfield et al., 1974) or an alcohol use disorder diagnosis (lifetime) by a study physician clinical assessment. Participants were fluent in either English or Spanish. Exclusion criteria were cognitive impairment (score of <21 on the Mini-Mental State Examination) and inability to provide informed consent (Folstein et al., 1975; Smith et al., 2006). The study was approved by the Institutional Review Boards of Boston Medical Center and Beth Israel Deaconess Medical Center. Study participants who attended the baseline assessment and at least 2 follow up visits (total of 3 or more assessments) were included in this analytic sample.

2.1 Outcome

The primary outcome of this study was having a favorable drinking pattern over time. At baseline and at each follow up visit, alcohol consumption was assessed using a validated calendar method (30-day Timeline FollowBack) (Sobell and Sobell, 1995). Participants were classified at each assessment as abstinent, drinking below or drinking above risky amounts (as defined by the National Institute on Alcohol Abuse and Alcoholism [≥5 drinks/occasion or >14 drinks/week for men; 4 or 7 drinks, respectively, for women and persons aged 65 and over]). Longitudinal drinking patterns were summarized as *favorable* or *unfavorable. A Favorable* drinking pattern was defined as not drinking risky amounts at every observed study visit (i.e., abstinent or consistently drinking below risky amounts) or a decrease in the observed drinking over time (e.g., from risky to not risky) with no observed increases. All other drinking patterns were defined as *unfavorable* (i.e. consistently drinking risky amounts, increase in drinking from not risky to risky amounts, or intermittent risky drinking).

In addition, since it is uncertain whether risky amounts as defined in the general population are appropriate definitions for HIV-infected adults, we evaluated the secondary outcome *continuous abstinence*, defined as reporting abstinence at every study visit.

2.2 Factors Associated with Drinking Patterns

Factors of interest and potential confounders of these associations were assessed at baseline (defined *a priori* based on published literature and clinical experience). Marital status, homelessness (Kertesz et al., 2003), age, gender, race/ethnicity, primary HIV risk factor at the time of infection (injection drug use; men sex with men; heterosexual sex), recent heroin, cocaine and marijuana use (past 12 months), any attendance at Alcoholics Anonymous (AA) meetings (past 6 months), and whether or not the individual spent time with people who drink alcohol (a measure of social pressure to drink) were self-reported. Health-related quality of life was summarized using the Mental Component Summary (MCS) and Physical Component Summary (PCS) scores of the 12-item Short-Form Health Survey (Delate and Coons, 2000). Past 6 month and lifetime diagnosis of alcohol dependence were assessed using the the Composite International Diagnostic Interview (World Health Organization, 1996).

We hypothesized that marital status, homelessness, AA attendance, and lack of social pressure to drink would be associated with more favorable drinking pattern; worse health-related quality of life and recent drug use would be associated with an unfavorable pattern. Other variables were considered potential confounders.

2.3 Analysis

We determined the frequency and proportion of each drinking pattern based on the observed data for each person. Multiple logistic regression models were fit to identify baseline factors associated with a favorable alcohol consumption pattern across time. The models adjusted for all factors of interest and potential confounders, none of which were highly correlated (Spearman r>0.40). The Hosmer-Lemeshow test was used to assess model goodness-of-fit. All analyses were conducted using two-sided tests and a significance level of 0.05. Analyses were performed using SAS software (version 9.1; SAS Institute, Cary, NC).

3. RESULTS

Of the 400 participants in the HIV-LIVE prospective cohort study, 358 (90%) completed at least 3 study visits and were included in the present analyses. Median follow-up was 3.4 years. The baseline characteristics of the study sample are presented in Table 1. Over the course of follow up, 54.5% had a favorable drinking pattern with 43.9% consistently drinking below risky limits at every assessment (70.7% of the latter group abstained), and 10.6% decreasing

consumption over time. Of the 45.5% with an unfavorable drinking pattern, 3.6% drank risky amounts at each assessment, 4.7% increased their drinking to risky amounts and 37.2% had intermittent risky drinking.

In the logistic regression model (Table 2), among the factors of interest, recent marijuana use had a negative association with a favorable drinking pattern. Current alcohol dependence (past 6 months) was also negatively associated with an unfavorable pattern. Older age, female gender and having a primary HIV risk factor of injection drug use at the time of infection (compared to heterosexual sex) were associated with a favorable drinking pattern.

Older age and female gender were also associated with continuous abstinence while marijuana use, cocaine use, social pressure to drink and current alcohol dependence were negatively associated with continuous abstinence.

4. DISCUSSION

In a prospective cohort of HIV-infected adults with current or past alcohol problems, almost half of the subjects had an unfavorable drinking pattern over time, but most with an unfavorable pattern were not consistently drinking risky amounts; they varied their drinking between risky and less than risky amounts. Thus an unfavorable drinking pattern is not a fixed state. Most subjects with a favorable drinking pattern were consistently abstinent or consistently drinking less than risky amounts. Unlike the unfavorable drinking pattern, the favorable pattern appears to be far more stable, with consistent abstinence as the most common pattern over time.

Compared with other cohorts of subjects with alcohol use disorders, not specifically with HIV infection, the proportion of abstinent subjects among those with a favorable drinking pattern in this study (>70%) was higher. In general populations, people with alcohol dependence in recovery are evenly spread between abstinence and moderate drinking (Sobell et al., 1996; Dawson et al., 2005). Similar to non-HIV infected populations, our study found abstinence to be the most stable form of remission (Dawson et al., 2007).

Adjusting for the severity of alcohol problems, we identified various factors independently associated with drinking pattern. Our results add to the evidence linking marijuana use to unfavorable drinking outcomes (both primary and secondary outcomes). Adolescent marijuana use is associated with heavy drinking in adulthood (Merline et al., 2008). Marijuana use is also a risk factor for alcohol dependence (Sartor et al., 2007). Our finding is consistent with studies showing an association between marijuana use and hazardous drinking among people in emergency departments (Woolard et al., 2003). Our findings of associations between age and female gender and favorable drinking patterns are also consistent with the results of general population studies (Dawson et al., 2005). Injection drug use as a risk factor at the time of HIV infection was associated with a lower odds of an unfavorable alcohol consumption outcome. We included this factor as a covariate to control for HIV risk. It was not identified as a predictor of interest as we did not have a hypothesis about its specific impact and thus would caution against over interpretation.

The effects of homelessness, heroin use, cocaine use, social pressure to drink, and AA attendance on the primary outcome were not statistically significant in this cohort although we may have had limited power to detect these associations. Nevertheless, even in the case of limited power, these factors appear to have weaker associations compared to factors of similar prevalence that were associated with drinking patterns. Of note, social pressure to drink and cocaine use were negatively associated with continuous abstinence.

This study has limitations. First, even though the study was prospective and analyses were adjusted for potential confounders, associations may or may not be causal. Second, the cut offs

we used for risky drinking were defined for the general population and have not been specifically defined for HIV-infected patients. For a variety of reasons (e.g., susceptibility to hepatic toxicity, medication interactions, immunosuppression) it is likely that among HIV-infected patients, amounts of alcohol that risk health consequences may be lower than in the general population. As such, some participants classified in our study in the favorable drinking pattern group may have been at risk for harm from drinking. However, this misclassification is likely not a major issue in this analysis since most participants with favorable drinking were abstinent. In addition, findings for continuous abstinence were similar with marijuana use, age, gender, cocaine use and social pressure to drink associated with abstinence. Prior literature also suggests an impact of other drug use and environmental factors (e.g. social pressure to drink) on the course of alcohol use disorders (Zywiak et al., 2006a; Moss et al., 2007). Lastly, generalizability of our findings may not extend beyond urban U.S. HIV-infected populations of adults with alcohol problems.

This study also has notable strengths. The most important strength is that we were able to define drinking patterns that reflected changes in alcohol consumption over time, therefore providing a more accurate picture of the drinking patterns in this population compared to cross sectional studies. Since intermittent risky drinking is common, future research should focus on drinking and consequences over time in HIV-infected adults. To more accurately assess the impact of drinking on clinical outcomes, repeated assessments of drinking over time will be preferable to one time measures that are unable to capture temporal variability.

Our finding that half of the cohort had a favorable drinking pattern suggests that a favorable evolution of drinking amounts among HIV-infected patients with alcohol problems is common. Clinicians and patients alike should have reason for optimism. Patients should be supported in their efforts to reduce drinking, and success should be acknowledged when it occurs. Although larger studies may identify other factors associated with drinking patterns, those we identified make clinical sense and may be clinically useful for identifying and addressing risky drinking among HIV-infected patients with alcohol problems. Variations over time and the substantial risk of recurrent risky drinking suggest that repeated screening and brief intervention should be done for HIV-infected adults with past alcohol problems, even when patients have not recently exceeded safe drinking limits.

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Table 1

Baseline Characteristics of a Prospective Cohort of Adults with HIV-infection and Current or Past Alcohol Problems [n=358]

Age, mean (SD)	41.6 (7.4)
Female, n (%)	89 (24.9)
Race/ethnicity, n (%)	
Black	157 (43.9)
White	119 (33.2)
Latino	63 (17.6)
Other	19 (5.3)
Homelessness, n (%)	84 (23.5)
Currently married, n (%)	22 (6.1)
Mental Component Summary score (MCS), mean (SD)	39.8 (11.4)
Physical Component Summary score (PCS), mean (SD)	43.5 (9.8)
Recent drug use (past 12 months), n (%)	
Heroin use	88 (24.6)
Cocaine use	163 (45.5)
Marijuana use	133 (37.2)
Drinks per day, last 30 days, mean (SD)	1.8 (5.5)
Attended AA meeting, past 6 months, n (%)	203 (56.7)
Alcohol dependence diagnosis (current), n (%)	35 (9.8)
Alcohol abuse diagnosis (lifetime), n (%)	61 (17.0)
Alcohol dependence diagnosis (lifetime), n (%)	245 (68.4)
Baseline drinking status, n (%)	
At risk drinking	114 (31.8)
"Moderate" drinking	41 (11.5)
Abstinent	203 (56.7)
Spending time with people who drink alcohol (social pressure to drink alcohol), n (%)	219 (61.2)
Primary HIV risk factor, at the time of infection, n (%)	
Injection drug use	184 (51.5)
Men sex with men	82 (23.0)
Heterosexual sex	91 (25.5)

SD= standard deviation

Homelessness was defined as at least one night on the street or in a shelter in the past 6 months

AA=Alcoholics Anonymous

Alcohol consumption (drinks per day) was assessed using the Timeline Followback method

The presence of a current (past 6 months) alcohol dependence, and a lifetime diagnosis of alcohol abuse or dependence were assessed using the the Composite International Diagnostic Interview (CIDI) Risky drinking was defined as >14 drinks/wk or >=5drinks on an occasion for men, >7 drinks/wk or >=4 drinks on an occasion for women and persons >= age 65 years. Moderate drinking was defined as drinking alcohol but below risky drinking limits. A drink was defined as 12–14 grams of ethanol, as in the amount in the U.S. in one 12 ounce beer, one 5 ounce glass of wine, or 1.5 ounces of

80 proof liquor. Social pressure to drink alcohol: Subjects were asked how many of the people they spend time with currently drink alcohol (none, a few, about half, most, all). Answers were later dichotomized (none vs other)

Table 2

Baseline Factors Associated with a Favorable Drinking Pattern and Continuous Abstinence in Multivariable Logistic Regression Analyses among a Prospective Cohort of Adults with HIV-infection and Current or Past Alcohol Problems [n=358]

	Favorable drinking pattern Adjusted Odds Ratio (95% CI)	Continuous abstinence Adjusted Odds Ratio (95% CI)
Baseline Factors of interest		
Homelessness	0.72 (0.41, 1.28)	0.61 (0.31, 1.20)
Currently married	0.64 (0.24, 1.70)	0.68 (0.23, 2.03)
Mental Component Summary score (MCS), per 1 point increase	0.99 (0.97, 1.02))	0.98 (0.96, 1.00)
Physical Component Summary score (PCS), per 1 point increase	1.02 (0.99, 1.04)	1.02 (0.99, 1.04)
Recent heroin use (past 12 months)	1.35 (0.70, 2.61)	1.62 (0.76, 3.46)
Recent cocaine use (past 12 months)	0.86 (0.50, 1.47)	**0.39 (0.20, 0.74)**
Recent Marijuana use (past 12 months)	**0.52 (0.31, 0.87)**	**0.53 (0.29, 0.99)**
Attending AA meetings, past 6 months	1.37 (0.83, 2.28)	1.40 (0.79, 2.46)
Spending time with people who drink alcohol (social pressure to drink alcohol)	0.81 (0.49, 1.35)	**0.41 (0.24, 0.72)**
Confounders		
Age, per 1 year increase	**1.04 (1.00, 1.07)**	**1.04 (1.00, 1.08)**
Gender (Female)	**2.44 (1.33, 4.50)**	**3.44 (1.80, 6.59)**
Race/Ethnicity (reference group: Black)		
Hispanic	0.73 (0.37, 1.46)	0.74 (0.35, 1.59)
White	1.15 (0.66, 2.00)	1.12 (0.60, 2.07)
Other	0.68 (0.24, 1.93)	0.50 (0.14, 1.84)
Primary HIV risk factor, at the time of infection (reference group: heterosexual sex)		
Injection drug use	**2.01 (1.05, 3.87)**	2.05 (0.96, 4.36)
Men sex with men	1.81 (0.86, 3.80)	1.86 (0.75, 4.61)
Alcohol dependence diagnosis (current)	**0.38 (0.17, 0.88)**	**0.32 (0.11, 0.99)**

AOR: Adjusted Odds Ratio from multiple logistic regression analysis

Homelessness was defined as at least one night on the street or in a shelter in the past 6 months

The presence of a current (past 6 months) diagnosis of alcohol dependence was assessed using the the Composite International Diagnostic Interview (CIDI)

Social pressure to drink alcohol: Subjects were asked how many of the people they spend time with currently drink alcohol (none, a few, about half, most, all). Answers were later dichotomized (none vs other)

The Hosmer and Lemeshow Chi-square test for the multivariable model suggests satisfactory model fit (p=0.7 and p=0.9 for favorable drinking pattern and continuous abstinence, respectively).