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Factors associated with attendance in 12-step groups (Alcoholics Anonymous/Narcotics Anonymous) among adults with alcohol problems living with HIV/AIDS

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Abstract

Background—Despite the value of 12-step meetings, few studies have examined factors associated with attendance among those living with HIV/AIDS, such as the impact of HIV disease severity and demographics.

Objective—This study examines predisposing characteristics, enabling resources and need on attendance at Alcoholic Anonymous (AA) and Narcotics Anonymous (NA) meetings among those living with HIV/AIDS and alcohol problems.

Methods—Secondary analysis of prospective data from the HIV-Longitudinal Interrelationships of Viruses and Ethanol study, a cohort of 400 adults living with HIV/AIDS and alcohol problems. Factors associated with AA/NA attendance were identified using the Anderson model for vulnerable populations. Generalized estimating equation logistic regression models were fit to identify factors associated with self-reported AA/NA attendance.

Results—At study entry, subjects were 75% male, 12% met diagnostic criteria for alcohol dependence, 43% had drug dependence and 56% reported attending one or more AA/NA meetings

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(past six months). In the adjusted model, female gender negatively associated with attendance, as were social support systems that use alcohol and/or drugs, while presence of HCV antibody, drug dependence diagnosis, and homelessness associated with higher odds of attendance.

Conclusions—Non-substance abuse related barriers to AA/NA group attendance exist for those living with HIV/AIDS, including females and social support systems that use alcohol and/or drugs. Positive associations of homelessness, HCV infection and current drug dependence were identified. These findings provide implications for policy makers and treatment professionals who wish to encourage attendance at 12-step meetings for those living with HIV/AIDS and alcohol or other substance use problems.

Keywords

HIV-infection; alcohol addiction disorder; substance-related disorders; 12 step groups; HIV/AIDS

1. Introduction

Individuals living with the Human Immunodeficiency Virus or Acquired Immune Deficiency Syndrome (HIV/AIDS) are more likely to be diagnosed with alcohol and other drug (AOD) use disorders than those individuals within the general population (Bing et al., 2001; Galvan et al., 2002; Galvan et al., 2003; Rabkin et al., 1997; Rabkin et al., 2004). The impact of AOD use by those living with HIV/AIDS presents the potential for increased challenges upon the health care delivery system (Masson et al., 2004), the heightened likelihood of risky behavior potentially resulting in new HIV infections (Palepu et al., 2003), non-adherence with antiretroviral treatments (ART) (Hendershot et al., 2009; Samet et al., 2004; Conigliaro et al, 2004; Dausey and Desai, 2003; Lucas, et al., 2002), liver complications exacerbated by co-occurring alcohol and other drug use, HIV/AIDS medications, and the hepatitis C virus (HCV) (Lucas et al., 2002; Moore et al., 2004; Palepu et al., 2003; Petry, 1999; Samet et al., 2007). While Alcoholic Anonymous (AA) and Narcotics Anonymous (NA) groups have great potential for the mental and physical health of those living with HIV/AIDS, there are few studies examining factors associated with group meeting attendance.

AA/NA meetings are the most frequently utilized recovery resource for people with AOD related problems (Narrow et al., 1993; Weisner et al., 2002; Weisner and Schmidt, 2001) and more people with drinking disorders attend AA meetings than any other recovery resource (Weisner et al., 1995; Humphreys et al., 1998). As AA/NA groups are free and widely available, they are also associated with positive outcomes, making an independent contribution to the reduction of AOD use, higher levels of abstinence and reduced levels of drinking, lower levels of incarceration, greater psychological adjustment, and lower overall treatment cost (Watson et al., 1997; Timko et al., 2000; Fiorentine and Hillhouse, 2000; Humphreys and Moos, 2001; Kaskutas et al. 2002; Kissin et al., 2003; McCrady and Share, 2003). AA/NA groups may occur in conjunction with formal systems of treatment or mandated requirements by the court system (Speiglman, 1994; Wild et al., 2002). For many, attendance is life long (Fiorentine and Hillhouse, 2000). Over the past decade, research on the process of change and outcomes associated with mutual help groups such as AA/NA supports their significance as a resource for recovery, providing guidelines for living, increasing social support networks and linkage to ongoing care (McCrady and Share, 2003).

Meta-analyses or reviews of multiple studies (Emrick et al., 1993; Tonigan et al., 1996; Bogenschultz, 2008) have reported on sociodemographic factors (e.g., spirituality, race, gender) associated with AA/NA participation. Attendance is more common among racial and ethnic minority groups, those with lower incomes, and those with unstable employment,

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suggesting that economic barriers may preclude formal treatment in favor of AA/NA attendance (Humphreys et al., 1998; Kaskutas et al., 1999). Prior formal substance abuse treatment is positively associated with AA/NA attendance, likely due to exposure to these groups (Humphreys et al., 1998; McCrady and Share, 2003).

Few studies of the factors associated with attendance among those living with HIV/AIDS have been published. An early paper addressed the impact of self help on HIV risk reduction, finding that in a sample of injection drug users, those who attended self help were almost twice as likely to reduce or eliminate the risk of HIV than those who did not attend (Sibthorpe, Fleming, and Gould, 1994). This study demonstrates that those attending self-help are amenable to HIV risk reduction interventions and the important role self-help can play in reducing risk. Among those living with HIV/AIDS, Burnam, et al. (2001) examined the factors associated with AA/NA attendance in the HIV Cost and Services Utilization Study (HCSUS), a national probability survey of 2,864 adults living with HIV/AIDS and receiving medical care in the United States in 1996. Controlling for need, African Americans were more likely than Whites to attend AA/NA group meetings, as were those in larger metropolitan areas and those in the Northeast, although sex, age, employment, income, and insurance were not associated with attendance. HIV clinical stage and symptom burden were not associated with attendance but lower CD4 cell count was positively associated with attendance.

This study advances previous research by examining factors associated with attendance at AA/NA group meetings among people living with HIV/AIDS in the era of antiretroviral treatments. In addition, the data set provides the opportunity to explore the impact of other factors, such as social supports, co-occurring depression, and, of particular interest, hepatitis C in a cohort with current or past alcohol problems.

2. Methods

We analyzed data collected for the HIV-Longitudinal Interrelationships of Viruses and Ethanol (HIV-LIVE) study, a prospective cohort study of 400 adults living with HIV/AIDS and alcohol problems. Eligibility criteria for this study included documentation of HIV infection, current or past alcohol problems defined as two or more positive responses to the CAGE (Cut down, Annoyed, Guilty, and Eye opener) alcohol screening questionnaire (Ewing, 1984; Samet et al., 2004) or an alcohol use disorder as assessed by a physician investigator, the ability to speak English or Spanish, a score of 21 or greater on the Mini Mental State Examination (Folstein et al., 1975; Smith et al., 2006) and plans to reside in the area for at least one year. The current analysis included subjects with two or more study interviews. All subjects provided written informed consent and were 18 years of age or older. A certificate of confidentiality was provided by NIAAA as an additional protection of subject confidentiality.

Recruitment of subjects for this study (n = 400) came from two urban hospital-based outpatient practices (30%) in Boston, MA as well as by referral of Boston Medical Center's (BMC) practicing physicians, flyers posted in the community, medical clinics, and addiction treatment facilities (32%). Approximately 38% of participants were recruited from previous observational studies conducted by the investigators (Samet et al., 2007). After obtaining informed consent, subjects enrolled during the period August 2001 until July 2003. Baseline data were collected, and every 6 months thereafter, up to 42 months ending in March 2006. In addition to demographics, interviewers assessed current and past alcohol/drug use and problems, health care utilization, indicators of HIV disease severity, and AA/NA attendance.

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2.1 Dependent Variables

The main dependent variable was at least one contact with AA/NA in the previous six months. Subjects were asked the following: “During the past 6 months, did you attend AA or NA meetings?” Secondly, subjects were asked: “How often did you generally attend?” This was followed by prompts for daily, several times a week, weekly, every two weeks, monthly, less than once a month, or other. The second dependent variable was at least weekly attendance over the previous six months, which may approximate a higher level of engagement in self help. In the absence of clear and consistent guidelines for people with substance use disorders generally, we make this approximation.

2.2 Independent variables

were selected using the Andersen Behavioral Model for Vulnerable Populations (Andersen, 1995; Weisner et al., 2002). This model is commonly used in studies to understand utilization of health care by examining three individual level domains: those factors that predispose people to utilize care (e.g., demographics), factors that enable use (e.g., ability to pay), and factors associated with need for the specific service (Andersen, 1995). The comprehensive database allowed for the exploration of other factors, which have yet to be reported on in the literature (e.g., HCV antibody status and social supports).

2.3 Predisposing variables

included age (dichotomized at the median, 44.5), sex, race (Black, White or other), marital status (married, single, or partnered but not married), sexual orientation (gay, bisexual, other vs. heterosexual), education level (high school graduate), living alone, born in the USA, sexual or physical abuse or trauma, and literacy level (a score of >60 on the Rapid Estimate of Adult Literacy in Medicine (REALM), indicating literacy at the high school level) (Davis et al., 1991). Sexual or physical abuse or trauma is considered a predisposing variable to remain consistent with previous literature (Burnam et al., 2001) and since it is not an enabling or need/severity factor when examining utilization of 12-step groups as an outcome. HIV/AIDS disease severity was assessed using CD4 cell count (dichotomized at the median), the presence of opportunistic infections or cancers, and an HIV-Symptom Index score, which is a measure of how often and how bothersome a person experiences 20 common HIV symptoms (Justice, et al., 2001; Kilbourne, et al., 2002) and the presence or absence of the hepatitis C Virus (HCV) antibody (testing was done at the first opportunity if results of testing for clinical purposes were not available).

2.4 Enabling resources

included employment status, receipt of government disability income, homelessness (spending one or more nights “on the street, without shelter” in the past 6 months), and whether or not the subject lived with children. Social support for substance abuse was assessed by asking subjects “how many of the people you spend time with” followed by three prompts “currently drink alcohol,” “are currently heavy or problem drinkers,” and “currently use drugs.” To assess social support for sobriety, subjects were asked, “How many of the people that you spend time with support your sobriety or abstinence?” The use of HIV antiretroviral medications was assessed by asking respondents if they were taking any of a list of all available specific medications over the previous six months, using photographic prompts, generic and brand names.

2.5 Need

for AA/NA variables included alcohol dependence in the past six months assessed using the Composite International Diagnostic Interview Short Form (CIDI-SF) (Kessler et al., 1998) and a diagnosis of drug dependence in the previous six months. Depressive symptoms were

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assessed using the Center for Epidemiologic Studies Depression scale (CES-D) (Radloff, 1977; Andresen et al., 1994) and a dichotomous variable was constructed based on a cutoff of 16 or greater. This cutoff has been shown to indicate clinically important depressive symptoms in the general population (Eaton and Kessler, 1981; Weissman et al., 1977). Involvement in the criminal justice system was measured by asking respondents if they were in jail during the previous six months.

3. Analysis

To explore the relationship between the various selected factors and AA/NA group attendance, multivariable analysis was conducted using generalized estimating equations (GEE) (Zeger and Liang, 1986; Liang and Zeger, 1986). This approach was chosen to account for correlation in the data due to incorporating repeated measures from the same subject. Models were fit using a logit link, an exchangeable working correlation structure, and the empirical variance estimator was used in all analyses. An advantage of the GEE approach is that the results are robust, i.e. valid estimates can be obtained from the empirical variance estimator even if the correlation structure is misspecified. In addition, the GEE approach is flexible and can accommodate settings where subjects have varying numbers of follow-up assessments. Independent variables were allowed to vary with time as appropriate and, to assess for potential collinearity, we verified that no pairs of independent variables were highly correlated (> 0.40). Preliminary crude analyses were performed that included only a single independent variable. A full multivariable model was then fit including all independent variables in the same model. To ensure that time varying independent variables preceded the episode of attendance, independent variables were “lagged” to predict report of AA/NA meeting attendance at the subsequent interview. If a participant missed a scheduled follow-up interview, then the outcome at the next available interview was used. We therefore also adjusted for duration of time between assessment of independent variables and outcomes. Similar analyses were used to evaluate the secondary outcome, “weekly or more frequent AA/NA attendance.” Analyses were conducted using two-sided tests and a significance level of 0.05. Due to the exploratory nature of the analyses we did not adjust for multiple comparisons. All analyses were conducted using SAS version 9.0 (SAS Institute, Inc., Cary, NC).

4. Results

4.1 Sample Characteristics

The study sample was comprised of 369 subjects who completed at least two research interviews. Of the initial 369 subjects, 91% completed three interviews, 82% (four interviews), 66% (five interviews), 63% (six interviews), 44% (seven interviews), and 6% completed an eighth interview. A majority of the sample was male, average age was 42.7 years, and was racially diverse (42.8% Black, 32.5% White, 24.7% Other) (Table 1). A majority had experienced sexual or physical abuse or trauma (80.4%), and about a third were gay, bisexual, or “some other” sexual orientation. As for HIV status, a minority had opportunitistic conditions, CD4 count averaged 462 cells/mm^3 and over half had a positive hepatitis C antibody test (58%). A majority of the sample studied reported spending time with people who use alcohol and who are supportive of their sobriety (61.7%) while less than half spent time with people who use drugs (47.3%). As for need variables, 12% met the criteria for a current (past 6-month) alcohol use disorder diagnosis, while almost half met the criteria for a current (past 6-month) drug dependence diagnosis (43.1%). At study entry, 58% had attended AA or NA group meetings during the six months prior, 50% of those in the third interview had attended, 48% in the fourth, 51% in the fifth, and 43% in the sixth, 48% in the seventh, and 67% in the eighth interview.

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4.2 Predictors of AA/NA Attendance

The unadjusted and full model are displayed in Table 2. In the unadjusted model (Table 2), living alone, being gay, bisexual, or a sexual orientation other than heterosexual, and alcohol or drug use by social supports had a significant negative association with attendance at AA/NA groups, while social support for sobriety, sexual or physical abuse or trauma, and homelessness in the past six months were positively associated with attendance. Need variables associated with greater odds of attendance were having a current drug dependence diagnosis, depressive symptoms, and having been in jail in the past 6 months.

In the adjusted model, being female was associated with lower odds of attendance, as was a social support system that used alcohol and/or drugs. The presence of HCV antibody and homelessness in the previous 6 months were associated with higher odds of attendance at an AA/NA group, as was having a drug dependence diagnosis.

When the dependent variable was defined as AA/NA attendance weekly or more often (Table 3), few differences emerged in the multivariable model except for minor changes in magnitude and significance of odds ratios. Being female and social supports using alcohol or drugs were still associated with lower odds of AA/NA attendance, while the presence of hepatitis C antibody and meeting the criteria for drug dependence were associated with an increased odds. The association between homelessness and AA/NA attendance was attenuated and no longer statistically significant.

5. Discussion

AA/NA group attendance by those living with HIV/AIDS and alcohol problems is impacted by a variety of factors. Factors that facilitate AA/NA group meeting attendance include a drug dependence diagnosis, homelessness, and the presence of HCV antibody. The odds of attendance were lower for subjects who were female or had social supports that use alcohol or other drugs. When AA/NA was defined as weekly or more frequent attendance, results were similar except the effect of homelessness was no longer statistically significant.

This study underscores the unique differences with regard to attendance in AA/NA groups by those living with HIV/AIDS. While Burnam et al., (2001) did not find significance for demographics including certain geographic locations, sex, age, employment, income, and insurance status, this study revealed the relevance of gender, social supports, homelessness, a drug dependence diagnosis and presence of the HCV antibody with regard to a greater likelihood of attendance or non-attendance of AA/NA groups.

Female gender was negatively associated with attendance in AA/NA, and the negative association between gender and AA/NA group attendance found in this study is **not necessarily** congruent with much of the literature. Some population studies show that women are more likely to drop out of AA/NA (Humphreys et al., 1994) and may not participate for reasons related to program structure, challenges related to lack childcare or if they sense AA/NA is punitive and male dominated (Kaskutas, 1994). Other studies demonstrate that while women may drop out of 12 step attendance more than men after 12 months of treatment (Humphreys et al., 1991), they were more likely to attend in the first place (Humphreys et al., 1994). However, in those studies, after the initial dropout period, women were found to attend as regularly as men (Humphreys et al., 1994). Additionally gender and other sociodemographic variables have not been reliably found to be strongly associated with 12-step attendance in prior studies among general groups of substance abusers (Bogenschultz, 2008; Emrick et al., 1993; Tonigan et al., 1996) or among HIV+ substance users (Burnam et al., 2001).

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Social supports currently using alcohol or other drugs were negatively associated with AA/NA group attendance. These findings are consistent with general population studies (Hasin and Grant, 1995; Kaskutas et al., 2002; Witbrodt and Kaskutas, 2005; Moos and Moos, 2006; Kaskutas et al., 2009) related to the negative impact of social supports using alcohol and other drugs on the attendance of those attending AA/NA. This study affirms the negative impact of social supports using alcohol and other drugs on those living with HIV/AIDS who likely would attend AA/NA groups.

There is also a strong and positive independent association with co-occurring hepatitis C, which may be the result of a multi-faceted approach to treatment that coordinates efforts and systematically integrates care. Attendance may also be motivated in an effort to abstain from alcohol or other drugs as it may further complicate their existing health conditions such as hepatitis C. The increased likelihood of AA/NA group attendance among those with co-occurring hepatitis C has implications for clinical practice and policy and is important that both medical and addiction treatment staff clearly understand HIV disease progression and a co-occurring diagnosis of hepatitis C.

On the system level, it would be useful to research the specific mechanisms that facilitate greater attendance of AA/NA groups. The strong and positive association of homelessness and attendance at AA/NA groups, may be due to placement of homeless individuals using substances into detoxification programs or residential services with programmatic requirements as a condition of entry or continuation in the shelters (Kertesz, et al., 2006). Such implications may include exploration of expansion of social networks for the homeless or holding AA/NA groups at convenient locations such as a shelter. Homeless and other low-income persons may be more likely than middle or high income persons to participate in cost-free services for several reasons (e.g., lack of access to other services).

There was also a positive association of those with a drug dependence diagnosis and increased attendance of AA/NA groups while findings were not as significant for those with an alcohol diagnosis or depressive symptoms. This finding, while consistent with other studies (Kaskutas et al., 2009) is curious, and may be related to the fact in addition to seeking specific care such as pharmacotherapy or detoxification, that those with a drug dependence diagnosis are more likely to seek attendance and maintain additional support during and after treatment through AA/NA groups (Timko et al., 2006).

This study offers insight with regard to the factors that may lead to AA/NA group attendance among those living with HIV/AIDS, particularly complementing the literature for those with long-term alcohol and substance use disorders. An additional strength of this study is that the data are quite detailed, which allows for the further examination of the negative impact of social supports that use alcohol or drugs, the role of gender, homelessness, a drug dependence diagnosis, and co-occurring hepatitis C status on AA/NA group attendance. However, limitations of the study are also worth noting. First, the analysis could be strengthened by considering contextual and ecological factors that play a role in participation in AA/NA for those living with HIV/AID, such as the availability of meetings as well as the degree to which the values of the individual are congruent with those manifest in the meetings (Mankowski, Humphreys, & Moos, 2001). Such variables, however, were not available in our data so these analyses were not performed. Second, generalizability of results is limited since data used for this study **were** collected on people living with HIV/AIDS and alcohol problems in the Boston area. The findings are likely applicable to people with HIV/AIDS in similar urban locations. In addition, the observed associations while informative may not be causal.

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Reliance on self-reported data is another limitation of this study, which may lead to measurement bias, in that subjects may not accurately report specific behaviors or AA/NA group attendance. Studies do show that self-report is consistent when respondents are asked about service utilization, but may be less reliable when assessing quantity of services (Goldberg et al., 2002). Bias in self-report may have been attenuated in this study by use of validated interview questions as well as the minimization of contextual factors that may influence the possibility of biased self report (Del Boca and Darkes, 2003), along with trained research assistants who emphasized confidentiality and took a systematic approach to interviewing, and a certificate of confidentiality provided by NIAAA as an additional protection of subject privacy.

Despite these limitations, this study offers valuable insight into the factors leading to attendance of AA/NA groups among a cohort of people living with HIV/AIDS. Results have relevance for administrators, clinicians and direct service providers working within the realms of HIV/AIDS, alcohol and other drug treatment, and AA/NA groups. Few data are available about this hard to reach population and AA/NA group attendance. This study has examined these questions using a rich data set that includes detailed predisposing, enabling, and need variables and has made use of clinical data.

This study examined the individual level factors associated with AA/NA group attendance among a cohort of adults living with HIV/AIDS. Of particular interest are variables that are barriers to AA/NA group attendance, such as gender and social supports' use alcohol and drugs. A strong positive association of other variables, such as a drug dependence diagnosis, co-occurring hepatitis C and homelessness indicates the possibility that current policies and practices by medical professionals or amongst service providers are encouraging AA/NA group attendance. Alternatively, the medical challenge of a hepatitis C diagnosis may be a motivator to seek care in the form of AA/NA for one's addiction. Understanding the factors that facilitate or impede AA/NA group attendance may improve the development of strategies to increase attendance, service delivery, referral and care, which is of critical importance for most vulnerable populations.

More research concerning barriers for women and AA/NA attendance is worthwhile since AA/NA is valuable for women in maintaining their sobriety (Beckman, 1993) for many of the same reasons men find AA/NA useful, such as fellowship, group support, and guidance (Kaskutas, 1994). Strategies to increase attendance of women in self help programs may include: increased referrals by medical practitioners to specialty treatment, self help programmatic support to meet the needs of subgroups of women who may have child care challenges or would benefit from meetings for women only, encouragement of female mentorship and/or sponsorship early in the self help process, while paying particular attention to other forms of self-help in the community that may assist in maintaining sobriety. This important issue warrants further exploration, especially in light of the increasing prevalence of HIV/AIDS among ethnic and racial minorities, and most notably women (Orwat, 2004).

There are several potential solutions to increase access and attendance among the specific populations identified with AA/NA groups. Much of this will certainly depend upon the role of medical, mental health and addiction professionals' successful ability to assess needs and link individuals into the appropriate group. However, additional factors must be considered with regard to the elimination of barriers, such as how to work with individuals that have social supports that are using alcohol or other drugs and creating barriers to access and attendance of supportive services such as AA/NA groups.

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Table 1

Baseline Characteristics of Subjects Recruited for HIV-LIVE Study

	Variable	Study Sample (n=369)
Predisposing Characteristics	Age, years, Mean (SD)	42.7 (7.5)
	Sex (female)	24.9%
	Race (White)	32.5%
	Race (Black)	42.8%
	Race (Other)	24.7%
	Married	6.7%
	High school graduate [a]	65.0%
	Lives alone	28.7%
	Born in the USA	87.5%
	Literacy, High school level [b]	63.7%
	Gay, Bisexual, Other Sexual Orientation	32.8%
	Any traumatic abuse, ever [c]	80.4%
	HIV Disease Severity Variables	
	Any opportunistic conditions [d]	16.6%
	HIV Quality of Life Scale, Mean (SD) [e]	9.6 (4.9)
	CD4 Count (cells/mm3), Mean (SD)	462.1 (299.4)
	HCV antibody present	58.0%
Enabling Resources	Employment status (unemployed) [d]	73.4%
	Social support uses alcohol or drugs	
	Social support drinks alcohol	61.7%
	Social support uses drugs	47.3%
	Social support helps with sobriety	88.8%
	Currently taking anti-HIV medications	63.7%
	Received disability [d]	73.4%
	Homeless [d]	24.1%
Need/Severity Domain	Alcohol Diagnosis [d], [f]	11.8%
	Drug dependence diagnosis [d]	43.1%
	Depressive symptoms [g]	62.3%
	In jail [d]	18.2%

[a] High school graduate (12 or more years of education).

[b] Literacy score > 60 (Davis et al., 1991).

[c] History of sexual or physical trauma or abuse.

[d] In the past 6 months.

[e] Justice et al. 2001, Kilbourne et al., 2002

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[f] Alcohol diagnosis assessed using Composite International Diagnostic Interview Short Form (CIDI-SF) (Kessler et al., 1998).

[g] Measure of depressive symptoms where a CESD score ≥16 indicates substantial depressive symptoms.

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Table 2

Factors Associated with any AA/NA Meeting Attendance [¥]

		Crude Model	Full Model
	Variable	**Odds Ratio (95% CI)**	**Adjusted Odds Ratio (95% CI)**
Predisposing Characteristics	Age ([a])	1.06 (0.86, 1.32)	1 (0.97, 1.03)
	Sex (female)	0.78 (0.60, 1.01)	**0.55 (0.34, 0.90)** *
	Race (Black) vs. White	1.16 (0.90, 1.48)	1.36 (0.83, 2.21)
	(Other) vs. White	1.17 (0.87, 1.58)	1.01 (0.53, 1.91)
	Marital Status		
	Married vs. Single	0.76 (0.49, 1.19)	0.96 (0.56, 1.66)
	Partnered, not married vs. Single	0.90 (0.72, 1.12)	0.95 (0.73, 1.25)
	High school graduate ([b])	0.88 (0.70, 1.10)	1.09 (0.70, 1.67)
	Lives alone	**0.66 (0.53, 0.83)** ***	0.98 (0.75, 1.28)
	Born in the USA	0.94 (0.67, 1.32)	0.82 (0.39, 1.72)
	Literacy at high school level ([c])	1.01 (0.80, 1.28)	1.28 (0.82, 2.00)
	Gay, Bisexual, Other Sexual Orientation vs. Heterosexual	**0.52 (0.41, 0.66)** ***	0.64 (0.40, 1.01)
	Any traumatic abuse, ever ([d])	**1.40 (1.06, 1.84)** *	1.66 (0.97, 2.84)
	HIV Disease Severity Variables		
	Any opportunistic conditions ([e])	1.04 (0.79, 1.35)	0.76 (0.56, 1.05)
	HIV Qual.of Life Scale ([f])	**1.47 (1.18, 1.84)** ***	1.03 (0.99, 1.07)
	CD4 Count ([g])	0.99 (0.79, 1.23)	1.02 (0.97, 1.08)
	HCV antibody present	**1.88 (1.50, 2.35)** ***	**2.27 (1.44, 3.58)** ***
Enabling Resources	Unemployed ([e])	1.13 (0.88, 1.44)	0.94 (0.68, 1.31)
	Social support uses alcohol or drugs	**0.47 (0.37, 0.61)** ***	**0.59 (0.44, 0.78)** ***
	Social support helps w/sobriety	**2.09 (1.46, 3.00)** ***	1.03 (0.73, 1.45)
	Lives without children	1.25 (0.85, 1.84)	1.06 (0.70, 1.62)
	Currently taking anti-HIV medications	0.90 (0.72, 1.13)	1.03 (0.77, 1.39)
	Received disability ([e])	1.07 (0.81, 1.40)	0.67 (0.44, 1.01)
	Homeless ([e])	**2.70 (2.01, 3.64)** ***	**1.64 (1.16, 2.33)** **
Need/ Severity	Alcohol Diagnosis ([e]), ([h])	1.19 (0.85, 1.66)	0.96 (0.56, 1.66)
	Drug dependence diagnosis	**1.72 (1.35, 2.19)** ***	**1.37 (1.05, 1.79)** *
	Depressive symptoms ([i])	**1.44 (1.15, 1.79)** **	1.04 (0.80, 1.35)
	In jail ([e])	**2.87 (1.98, 4.17)** ***	1.15 (0.73, 1.80)

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*p<05

**p<.01

***p<.001

¥Analyses based on 369 subjects and 1,151 observations.

[a]Age is a dichotomous variable at median (44.5 years).

[b]High school graduate is 12 or more years of education)

[c]Literacy score > 60 (Davis et al., 1991).

[d]History of sexual or physical trauma or abuse.

[e]Past 6 months.

[f]Justice et al. 2001, Kilbourne et al., 2002

[g]CD4 count a dichotomous variable at median.

[h]Alcohol diagnosis using Composite International Diagnostic Interview Short Form (CIDI-SF) (Kessler et al., 1998).

[i]Measure of depressive symptoms where a CESD score ≥16 indicates substantial depressive symptoms.

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Table 3

Factors Associated with AA/NA Attendance Weekly or More Often [¥]

	Variable	Adjusted Odds Ratio (95% CI)
Predisposing Characteristics	Age *(a)*	1.01 (0.98, 1.04)
	Sex (female)	**0.53 (0.32, 0.89)** *
	Race (Black) vs. White	1.21 (0.74, 1.96)
	(Other) vs. White	0.95 (0.52, 1.75)
	Marital Status (Married vs. Single)	0.60 (0.30, 1.19)
	(Partnered, not married vs. Single)	0.88 (0.67, 1.17)
	High school graduate *(b)*	0.80 (0.52, 1.23)
	Lives alone	0.93 (0.69, 1.25)
	Born in the USA	0.85 (0.42, 1.71)
	Literacy, High school level *(c)*	1.35 (0.86, 2.12)
	Gay, Bisexual, Other Sexual Orientation vs. Heterosexual	0.80 (0.51, 1.27)
	Any traumatic abuse, ever *(d)*	1.26 (0.74, 2.14)
	HIV DISEASE SEVERITY VARIABLES	
	Any opportunistic conditions *(e)*	0.75 (0.55, 1.02)
	HIV Quality of Life Scale *(f)*	1.01 (0.98, 1.04)
	CD4 Count *(g)*	0.99 (0.94, 1.05)
	HCV antibody present	**2.05 (1.31, 3.20)** **
Enabling Resources	Unemployed *(e)*	0.80 (0.58, 1.09)
	Social support uses alcohol or drugs	**0.56 (0.42, 0.74)** ***
	Social support helps with sobriety	1.03 (0.71, 1.50)
	Lives without children	1.22 (0.70, 2.11)
	Currently taking anti-HIV medications	1.03 (0.75, 1.41)
	Received disability *(e)*	0.73 (0.47, 1.13)
	Homeless *(e)*	1.33 (0.94, 1.87)
Need/Severity	Alcohol Diagnosis *(e), (h)*	0.99 (0.57, 1.75)
	Drug dependence diagnosis	**1.63 (1.22, 2.18)** **
	Depressive symptoms *(i)*	0.94 (0.71, 1.24)
	In jail *(e)*	1.48 (0.94, 2.35)

* p<.05

** p<.01

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*** p<.001

¥ Analyses based on 369 subjects and 1,151 observations.

(a) Age is a dichotomous variable at median (44.5 years).

(b) High school graduate (12 or more years of education).

(c) Literacy score > 60 (Davis et al., 1991).

(d) History of sexual or physical trauma or abuse.

(e) Past 6 months.

(f) Justice et al. 2001, Kilbourne et al., 2002

(g) CD4 count is a dichotomous variable at median.

(h) Alcohol diagnosis using Composite International Diagnostic Interview Short Form (CIDI-SF) (Kessler et al., 1998).

(i) Measure of depressive symptoms where a CESD score ≥16 indicates substantial depressive symptoms.