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CHARACTERISTICS OF HIV-POSITIVE CIGARETTE SMOKERS: A SAMPLE OF SMOKERS FACING MULTIPLE CHALLENGES

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Abstract

HIV-positive populations have high smoking rates and smoking puts HIV-positive individuals at higher risk for HIV-related health problems. Little information is available on the characteristics of HIV-positive smokers. The present study examines the baseline psychosocial characteristics of 184 HIV-positive cigarette smokers enrolled in a smoking cessation clinical trial. The sample was 82% male, and 53% Caucasian. Over half were unemployed and 43.8% reported an income of less than \$10,000. Mean cigarettes per day was 19.2 and the mean Fagerström Test Nicotine Dependence score was 4.8. The majority reported a strong desire to quit however, only 45% endorsed a goal of complete abstinence. On average, 43.2% of the smokers' social support was made up of other smokers. Both licit and illicit drug use was common and there were significant rates of lifetime psychiatric diagnoses in this cohort of smokers. It is critical to evaluate interventions that consider the specific needs of this group.

Identifying variables that may influence initiation of smoking cessation treatment and treatment success is critical given the smoking rates among HIV-positive populations and the medical implications of smoking in this population. Whereas national estimates of smoking indicate that approximately 21% of the adult population smokes (Centers for Disease Control and Prevention, 2007), higher rates have been reported in numerous HIV-positive cohorts. (Collins et al., 2001) found a 51% smoking rate among a national probability sample of 2,864 HIV-positive individuals. Burns et al. (1996) reported that 57% of 3,221 HIV-positive men and women were current smokers. Others have supported similar, or higher, rates of smoking among HIV-positive samples (Gritz, Vidrine, Lazev, Amick, & Arduino, 2004; Mamary, Bahrs, & Martinez, 2002; Niaura, Shadel, Morrow, Flanigan, & Abrams, 1999).

Although the effect of cigarette smoking on the progression of HIV disease is unclear, smoking has been found to predict an increased likelihood of a variety of HIV-related medical complications, including bacterial pneumonia, HIV-related pulmonary emphysema, hairy leukoplakia, oral candidiasis, and AIDS dementia (Boulter et al., 1996; Burns et al., 1996; Conley et al., 1996; Diaz et al., 2000; Greenspan, Barr, Sciubba, & Winkler, 1992; Hirschtick et al., 1995; Palacio, Hilton, Chanchola, & Greenspan, 1997; Reardon, Kim, Wagner, Koziel, & Kornfeld, 1996). Cigarette smoking has also been found to have a negative impact on the health-related quality of life in persons with HIV (Turner et al., 2001). Smoking cessation has been recommended for HIV-positive individuals, particularly smokers with T cell counts below 200 (Hirschtick et al., 1995). Developing effective smoking cessation interventions for this population may decrease the number or frequency of HIV-related medical conditions, improve

the quality of life of the HIV-positive individual, and reduce associated medical costs for the treatment of these conditions.

Recent developments in treatment of HIV disease such as the success of highly active antiretroviral therapies (HARRTs) and the shift toward thinking of HIV disease as a chronic medical condition have implications for the development of smoking cessation interventions for HIV-positive populations. Ironically, slowing the progression of HIV disease and increasing life spans may provide an opportunity for the number and frequency of smoking-related medical complications and conditions to increase, making smoking cessation even more important in this population. Several studies reported in 2003 appear to support this possibility. Miguez-Burbano et al., 2003 found that HIV-positive cigarette smokers, many of whom had been on a HARRT regimen, were twice as likely to develop *Pneumocystis carinii* pneumonia (PCP) and tuberculosis as HIV-positive nonsmokers. In addition, daily tobacco use seemed to attenuate by 40% the immune and virological response to antiretroviral therapies. Research conducted prior to the advent of HAART found no relationship between cigarette smoking and the development of PCP. Other research suggest that individuals with HIV are at higher risk for cardiovascular disease (CVD) (Friss-Moller et al., 2003; Mooser, 2003; Saves et al., 2003; Vittecoq et al., 2003). There is also limited evidence that HARRT regimens may increase the risk for coronary heart disease. Because cigarette smoking has been identified as the major risk factor for CVD among this group of smokers, smoking treatment interventions have been strongly recommended.

However, relatively little is known about the characteristics of HIV-positive smokers. Smoking has been associated with age, educational level, illicit drug use, and heavy drinking among HIV-positive samples (Burkhalter, Springer, Chhabra, Ostroff, & Rapkin, 2005; Gritz et al., 2004). Results from a patchwork of studies suggest that HIV-positive smokers smoke an average of 15 to 20 cigarettes per day and have moderate levels of nicotine dependence (Burkhalter et al., 2005; Gritz et al., 2004; Mamary et al., 2002; Vidrine, Arduino, Lazev, & Gritz, 2006). It is unclear how many HIV-positive smokers are interested in quitting. Although two studies have found a substantial interested in quitting (Burkhalter et al., 2005; Mamary et al., 2002) one found that 80% of the sample had not considered quitting (Niaura et al., 2000).

The purpose of the present study is to add to the literature by providing descriptive information on smoking-related and demographics variables of a cohort of HIV-positive smokers entering cessation treatment. Participants are being recruited from two HIV-positive Clinical care sites, a medical services clinic and a mental health care clinic. We will also examine potential differences in these cohorts as a function of the treatment setting. A better understanding of this group of smokers may assist health care providers by identifying variables that may facilitate or impede smoking cessation and can inform the further development of smoking cessation interventions targeting this high risk group.

METHOD

PARTICIPANTS

As part of an intervention study, 184 participants have been recruited from two outpatient clinics serving HIV + persons in San Francisco, California. Recruitment is ongoing. Seventy-nine individuals are patients at the University of California, San Francisco AIDS Health Project (AHP), an organization that provides HIV testing and counseling as well as substance abuse treatment and mental health services. One hundred five participants are patients at the Positive Health Practice (PHP) at San Francisco General Hospital (SFGH), which provides medical care to people with HIV. SFGH is the public health care facility for the county of San Francisco. To be eligible, participants must be 18 years or older, smoke at least most days of the month, and be registered patients at one of the facilities. Individuals are excluded if they are already

enrolled in other smoking cessation treatment, or are experiencing significant or severe cognitive impairment or dementia.

PROCEDURES

Participants are recruited from both sites using direct provider referral, through posters and flyers distributed at the clinics and through recruitment letters sent to their home addresses. Potential participants are provided an overview of the study and screened briefly for exclusion criteria via telephone. If interested and eligible, they are scheduled for a baseline assessment.

During the initial assessment, in addition to basic demographic information, study participants are screened for nicotine use and dependence, history and current use of alcohol and other drugs, psychological distress, motivation to change, and stages of change. They are stratified based on gender, history of major depression and the number of cigarettes they were currently smoking per day and randomized into one of three arms of the study: individual counseling, computer-based intervention or the minimal contact control arm.

The counseling condition includes six individual counseling sessions. The intervention is based on a cognitive behavioral treatment model and has been tailored to the needs of HIV-positive smokers. Tailoring was based on research with HIV-positive individuals indicating the negative impact of smoking on HIV-related health conditions, high levels of stress, high levels of depression, and low levels of social support. Thus, the intervention includes specific information on HIV-related health issues and smoking, a stress management component, a mood management component, and a social support component. Those participants randomized into the computer-based Internet condition are offered access to a Web site intervention modeled on the curriculum offered to counseling participants. The Web site can be accessed at the clinic or at home. Individuals without Internet access receive vouchers to obtain access at local cafés and shops. Participants randomized into the minimal contact control condition receive a self-help guide and minimal instruction. All who report smoking at least of five cigarettes per day are offered a 10-week course of nicotine replacement therapy (NRT), with a choice of nicotine patch or gum.

We hypothesize that the counseling and computer-based interventions will be more effective than the control condition, whereas the computer-based intervention will be more cost effective than the counseling intervention.

INTERVIEW DATA

During the baseline interview, participants are directly assessed using the Composite International Diagnostic Interview (CIDI) schedule, a structured, computerized interview schedule which provides a DSM-IV diagnosis (World Health Organization, 1997); modules measuring nicotine and alcohol abuse and dependence as well as depression and bipolar disorder are administered. The Addiction Severity Index (McLellan et al., 1992) is used to assess current and historical alcohol and other drug use as well as psychiatric history and treatment.

SELF REPORTED INFORMATION

Demographic information, including age, gender identification, and ethnicity, as well as smoking history and current use patterns are obtained using self report questionnaires developed by our group and used across multiple studies. Smokers also complete the Fagerström Test for Nicotine Dependence, a six-item instrument measuring smoking behaviors indicative of physical dependence (Payne, Smith, McCracken, McSherry, & Antony, 1994); the Thoughts About Abstinence Scale, a four-item measure that assesses desire to quit, anticipation about successfully quitting, anticipated difficulty with remaining abstinent, and an abstinence-

related goal (Hall, Havassy, & Wasserman, 1990); the Social Network List--Smoking Edition, which measures the size of an individual's social support network, the proportion of smokers in that network and perceived support for cessation (Stokes, 1983), and the Stages of Change measure, a five-item scale assessing readiness to quit smoking (DiClemente et al., 1991).

DATA ANALYSES

For the purposes of this descriptive report, basic frequency analyses were used to determine the mean values and range on continuous variables and proportions on non-continuous variables. Because the AHP provides testing and mental health services and the PHP provides medical care, it is important to determine if the HIV-positive smokers recruited from each site significantly differ on potentially important smoking treatment-related variables. Therefore, we conducted a series of T tests and chisquare analyses to determine potential differences as a function of recruitment site.

RESULTS

Demographic results are presented in Table 1. The mean age of the HIV-positive sample is 45.2 years old. Participants are predominantly male (82.1%), with a majority identifying as gay or lesbian (65.1%) and never married (75.9%). The sample is ethnically diverse (46.7% non-White) with high unemployment rates (66.5%). Almost half (43.8%) report an annual income below \$10,000 and a large proportion are in unstable housing situations (37.4%). We found significant differences between recruitment sites on gender and sexual orientation. Smokers from the PHP were more likely to be female ($\chi = 21.10, p < .0001$) and identify as heterosexual ($\chi = 14.27, p < .001$) than smokers from the mental health clinic.

Self-reported rates of alcohol and drug use in the past 30 days are listed in Table 2. Both licit and illicit drug use was common in the HIV-positive sample. Over 40% of the sample reported alcohol use, 39.7% reported marijuana use, 19.6% reported opiate use, 9.8% reported cocaine use, and 8.7% reported amphetamine use during the past 30 days. We found differences between sites in the use of three drugs with smokers from the medical clinic more likely to report methadone use in the past 30 days ($\chi = 6.27, p < .05$) and smokers from the mental health clinic more likely to report sedative use other than barbituates ($\chi = 13.01, p < .001$) and inhalants ($\chi = 8.55, p < .005$) during the past 30 days. Approximately one third (33.7%) reported a history of treatment for alcohol problems and over half (54.9%) reported a history of treatment for drug problems. There were no differences between recruitment sites.

Table 3 presents findings on cigarette and smoking-related variables from the HIV-positive sample. Overall the sample smoked just less than one pack of cigarettes per day (mean = 19.2) and had a moderate level of nicotine dependence (Fagerström score mean = 4.8). On average they had 4.2 prior attempts to quit smoking and had a significant proportion of smokers in their social support networks (43.2%). They reported high levels of desire to quit smoking and high levels of confidence in being successful. Approximately half of the sample was in the contemplation stage of change and the other half was in the preparation stage. We also found that 13% of the sample planned to quit smoking but not within the next 30 days. Less than half of the sample (45.0%) chose lifetime abstinence (quit forever) as a treatment goal while approximately 16% choose a goal that include some smoking. The only significant difference between sites was on the stages of change measure with smokers from the mental health clinic being more likely to be in the preparation stage ($\chi = 4.38, p < .05$).

There were also significant rates of lifetime psychiatric diagnoses in the sample. Overall, 37.5% of HIV-positive smokers met criteria for a major depressive episode, 25% met criteria for bipolar disorder, 50% met criteria for alcohol dependence and 74.5% met criteria for nicotine dependence. Psychiatric diagnoses by site are displayed in Figure 1. Bipolar disorder was the

only psychiatric diagnoses with differences as a function of recruitment site with 37.9% of smokers from the mental health clinic meeting criteria while 15.2% of the smokers from the medical clinic meeting criteria ($\chi^2 = 12.43$, $p < .001$).

DISCUSSION

The results suggest that HIV-positive smokers who are interested in quitting smoke about a pack of cigarettes a day and have a moderate level of nicotine dependence. This sample also reports high levels of desire to quit and high expectations for success. These findings are consistent with the findings from other HIV-positive cohorts (Mamary, Bahrs, & Martinez, 2002; Vidrine et al., 2006) and similar to recent findings in work with smokers from the general community (Humfleet, Hall, & Delucchi, 2008).

Two findings stand out from the others. First, these HIV-positive smokers report that almost half of the individuals in their current social support networks are smokers. Social network research indicates that smoking appears to be maintained through social ties, that smokers tend to be marginalized socially, and that inter-connected people tend to quit as a group (Christakis & Fowler, 2008). Treatment research suggests that provision of intratreatment and extratreatment social support predicts successful quitting (Fiore et al., 2000). Although many smoking cessation programs provide intratreatment support through individual or group counseling, it may be particularly important to address the issue of extratreatment support with HIV-positive smokers. In addition to evaluating smoking cessation treatment on the individual level, future research with this population might benefit by focusing on interventions that modify the smokers' social network or target small interrelated groups. Second, less than half of the smokers in this sample chose a treatment goal of total abstinence with a significant proportion choosing a treatment goal that included some allowance for occasional or controlled tobacco use. The proportion choosing a total abstinence goal is significantly lower than we have found in general community cohorts (Humfleet et al., 2008). This finding is significant because previous research has indicated that selecting a total abstinence goal is one of the strongest predictors of treatment success across a variety of drugs of dependence, including alcohol, opiates, and nicotine (Hall et al., 1990). Although there are multiple possible explanations for this finding (low self-efficacy, lower motivation, etc.), a few may be particularly relevant to the study population. Treatment goals may be influenced by health status with those most physically impacted by HIV disease having less stringent goals. Recreational use of other drugs may also impact the smoker's abstinence goal. In addition, one might speculate that smoking cessation treatment goals of HIV-positive smokers could be influenced by the harm reduction model that is emphasized in many HIV risk reduction programs. In that case, smokers may be more likely to perceive reduced tobacco use as a healthier alternative to ongoing regular use. Exploration of specific treatment goals may be an important element of any smoking cessation intervention with this group. Further research in this area is warranted.

This group of smokers faces a variety of psychological, environmental, and economic challenges. Many of these characteristics are associated with high risks for smoking and lower levels of treatment success. A large proportion of this sample was unemployed, had extremely low incomes, and had unstable living situations. In addition, a significant proportion of the sample report current alcohol and illicit drug use which have been associated with smoking treatment failure (Humfleet, Munoz, Sees, Reus, & Hall, 1999). Participants also had high rates of lifetime major depressive episodes, bipolar disorders, and alcohol dependence, all associated with tobacco use.

Somewhat surprisingly, we found few differences as a function of treatment site. Although there is no evidence to predict differences on demographics or tobacco use variables, one might

expect higher rates of illicit substance use and mental health diagnoses from a cohort recruited from a mental health treatment clinic as compared to one recruited from a medical setting. However, we found no significant differences on current use of most drugs, including alcohol, opiates, barbiturates, cocaine, amphetamines, or cannabis, nor did we find a difference on rates of treatment for alcohol or drug dependence. Given these findings and the known association of substance use with increased risks for HIV infection, addressing illicit drug use as a part of smoking treatment may be important regardless of the treatment setting.

We were particularly struck by the high rate of bipolar disorders. Although it appears that overall rate of bipolar disorders may have been biased by recruiting from a mental health clinic, the rates of bipolar disorder from the medical clinic sample (15.2%) remain much higher than the rates of bipolar disorder in the general population (1.6%) (American Psychiatric Association, 2000). Research on smoking cessation interventions with bipolar cigarette smokers may provide valuable strategies that may be applicable to the treatment of some HIV-positive smokers.

Given the multiple psychological, social, economic, and medical needs of this group of smokers, low-cost, generic smoking cessation interventions may be ill suited to this population. It is critical to develop and evaluate smoking cessation interventions that consider the potential psychosocial-environmental barriers faced by HIV-positive smokers and incorporate treatment strategies that address the influence of these variables. Findings from our current trial, which includes interventions that have been designed to address some of the psychosocial needs of this group of smokers, will help to improve our understanding of this high-risk group and can inform future research directions.

This study has several limitations. The sample size limits the generalizability of the findings and points to the need to examine these characteristics in additional treatment samples. Because the participants were recruited through public health care settings, the results may not generalize to all HIV-positive smokers, particularly those who are employed and have private health insurance. However, studies have shown that 70%-84% of HIV-positive individuals in the United States have public health insurance or no insurance (Bozzette et al., 1998; Fleishman et al., 2005). Therefore, the current findings may generalize to a significant proportion of HIV-positive smokers in the United States.

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FIGURE 1.

Prevalence of Psychiatric Diagnoses by Recruitment Setting.

Note. MDD = Major Depressive Disorder; PHP = Positive Health Project; AHP = AIDS Health Project.

TABLE 1

Demographic Variables

	Total Sample (N = 184)	AIDS Health Project Sample N = 79	Positive Health Project Sample (N = 105)
Variable	N (%)	N (%)	N (%)
Sex *			
Male	151 (82.1)	75 (94.9)	76 (72.4)
Marital Status			
Never married	139 (75.9)	60 (76.9)	79 (75.2)
Does not live w/ spouse/partner	136 (81.4)	64 (87.7)	72 (76.6)
Hispanic Yes	25 (13.9)	9 (11.5)	16 (15.8)
Race			
African-American/Black	51 (27.7)	18 (22.7)	33 (31.4)
Caucasian/White	98 (53.3)	49 (62.0)	49 (46.7)
Other	35 (19.0)	12 (15.2)	23 (21.9)
Employment Status			
Unemployed	111 (66.5)	39 (56.5)	72 (73.5)
Highest degree			
High school/GED	83 (56.9)	31 (48.4)	52 (63.4)
Living situation			
House/apartment [rent/own]	93 (51.1)	47 (60.3)	46 (44.2)
Halfway House/Therapeutic Community	27 (14.8)	12 (15.4)	15 (14.4)
SRO room/hotel/motel	32 (17.6)	9 (11.5)	23 (22.1)
Homeless	9 (5.0)	4 (5.2)	5 (4.8)
Other	21 (11.5)	6 (7.7)	15 (14.4)
Sexual Orientation **			
Homosexual/gay/lesbian	112 (65.1)	57 (75.0)	55 (57.3)
Annual Income			
< \$10,000	78 (43.8)	26 (32.9)	52 (52.5)
Variable	Mean (SD)		
Age	45.2 (7.82)	45.7 (6.73)	44.8 (8.56)

Note.

* $p < .0001$;

** $p < .001$.

TABLE 2

Proportion of Participants Reporting Alcohol or Drug Use During the Previous 30 Days and History of Alcohol or Drug Treatment

	Total Sample (N = 184)	AIDS Health Project Sample (N = 79)	Positive Health Project Sample (N = 105)
Variable	N (%)	N (%)	N (%)
Alcohol any use, last 30 days	79 (42.9)	34 (43.0)	45 (42.9)
Alcohol intoxication, last 30 days	33 (17.9)	17 (21.5)	16 (15.2)
Heroin, last 30 days	2 (1.1)	1 (1.3)	1 (1.0)
Methadone, last 30 days *	12 (6.5)	1 (1.3)	11 (10.5)
Opiates, last 30 days	36 (19.6)	19 (24.1)	17 (16.2)
Barbiturates, last 30 days	2 (1.1)	1 (1.3)	1 (1.0)
Other sedatives, last 30 days **	34 (18.5)	24 (30.4)	10 (9.5)
Cocaine, last 30 days	18 (9.8)	7 (8.9)	11 (10.5)
Amphetamines, last 30 days	16 (8.7)	9 (11.4)	7 (6.7)
Cannabis, last 30 days	73 (39.7)	32 (40.5)	41 (39.1)
Hallucinogens, last 30 days	3 (1.6)	1 (1.3)	2 (1.9)
Inhalants, last 30 days ***	12 (6.5)	10 (12.6)	2 (1.9)
>1 Drug, last 30 days	57 (31.0)	22 (27.8)	35 (33.3)
Treatment for alcohol abuse/dependence	62 (33.7)	25 (31.7)	37 (35.2)
Treatment for drug abuse/dependence	101 (54.9)	40 (50.6)	61 (58.1)

* $p < .05$;

** $p < .001$;

*** $p < .005$.

TABLE 3
Cigarette Use and Smoking Treatment-Related Variables

	Total Sample (N = 184)	AIDS Health Project Sample (N = 79)	Positive Health Project Sample (N = 105)
Variable	N (%)	N (%)	N (%)
Treatment Goal			
No clear goal	8 (4.4)	2 (2.5)	6 (5.9)
Smoke in a controlled manner	8 (4.4)	3 (3.8)	5 (4.9)
Abstain from smoking for a time	10 (5.6)	4 (5.1)	6 (5.9)
Smoke occasionally	4 (2.2)	4 (5.1)	0 (0)
Quit smoking but might slip	58 (32.2)	30 (38.0)	28 (27.7)
Quit smoking forever	81 (45.0)	32 (40.5)	49 (48.5)
Other	11 (6.1)	4 (5.1)	7 (6.9)
Plan to quit smoking			
Contemplation Stage	85 (47.5)	33 (43.4)	61 (59.2)
* Preparation Stage	94 (52.5)	43 (56.6)	42 (40.8)
Variable	Mean (SD)		
Fagerström	4.8 (2.35)	4.6 (2.59)	5.0 (2.15)
Desire to quit ^a	8.6 (1.59)	8.4 (1.49)	8.7 (1.48)
Expect to be successful ^b	7.9 (1.82)	7.6 (1.83)	8.1 (1.82)
How difficult ^c	6.7 (2.36)	6.8 (2.05)	6.6 (2.56)
Prior attempts to quit	4.2 (6.80)	5.2 (7.62)	3.5 (6.12)
Age first tried cigarettes	14.2 (5.72)	14.5 (5.56)	13.9 (5.83)
Age began smoking regularly	17.3 (5.55)	17.6 (5.71)	17.0 (5.42)
How motivated to quit ^d	1.6 (0.70)	1.6 (0.70)	1.6 (0.70)
Usual daily cigarettes	19.2 (10.1)	19.7 (11.47)	18.9 (8.90)
Network % smokers	43.2 (31.31)	39.4 (30.68)	46.2 (31.65)

^a 1 = No desire to quit, 10 = Full desire to quit.

^b 1 = Lowest expectation of success, 10 = Highest expectation of success.

^c 1 = Lowest amount of difficulty, 10 = Highest amount of difficulty.

^d 1 = Extremely strong desire to quit, 4 = No desire to quit.

* $p < .05$.