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# Primary Care Use among HIV Positive Inpatients at an Inner City Public Hospital: The Impact of Crack Cocaine Use

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## ABSTRACT

*We studied factors associated with HIV care utilization in symptomatic HIV-positive crack-using and non-using patients at a public hospital in Miami, Florida. A bedside survey conducted with 89 HIV-positive crack-users and 93 HIV-positive non-users examined health care knowledge, perceived health status, drug use, and HIV care patterns. A multi-nominal model was utilized to calculate the adjusted odds ratio (AOR) of three levels of care: currently receiving care (having seen an HIV provider in the past 4 months), having dropped out of care (having seen an HIV provider at least once but not in the past 4 months), and never having seen an HIV provider. Crack use and homelessness were associated with having dropped out of care. Better knowledge of HIV, living with HIV for a longer time, and being employed were associated with currently being in care. Attention to socioeconomic factors and substance abuse rehabilitation is needed to improve treatment outcomes.*

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## Introduction

Since the early 1990s, crack cocaine use has been a recognized risk factor for HIV infection among disadvantaged minorities due to its association with high-risk sexual behaviors (Edlin et al., 1994; Diaz et al., 1994). The lives of crack cocaine users are often chaotic because use is associated with poverty, crime, family dysfunction, and violence (Sterk, 1999; Boyd & Mieczkowski, 1990; Sherman & Steckler, 1998). Studies estimate that few crack users enter drug treatment, and those who do tend to leave against medical advice (Siegal et al., 2002; Zule, Lam, & Wechsberg, 2003). HIV-positive crack users are among those who often delay seeking care after initial diagnosis (Brewer et al., 2007) and like other substance abusers, when in care, they are more likely to have less favorable treatment outcomes than persons who do not abuse drugs (Cook et al., 2008; Cunningham et al., 2006; Lucas, Cheever, Chaisson, & Moore, 2001; Lucas, Gebo, Chaisson, & Moore, 2002; Lucas et al., 2006; Kalichman, Graham, Luke, & Austin, 2002).

Most studies examining substance abusers and HIV care utilization recruit participants from outpatient HIV clinics and HIV social service organizations (Cunningham et al., 2006; Lucas et al., 2002; Lucas et al., 2006; Melchior et al., 2001), and often focus on HAART utilization and virologic outcomes. Studies that recruit from sites providing HIV care underestimate the magnitude of missed opportunities for care and services because their sample populations are already integrated into HIV

outpatient services to some extent (Lucas et al., 2001). Additionally, studies of substance abusers and HIV often combine crack smokers, powder cocaine users, heroin users, and alcohol abusers into a single group (Pulvirenti et al., 2003; Cunningham et al., 2006; Lucas et al., 2001; Lucas et al., 2002; Lucas et al., 2006). Exclusive attention to crack cocaine users is rare in the literature. Thus, many issues affecting HIV-positive crack cocaine users have not been rigorously examined.

To explore barriers to primary care utilization by HIV-positive crack users, we selected as our target population patients who were symptomatic with HIV disease but not necessarily in primary care. We recruited patients from the HIV inpatient service of Jackson Memorial Hospital, a large public hospital in Miami, Florida, where crack cocaine users comprise a large proportion of the in-patient population (Metsch et al., 2007). We compared hospitalized HIV-positive active crack users with socio-demographically similar HIV-positive non-crack users, and analyzed their HIV primary care utilization. We then examined whether active crack cocaine use was associated with currently being in HIV care, having dropped out of care, or having never been in care.

## Methods

### *Participants and procedures.*

In all, 193 HIV-positive individuals admitted to the Adult HIV Inpatient Service at Jackson Memorial Hospital in Miami, Florida were recruited between

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November 2002 and August 2003. Eligible patients were at least 18 years of age, able to provide informed consent, and self-reported being HIV positive. Medical staff referred potential participants to a trained interviewer. Once informed consent was obtained, the interviewer administered a 30-minute questionnaire at the bedside. Each participant was given \$20 cash as compensation for participation. Medical records for each participant were reviewed for information on prior hospitalizations, diagnoses, CD4 counts, and viral load. The University of Miami Institutional Review Board (IRB) provided approval for the study.

#### *Measures*

**Socio-demographic characteristics.** Participants were asked to report basic socio-demographic information including: age, gender, marital status, ethnicity, level of education, main source and level of income in the past year, current living status, and receipt of medical insurance during the past year. They were also asked to report their HIV risk factors, history of mental illness, sexual activity in the last 30 days, and history of drug or alcohol use. Active crack use was defined as crack use in the last 30 days. Non-crack users were defined as not having used crack in the last 30 days.

**HIV care and treatment status.** HIV primary care utilization was categorized on the basis of participants' primary care use. We asked participants if they had ever received HIV primary care. Those who responded "yes" were then asked if they were currently receiving HIV primary care. If they said "yes," and were determined to have seen a provider in the last four months, they were categorized as currently in care. If they answered "yes" but had seen not seen their provider within the last four months, or reported they had received care at some point but were no longer in care, they were categorized as dropped out of care. Participants who responded "no" to having ever received care were categorized as never receiving care. With the use of a pill chart to help with identification and recall of medicinal treatments, participants were also asked if they were currently receiving HIV medications, including antiretrovirals. For this study, HAART is considered a combination of triple anti-retroviral therapy.

**Health status.** Participants were asked how long they had been diagnosed with HIV, and if they knew their most recent CD4 count and HIV viral load results. Medical record abstraction was used to document participants' CD4, HIV-RNA levels, and prior hospitalizations. Participants were asked to rank their own health status, using a scale with the responses poor, fair, good, or excellent.

**Perceptions of HIV care.** Fact based statements such as "*HIV medications can slow the progression of illness*" were used to assess participant knowledge of HIV care. The response choices were Likert scale (responses included strongly disagree, somewhat disagree, somewhat agree and strongly agree), and reverse coded with the highest score representing the best knowledge of the benefits of HIV care. Questions regarding HIV knowledge, beliefs and attitudes were derived from the Access to Anti-retroviral Treatment (ARTAS) study (Krawczyk et al., 2003).

#### *Statistical Analysis*

Health status and care characteristics of HIV inpatient crack users and non-users were described as frequencies, means, and medians. Chi-square tests of independence and t-tests, for frequencies and means respectively, were used to test for differences between the two groups. The Mann-Whitney U test was used to compare medians.

For the multivariate analysis, potential correlates of HIV primary care utilization that were identified in previous studies (Cunningham et al., 2000; Gebo et al., 2005; Kalichman et al., 2002; Shapiro et al., 1999) were assessed using chi-square tests of independence and t-tests. The following correlates were evaluated: country of origin, income, history of mental illness, HIV medical knowledge, years since diagnosis, current crack use, homelessness, perceived health status, main source of income, having children, marital status, history of incarceration, alcohol use, marijuana use, sex in the past 30 days, high on drugs or alcohol in the past 30 days, and exchanged sex for drugs or money in the past 30 days. Correlates associated with HIV primary care utilization at the level of  $p \leq .20$  were included in an initial multi-nominal logistic model of HIV primary care utilization. This model allows for the simultaneous comparison of the two contrasts: the adjusted log odds of having dropped out of care versus currently receiving care and the adjusted log odds of currently being in care versus never having been in care. A parsimonious model was developed by retaining a set of demographic variables (age, gender, race/ethnicity, and education) and health status (self-perceived health status and history of mental illness) and excluding variables that exceeded  $p = .05$  (for all contrasts) in a stepwise fashion by backward elimination. At each step, coefficients and standard errors were examined for indications of confounding by the removed variable. There were no multicollinearity problems (all variance inflation factors were below 1.4). Data was analyzed using Stata, version 7 (State Corporation, College Station, Texas).

## Results

### *Bivariate analyses of demographic variables between crack users and non-users*

Eighty-nine active crack cocaine users and 93 non-users were included in the analysis after the exclusion of eight persons diagnosed with HIV infection during the current hospitalization. The primary risk factor for both groups was heterosexual contact (62% of active crack users vs. 54% of non-users, data not shown). As the data in Table 1 show, among active crack cocaine users, 55.1% were women and among non-users, 41.9% were women. Mean age was similar in both groups (40 years). Although African Americans comprised the majority of both users and non-users, active crack users were significantly more likely to be African American, born in the United States, and homeless. The majority of active crack users and non-users had a history of incarceration; however, active crack users were significantly more likely to have been incarcerated. Most of the participants were poor, with an income of less than \$10,000/year, and less than a high school education. Only five persons (three non-users and two users, data not shown) had private insurance coverage, with nearly all other participants being covered by Medicaid, Medicare, or the Ryan White Comprehensive AIDS Resources Emergency Act. Among non-users, 35% had a past history of crack cocaine use and 14% had a history of injection drug use. Active crack cocaine users were significantly more likely than non-users to have used alcohol, marijuana, and powder cocaine. They were also significantly more likely to have injected heroin in the last 30 days as well as to have engaged in high-risk sexual behaviors, defined as having sex while high or with a paying sex partner, within the last 30 days.

### *Health care variables*

Bivariate analysis of the health care characteristics of crack users and non-users are compared in Table 2. The majority of participants in each group rated their current health as fair to poor. Medical record abstraction revealed that mean and median CD4 counts were low in both groups and viral loads were high. Among active crack users, 73% did not know their viral load when asked and 7% did not know the meaning of viral load; 64% of non-users in care did not know their viral load, and 8% did not know the meaning of viral load (data not shown). All active crack users had detectable viral loads, unlike three non-users with an undetectable viral load (data not shown). There were no significant differences between active crack users and non-users with regard to history of mental illness, length of HIV diagnosis, number of prior hospitalizations, having received HIV primary care, or, among those

with CD4 counts of less than 350 cells per cc, having received combination antiretroviral therapy. About 60% of crack users and 52% of non-users had prior HIV related hospitalizations ( $p=NS$ ).

**Table 1. Bivariate Analysis of Socio-demographic Traits of HIV Inpatient Crack Users and Non-users**

	<u>Crack Cocaine Status</u>	
	User N=89 (%)	Non-user N=92 (%)
Age ( <i>M</i> and <i>SD</i> )	40.8 (6.1)	40 (10.7)
Female	49 (55.1)	39 (42.4)
Single marital status	59 (66.3)	67 (72.8)
U.S. born**	85 (95.5)	68 (72.8)
Language spoken**		
English	86 (96.6)	75 (81.5)
Spanish	3 (3.4)	8 (8.7)
Race**		
African American	83 (93.3)	74 (80.4)
White	2 (2.2)	5 (5.4)
Hispanic	3 (3.4)	13 (14.0)
< High school educ.	57 (64.1)	47 (50.1)
Ann. income < \$5K	48 (53.9)	39 (43.3)
Ann. income < \$10K	78 (87.9)	76 (85.4)
Source of income		
Job	11 (12.5)	22 (23.9)
VA, disability, SSI	40 (45.5)	45 (48.9)
Homeless**	32 (36)	8 (8.7)
Have children	56 (62.9)	63 (68.5)
Hx of incarceration**	73 (82)	51 (56)
Crack use ever**	89 (100)	33 (33.5)
Alcohol in 30 days**	44 (49.5)	6 (6.6)
Marijuana use in last 30 days*	14 (15.7)	4 (4.4)
Powder cocaine use in last 30 days**	17 (19.1)	0 (0.0)
IV use in 30 days**	4 (4.5)	0 (0.0)
Sex in last 30 days**	30 (33.7)	8 (8.7)
Sex while high in last 30 days, if active*	26 (86.7)	2 (25.0)
Had paying partners in last 60 days, if active*	16 (53.3)	0 (0.0)

\* Pearson  $\chi^2 < .05$

\*\* Pearson  $\chi^2 < .01$

A review of medical records revealed histories of a variety of HIV related illness among participants. Common current and prior diagnoses among the

sample included *Pneumocystis jirovecii* (PCP, 18.0 % of active crack users vs. 20.4% of non- users), tuberculosis (14.6% vs. 10.8%), community acquired pneumonia (47.2% vs. 35.5%), diarrhea (31.5% vs. 23.7%), genital herpes (23.6% vs. 19.3%), esophageal candidiasis (16.9% vs.18.3%), HIV-associated nephropathy (5.6% vs. 5.4%), hepatitis (7.9% vs. 2.2%) and toxoplasmosis of the central nervous system (2.2% vs. 8.6%). Syphilis was the only disease for which there was a statistically significant difference between the two groups (18.0% of active crack users vs. 6.5% of non-users; p = .02).

**Table 2. Bivariate Analysis of Health Care Traits of HIV Inpatient Crack Users and Non-users, 2002-2003**

	<u>Crack Cocaine Status</u>	
	User N =89 (%)	Non-user N=92 (%)
Good to excellent general health in past 6 months	25 (28.1)	29 (31.2)
Fair to poor general health in past 6 months	64 (71.9)	63 (67.4)
Mean CD4 count	156	116
Median CD4 count	59	57
Mean HIV-RNA count	27000	299233
Median HIV-RNA count	131000	193000
Diagnosed with HIV		
< 5 years ago	36 (29.2)	48 (31.7)
≥ 5 years ago	63 (70.8)	54 (59.3)
Hx of mental illness	21 (23.6)	17 (19.6)
Ever received HIV primary care	71 (79.8)	77 (84.6)
Currently in HIV care, if ever received care*	44 (62.0)	71 (92.2)
Ever taken meds for the virus (if CD4<350)	50 (79.6)	73 (88.0)
Currently on HAART, if in care currently, and CD4<350	17/31 (54.8)	46/66 (69.7)
Mean no. of prior hospitalizations	5.5	4.8
Median no. of prior hospitalizations	5	3
Mean HIV knowledge (scale scores)	3.67	3.73

\* Pearson  $\chi^2 < .05$

As shown in Table 2, the majority of both groups had accessed primary care at some point, and active crack users were as likely as non-users to have accessed primary care. However, active crack users were significantly more likely to have dropped out of care. The most common reason cited by active crack users for dropping out of care was “drugs and street life,” which was cited by 19%, followed by “medications make me sick” which was cited by 8%. Non-users who had dropped out of care had a wide variety of responses, none of which were cited by more than two individuals (data not shown).

*Attitudes toward health care*

HIV knowledge scores did not differ significantly between crack users and non-users. Crack users were as likely as non-users to have positive attitudes regarding the value of a low viral load and high CD4 count (>90% of both groups, data not shown). Persons in both groups also expressed positive attitudes regarding their HIV treatment, with 95% of each group agreeing, for example, that their provider answers their questions and that their provider cares about them.

*Multinomial logistic regression analyses.*

A multinomial logistic model was conducted to determine if crack cocaine use was an independent predictor of health care utilization. Active crack users were more likely to have dropped out of care (versus currently in care) (AOR = 3.67). Participants who were currently homeless were also more likely to have dropped out of care (AOR = 3.14). Crack cocaine use was not significantly associated with currently being in care versus never having been in care. Respondents with better HIV medical knowledge were more likely to currently be in care (versus never having accessed care). The odds increased by 3.12 for each unit increase on a four-point scale. Respondents who were aware of their HIV diagnosis five years or more and those whose source of income was employment (rather than sources of government assistance) were also more likely to be currently in care (versus never having accessed care) (AORs of 3.65 and 3.97, respectively).

**Discussion**

In our sample of inner city, HIV-positive, hospitalized patients, we found notable similarities between active crack users and non-users. Active crack users were as likely as non-users to have received HIV primary care at some point in their lives, although active crack use and homelessness were significantly associated with individuals subsequently dropping out of care. Whereas active crack cocaine users were more likely than non-users to be African American, homeless, and have history of incarceration, over 80% of nonusers were also

African American and greater than half had a history of incarceration. Like active crack users, non-users were likely to have less than a high school education, and an income of  $\leq$  \$10,000/ year.

As with socio-demographic characteristics, we noted similarities between active crack users and non-users regarding health characteristics. Despite having accessed care, the majority of both users and non-users appear to be doing poorly. Many participants had multiple hospitalizations related to HIV infection and a large proportion rated their health as only fair to poor over the last six months. Most had not achieved virologic suppression when on HAART. An important issue highlighted is that whereas active crack cocaine use may be a particularly strong barrier to successful HIV care, impoverished persons of color have other significant obstacles to achieving success with their HIV care.

Active crack use and homelessness were associated with dropping out of care. Like poverty, homelessness and drug dependency may affect health care not only as barriers, but by “contributing to life chaos and instability” (Wong, Sarkisian, Davis, Kinsler, & Cunningham, 2007). The chaotic lifestyle of crack users and their tendency to put the acquisition of drugs as salient in their lives (Sharpe, Lee, Nakashima, Elam-Evans, & Fleming 2004; Sherman & Stecker, 1998) leads to the neglect of basic needs. Homelessness is a well-documented deterrent to the utilization of primary health care (Kushel, Vittinghoff, & Haas, 2001; Masson, Sorensen, Phibbs, & Okin, 2004; Arno et al., 1996).

In our sample, accessing HIV primary care was predicted by greater knowledge of the benefits of medical treatment for HIV infection, knowledge of HIV-positive serostatus for greater than five years, and being employed. The finding that increased knowledge of the benefits of care is associated with continued utilization of care is consistent with one of the core components of the Health Belief Model that posits that positive attitudes can explain health-seeking behaviors (Janz & Becker, 1984). Persons who were aware of their HIV-positive serostatus for longer than five years were also more likely to be in care. This may be due to longer symptomatic illness or overcoming procrastination. These findings suggest that more education about the benefits of HIV care, particularly early presentation for care and treatment, could help increase utilization of HIV care among residents of these communities. Targeting inner city communities with increased information on HIV prevention and the value of medical treatment is a national public health priority (CDC, 2007).

Persons who were employed were also more likely to seek care. Yet we found that very few participants had private medical insurance, and so it

is unlikely that insurance status played a role in the observed difference. Instead, as Farley (2006) points out, work is an organizing factor in individuals' lives that helps them maintain structure and mitigates against social disorganization. Among our participants, being employed may be associated with increased self-efficacy to seek HIV primary care, and a higher degree of social integration.

Problems of retention and adherence to medications among socially vulnerable populations have long been noted (Shapiro et al., 1999; Cunningham et al., 2006; Lucas et al., 2001; Lucas et al., 2002; Lucas et al., 2003; Mugavero et al., 2007). This issue is of even greater importance now, as it has recently been recognized that HIV incidence has been significantly underestimated in the United States (Hall et al., 2008). These same revisions of HIV incidence confirm the disproportionate burden of disease borne by African Americans. Thus, there is evidence that significant work remains to be done in order to address health disparities in HIV disease. New approaches deserve contemplation. In addition to addressing individual risk factors for infection, and barriers to care, social determinants of disease transmission and access to care should be considered. These social determinants include the effects of poverty, low levels of education, housing instability, drug use, and incarceration, which fuel both increased risk of infection (Farley, 2006; Adimora et al., 2001; Johnson & Raphael, 2006), as well as poor treatment outcomes.

This study has several limitations. The study was carried out in a single large public hospital with a predominately indigent inner city population, and may not generalize to others in the United States. We relied on the hospital records from Jackson Memorial Hospital alone, which has many HIV outpatient satellite clinics, so we may have missed pertinent medical history that were neither in the hospital data base, the attending note, nor reported by the patient. This would have led us to underestimate the medical problems of the population studied. However, few patients reported hospitalizations outside of the Jackson Memorial Hospital System. Secondly, we relied on self-reported data, including data on the use of illegal drugs, in a face-to-face interview. Although there was an inherent risk of participants under-reporting drug use, the validity and reliability of self-reported drug use among chronic users has been reported to be high (Booth, Crowley, & Zhang, 1996). Additionally our interviewer was able to establish an excellent rapport with participants.

Despite these limitations, the findings in this study are consistent with a wide body of literature reporting substance abuse and other social issues as important barriers to care. Our results add to the data



available on the specific barriers crack users specifically face in obtaining HIV care, suggesting that strong social interventions are needed to provide access to substance abuse treatment, housing, and other social services. It also suggests that crack cocaine use is just one of many barriers to optimizing HIV care for poor minority inner city residents, particularly those with advanced HIV/AIDS disease. Failure to identify the broader social factors of poverty, housing instability, low levels of education and social disorganization, which foment drug use, will lead to inappropriate interventions.

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