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Predictors of High Risk Sexual Behavior Among HIV-Infected Crack Cocaine Users in Two US Urban Centers

By

Lindsay C. Boole
Degree to be awarded: Master of Public Health

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Carlos del Rio, MD
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Predictors of High Risk Sexual Behavior Among HIV-Infected Crack Cocaine Users in Two US Urban Centers

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2004

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An abstract of
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Abstract

Predictors of High Risk Sexual Behavior Among HIV-Infected Crack Cocaine Users in Two US Urban Centers

By Lindsay C. Boole

Background: HIV incidence in the United States is largely driven by sexual transmission in urban centers. There are limited data describing correlates of high risk sexual behavior among HIV-infected crack users.

Methods: Interviews were conducted at bedside with sexually active, HIV-infected crack cocaine users who were recruited from the inpatient wards at Jackson Memorial Hospital in Miami, Florida and Grady Memorial Hospital in Atlanta, Georgia, between August 2006 and March 2010. Participants were asked about sociodemographic characteristics, HIV clinical indicators, and psychosocial factors. Scales measuring several hypothesized mediators of sexual behavior, including knowledge, motivation, and preparatory behaviors, were assessed. Multiple logistic regression was performed to identify factors associated with sexual risk behavior.

Results: Among 411 study participants, 34.6% reported high risk sexual behavior in the prior six months. In multivariate modeling, sexual risk behavior was associated with low self-efficacy for condom use (aOR=2.22; 95%CI=1.37-3.60), low perceived risk of HIV transmission (aOR=2.58; 95%CI=1.37-4.87), multiple sexual partners (aOR=2.59; 95%CI=1.60-4.21), and intoxication during most recent sexual encounter (aOR=1.72; 95%CI=1.05-2.79). Participants of black race and men who had sex with men were less likely to engage in high risk sexual behavior (aOR=0.41; 95%CI=0.20-0.86 and aOR=0.40; 95%CI=0.24-0.68 respectively). In stratified analysis of females, high risk sexual behavior was associated with low self-efficacy for condom use (aOR=2.56; 95%CI=1.26-5.21), low perceived risk of HIV transmission (aOR=3.03, 95%CI=1.21-7.61), low social support (aOR=2.02; 95%CI=1.00-4.06), and multiple sexual partners (aOR=4.53, 95%CI=2.19-9.34). Women of black race were less likely to engage in high risk sexual behavior when compared to non-black women (aOR=0.22; 95%CI=0.06-0.74). Among males, low self-efficacy for condom use (aOR=3.27; 95%CI=1.52-7.04) and heterosexual men (aOR=2.96; 95%CI=1.34-6.56) remained significantly associated with high risk sex, lack of risk reduction behaviors (aOR=2.35; 95%CI=1.08-5.12) and engaging in transactional sex (aOR=2.56; 95%CI=1.14-5.71) were additional predictors.

Conclusions: A significant proportion of HIV-infected crack users are participating in high risk sexual behavior. Interventions promoting safe sex in this population should emphasize risk of HIV transmission inherent to sexual encounters with susceptible individuals and should attempt to build condom-specific self-efficacy.

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CHAPTER I: BACKGROUND AND LITERATURE REVIEW

Despite decades of public health research and intervention, the HIV epidemic in the United States continues to advance. An estimated 56,000 new HIV infections occur annually in the United States.[1] Incidence of HIV is highest in urban centers, and in the Southeast region, including Georgia and Florida.[2] HIV incidence is high in marginalized populations such as inner-city poor, the homeless, incarcerated populations, and drug abusers. These populations possess lower levels of education and little access to health care, and thus are difficult to reach with existing education efforts and behavioral interventions. Sexual transmission is responsible for most new cases, with 53% of new HIV infections attributable to sexual transmission among men who have sex with men and 31% occurring with heterosexual contact.[1]

Prevalence of HIV infection has increased more dramatically than incidence over the past 15 years, due to increased life expectancy attributable to highly active antiretroviral therapy (HAART).[3] Currently, an estimated 1.1 million adolescents and adults are living with HIV in the United States.[4] In the initial years of the epidemic, HIV prevention efforts focused on the prevention of HIV acquisition by HIV-negative individuals. However, every HIV transmission events involve two individuals: one seropositive and one seronegative. With continually increasing prevalence of HIV infection, the role of HIV positive individuals in the perpetuation of the HIV epidemic is receiving increasing attention.[5-7] The CDC “Prevention with Positives” strategy has the added advantage of allowing interventions to target HIV positive individuals, rather than attempt to affect the general, or even at-risk, population.

For the purposes of this review, the terms “high risk sex” and “sexual risk behavior” are both used to indicate unprotected anal or vaginal sexual activity between an HIV seropositive individual and an HIV seronegative or unknown individual, thus describing sexual events with a possibility of HIV transmission. Most studies of sexual risk behavior use this definition; in some cases, serostatus of sexual partners is not elucidated and high risk sex refers to any unprotected anal or vaginal intercourse. Rare studies also include oral sex in the definition of high risk, as there exists a theoretical but small risk of HIV transmission associated with oral sex. [8]

Sexual risk behavior among HIV-infected individuals

Sexual risk behavior among HIV positive individuals in the United States has been well described in the literature. Patterns of sexual activity associated with a higher prevalence of high risk sex in this population include participation in transactional sex[9, 10] as well as both having multiple sexual partners[7, 11-14] and even having just one partner.[12, 15] Substance use behavior, such as any alcohol use,[7] binge drinking[11] and substance use during sex,[10, 13, 16] has also been associated with high risk sex. Characteristics related to clinical status and health care seeking behavior have also been shown to mediate sexual risk behavior. In one study, self-perceived excellent/very good health status was a risk factor for high risk sex among men who have sex with men (MSM).[11] Use of highly active antiretroviral therapy has been shown to increase sexual risk behavior in some studies[9] and to have no effect in others.[17] Longer time since HIV diagnosis has been associated with increased prevalence of high risk sex.[9] The relationship between mental illness and high risk sex is unclear. Depressive symptoms

have been associated with high risk sex in some studies,[7, 10, 15] but are not significant in others.[11, 13] Increasing social support negatively correlates with high risk sex.[14] Finally, demographic characteristics that have been found to be important covariates in the relationship between specific behaviors or characteristics and high risk sex include female gender[7, 9, 11] younger age,[7, 13, 14] less education[10] and lower socioeconomic status.[13, 15] Employment has been found to be a risk factor[11] and a protective factor for sexual risk behavior. Ethnicity has also had variable association with sexual risk behavior. In one study, both African American and White ethnicity were risk factors for high risk sex,[12] compared to Hispanic ethnicity.

Multiple psychological and cognitive constructs have been used to explain the mediation of high risk sex. Constructs central to various behavioral models, including The Theory of Planned Behavior,[18] Theory of Reasoned Action,[19] Health Belief Model,[20] AIDS Risk Reduction Model,[21] and Information-Motivation-Behavioral Skills Model[22] have been studied in relation to high risk sex among both at-risk (HIV negative) and HIV positive populations. Knowledge, motivation, perceived control, and behavioral intention, while not the only constructs described in the aforementioned models, are of interest in this review since data was collected on these constructs in the present study. First, knowledge about appropriate prevention methods and factual knowledge of HIV transmission biology have both been associated with decreased sexual risk behavior.[17] Motivation for behavior change – in this case, safe sex – involves perception of risk, perception of personal responsibility for mitigating risk, and attitude toward the proposed behavior. In the literature, lower risk perception, lower perceived personal responsibility, and negative attitudes toward condoms have all been associated

with high risk sexual behavior among HIV positive individuals.[7, 10-13, 16, 17, 23, 24] Self-efficacy describes the perception of personal control over a behavior or outcome, and it is measured in relation to a specific behavior or outcome. Low self-efficacy for condom use has been associated with high risk sex among HIV positive individuals.[10, 11, 16] Finally, behavioral intention is generally a downstream mediator in the relationship between the previously described constructs and actual performance of the desired behavior.[13] Behavioral intention with regard to high risk sex includes stated intent to practice safe sex, as well as accomplishment of condom-specific actions (e.g. keeping condoms in one's pocket or purse). Other constructs relevant to safe sex behaviors, but not directly discussed in the context of the present study, include perceived barriers to the desired behavior, perceived efficacy of the behavior, outcome expectancies, and perceived interpersonal and social norms.[16, 25] Characteristics specific to one's sexual partner(s) and social network also contribute to behavior change,[16, 26-28] but are outside the scope of this review.

Substance use and sexual HIV risk

The role of substance use in the ongoing HIV epidemic is receiving increasing attention.[29, 30] Substance abuse is associated with multiple high risk sexual behaviors, including sex for drugs, unprotected sex, and having multiple partners.[11, 12, 31] Early studies of HIV transmission among drug using populations focused on intravenous drug abusers due to the direct risk associated with injection practices. However, a strong association also exists between use of injection and non-injecting substances and high risk sexual behavior.[32] Previous studies have identified elevated risk of both unsafe

sexual practices and HIV infection among abusers of alcohol, marijuana, non-injecting opioids, cocaine, and methamphetamine.[32-34]

Latka et al. described predictors of unprotected heterosexual sex in a population of HIV-positive injection drug-using women.[16] In multivariate analysis stratified by partner type, factors associated with high risk sex with main partners included low self-efficacy for safe sex, low personal responsibility for limiting HIV transmission, and lower perception of partner's support for safe sex. High risk sex with casual partners was associated with higher psychological distress, participation in transactional sex, and low self-efficacy for safe sex. In an analysis of male HIV-positive injection drug users from the same study,[10] Purcell et al. reported that unprotected sex with HIV negative or unknown main partners was associated with low self-efficacy for condom use, weaker partner norms supporting condoms, and more negative condom beliefs. For unprotected sex with HIV negative or unknown casual partners, low self-efficacy for condom use was again significant, as were transactional sex and lower education. The authors concluded that high risk sexual behavior among injection drug-using individuals was a prevalent mode of transmission, and that interventions among drug users should attempt to address the specific predictors of sexual risk behavior.

Crack cocaine and HIV

The nature of the association between crack cocaine and HIV continues to evolve.[30] Crack use has been independent associated with HIV positive serostatus in multiple studies, and this association is widely thought to be caused by increased sexual risk behavior associated with crack use.[35-40] Individuals who use crack cocaine are

more likely than non-users to have multiple partners, engage in transactional sex, to participate in drug use before or during sex, to have unprotected sex, and to be infected with HIV.[35, 41-43] This is thought to be due to the "master role of the addict," which refers to the fact that individuals addicted to crack cocaine often prioritize acquisition and use of the drug ahead of other personal needs. This results in exchanging sex for money or drugs, as well as deprioritizing personal safety in sexual encounters.[35, 44, 45] Higher levels of impulsivity have been reported among users of crack cocaine, compared to other drug users.[46] Additionally, the euphoric high associated with crack cocaine has been found in qualitative studies to result in hypersexuality due to augmentation of physical pleasure and impaired judgment.

Crack use may also have biological effects on the risk of sexual HIV transmission. Bagasra and Pomerantz found that HIV replication in vitro was significantly higher when cocaine metabolites were present.[47] This may result in an increased risk of infection after exposure to HIV, and may also increase infectivity in HIV-infected individuals via increased viral load. Cook et al. reported an association among women between crack use and progression of HIV disease, including greater rate of CD4 cell loss, and higher viral loads, and higher rates of death from AIDS-related causes.[48] Thus, use of crack cocaine is thought to contribute significantly to sexual transmission of HIV among marginalized, urban populations.

Fewer studies have described sexual behavior specific to the overlapping population of HIV-positive crack cocaine users. Schönnesson et al. performed a cluster analysis of correlates of HIV risk behavior in a population of 258 African-American, self-identified heterosexual, HIV infected crack cocaine users recruited through HIV service

agencies and from a hepatitis B vaccine study in Houston, Texas.[49] The cluster analysis identified one group of individuals with high prevalence of multiple sexual risk behaviors, including inconsistent condom use (100% of group members), three or more sexual partners (88%), transactional sex (68% having traded sex for money, 56% having traded sex for drugs), and more than once daily crack use (50%). The other two groups produced by the cluster analysis were defined by (1) inconsistent condom use without multiple partners or transactional sex and (2) consistent condom use. Compared to these other groups, the high sexual risk group had a higher proportion of illegal sources of income, higher proportion of binged crack use, daily alcohol use, same gender sex partners, and more prevalent depressive symptoms. Hypothesized psychologic mediators of behavior such as attitudes toward condom use, condom use self-efficacy, and condom use responsibility, were not significantly different for the highest risk group compared to the two other groups in one-way ANOVA. This was likely due to the fact that two groups were defined by inconsistent condom use (with one exhibiting other high risk activities or partners, and another exhibiting otherwise safe behavior), so differences in condom-specific behavioral mediators were unlikely to be detected. While this study identified several significant associations with membership in the highest risk group, it was limited by its use of an in-treatment population and a population who universally self-identified as heterosexual, both of which limit the degree to which results can be generalized to other groups of HIV infected crack cocaine users.

In a study of heterosexually active, African-American, HIV-positive crack smokers in Houston, Texas, Harzke et al. found that individuals who reported binge use of crack cocaine (explained as “using as much drug as you can, until you run out of drug

or are unable to use any more") had more sex partners, more prevalent sex trade behavior, and less consistent condom use than non-bingers.[50] Prevalence of binge use among users of crack cocaine was high (77%) in this population. This study provides further evidence for the connection between crack use and high risk sex among HIV-positive individuals. However, the participants that were studied were recruited from health clinics and social service agencies, so generalization of results to populations who do not seek these kinds of care or assistance may be limited.

Timpson, et al. studied factors associated with sexual risk behaviors and with consistent condom use in a population of HIV-positive, African American users of crack cocaine who were receiving antiretroviral medications.[51] The dependent variable in this study was intent to use a condom for a specific sexual act within a specific time frame, and data was stratified by partner type (main, casual, trade) for both collection and analysis. Independent variables examined for correlation with the dependent variables included demographic characteristics, drug use, sexual behaviors, psychosocial scales (e.g. depression, risk taking), and "cognitive escape" scales,[52] (e.g. "I have sex without a condom when I feel angry"). In a multivariate model, Timpson, et al. found that transactional sex, high social conformity scores, high scores indicating need for help with drugs, and substance use escape scores were significantly associated with intent to use condoms with casual partners. Intent to use condoms with a main partner was significantly associated with the main partner being HIV-positive, with high need for help with drugs, and with substance use escape scores. This study did not evaluate direct behavioral mediators such as self-efficacy, empowerment, perceived risk, and attitudes toward condoms. Also, its use of a population that uses crack cocaine but is also in care

and receiving antiretroviral treatment for HIV is a limitation on generalizability, since users of crack cocaine are often insufficiently stable or reliable to begin antiretroviral treatment.

Campsmith et al. examined correlates of sexual risk behavior among users of crack cocaine interviewed as part of the Centers for Disease Control and Prevention Supplement to HIV/AIDS Surveillance (SHAS) project, a cross-sectional interview-based behavioral survey of individuals identified to be HIV-positive through routine case surveillance.[53] They reported that a higher prevalence of sexual risk behavior among individuals who had used crack since HIV diagnosis, compared to those who had used crack before HIV diagnosis but not after. In multivariate analysis stratified by sexual orientation, crack use was a predictor of all defined sexual risk behaviors (unprotected sex with main partner, unprotected sex with casual partner, multiple sex partners, transactional sex) for MSM. For heterosexual men, crack use was significantly associated with unprotected sex with casual partners, having multiple sex partners, and (for black heterosexual men only) engaging in transactional sex. Finally, for heterosexual women, crack use was associated with unprotected sex with a main partner, having multiple partners, and participating in transactional sex. The authors controlled for a limited set of covariates in their models, including age, race/ethnicity, education, HIV versus AIDS, time since HIV diagnosis, and history of injection drug use. The authors concluded that the behaviors associated with acquiring and using crack cocaine are associated with substantially increased risk of sexual transmission of HIV. While this study enhanced the relationship between crack use and sexual risk behaviors among HIV positive individuals

in the literature, it did not attempt to describe the cognitive or psychological mediators of those behaviors.

The present study aims to further describe characteristics, behaviors, and attitudes contributing to high risk sexual practices among HIV-infected, urban crack cocaine users. By identifying underlying reasons for engagement in behaviors that put sexual partners at risk of HIV infection, clinicians, public health practitioners, and researchers will be able to tailor education and prevention messages to specific cognitive and psychological mediators in this population.

CHAPTER II: MANUSCRIPT

Predictors of High Risk Sexual Behavior Among HIV-Infected Crack Cocaine Users in Two US Urban Centers

Lindsay Boole, B.S.E.

Abstract

Background: HIV incidence in the United States is largely driven by sexual transmission in urban centers. There are limited data describing correlates of high risk sexual behavior among HIV-infected crack users.

Methods: Interviews were conducted at bedside with sexually active, HIV-infected crack cocaine users who were recruited from the inpatient wards at Jackson Memorial Hospital in Miami, Florida and Grady Memorial Hospital in Atlanta, Georgia, between August 2006 and March 2010. Participants were asked about sociodemographic characteristics, HIV clinical indicators, and psychosocial factors. Scales measuring several hypothesized mediators of sexual behavior, including knowledge, motivation, and preparatory behaviors, were assessed. Multiple logistic regression was performed to identify factors associated with sexual risk behavior.

Results: Among 411 study participants, 34.6% reported high risk sexual behavior in the prior six months. In multivariate modeling, sexual risk behavior was associated with low self-efficacy for condom use (aOR=2.22; 95%CI=1.37-3.60), low perceived risk of HIV transmission (aOR=2.58; 95%CI=1.37-4.87), multiple sexual partners (aOR=2.59; 95%CI=1.60-4.21), and intoxication during most recent sexual encounter (aOR=1.72; 95%CI=1.05-2.79). Participants of black race and men who had sex with men were less likely to engage in high risk sexual behavior (aOR=0.41; 95%CI=0.20-0.86 and aOR=0.40; 95%CI=0.24-0.68 respectively). In stratified analysis of females, high risk sexual behavior was associated with low self-efficacy for condom use (aOR=2.56; 95%CI=1.26-5.21), low perceived risk of HIV transmission (aOR=3.03, 95%CI=1.21-7.61), low social support (aOR=2.02; 95%CI=1.00-4.06), and multiple sexual partners (aOR=4.53, 95%CI=2.19-9.34). Women of black race were less likely to engage in high risk sexual behavior when compared to non-black women (aOR=0.22; 95%CI=0.06-0.74). Among males, low self-efficacy for condom use (aOR=3.27; 95%CI=1.52-7.04) and heterosexual men (aOR=2.96; 95%CI=1.34-6.56) remained significantly associated with high risk sex, lack of risk reduction behaviors (aOR=2.35; 95%CI=1.08-5.12) and engaging in transactional sex (aOR=2.56; 95%CI=1.14-5.71) were additional predictors.

Conclusions: A significant proportion of HIV-infected crack users are participating in high risk sexual behavior. Interventions promoting safe sex in this population should emphasize risk of HIV transmission inherent to sexual encounters with susceptible individuals and should attempt to build condom-specific self-efficacy.

Introduction

An estimated 56,000 new HIV infections occur each year in the United States.[1] Incidence of HIV is highest in urban centers, and in the Southeast region, including Georgia and Florida.[2] Currently, sexual transmission is responsible for most new cases, with 53% of new HIV infections attributable to sexual transmission among men who have sex with men (MSM) and 31% occurring with heterosexual contact.[1] Prevalence of HIV infection has increased dramatically in the past 15 years due to increased life expectancy attributable to highly active antiretroviral therapy (HAART).[3] An estimated 1.1 million adolescents and adults living with HIV in the United States.[4] With continually increasing prevalence of HIV infection, the role of HIV positive individuals in the perpetuation of the HIV epidemic is receiving increasing attention.[5, 6]

Individuals who use crack cocaine contribute significantly to HIV transmission among marginalized, urban populations via high-risk sexual practices. Users of crack cocaine are more likely than non-users to have multiple partners, engage in transactional sex, to participate in drug use before or during sex, and to have unprotected sex.[35, 41-43]

Characteristics associated with high risk sex among HIV-infected individuals include gender, lower income, multiple sexual partners, binge drinking, and drug use prior to sex.[11, 13, 16] Prevention knowledge, risk perception, and basic understanding of HIV transmission biology are associated with decreased likelihood for engagement in high risk sexual behavior.[17] Low perceived personal responsibility for preventing transmission to susceptible partners and negative attitudes about condoms have also been associated with high risk sex among HIV positive individuals.[10, 11, 16, 23] Finally,

low self-efficacy for safe sex and lack of risk-avoidance strategies have also been associated with high risk sex.[16] However, little data exists to describe sexual behavior specific to the overlapping population of HIV-positive crack cocaine users.

This study aims to identify factors contributing to high risk sexual practices among a population of HIV-infected, urban crack cocaine users. By identifying underlying reasons for engagement in behaviors that put sexual partners at risk of HIV infection, clinicians and researchers will be able to appropriately tailor education and prevention messages in this population.

Methods

Study Population and Data Collection

Data analyzed for this study were collected as part of the baseline assessment in an NIH/NIDA funded study of a behavioral intervention study for sexually active HIV infected crack users called Project HOPE (Hospital Visit is an Opportunity for Prevention and Engagement with HIV positive Crack Users (NIH/NIDA RO1 DA017612-01A2). Study participants were recruited from the inpatient wards at Jackson Memorial Hospital in Miami, FL and Grady Memorial Hospital in Atlanta, GA. During the study recruitment period, all HIV positive inpatients who were interested in learning about the study were screened for eligibility. To be eligible for the study, participants were required to meet the following criteria: (1) at least 18 years of age, (2) HIV positive, (3) report being sexually active during the previous six months, (4) report using crack cocaine during the previous two years, (5) report no use of injection drugs in the past 12 months, (6) willing

to provide contact information for study follow-up, (7) and capable of communicating in English. Written informed consent was obtained from participants.

Between August 2006 and March 2010, baseline assessments were administered at participants' bedsides through the A-CAPI (Audio-Computer Assisted Personal Interview) method. The structured interview lasted approximately two hours and consisted of questions about demographics, drug use and sexual activity patterns, clinical status, and psychosocial characteristics. Participants were compensated $25.00 upon completion of the interview. All data were de-identified; identifiers and contact information remained confidential and were kept separately from study data. All research was reviewed and approved by the institutional review boards of both the University of Miami and Emory University, and by the research oversight committees of Jackson Memorial Hospital and Grady Memorial Hospital.

Variables and Measures

Sexual Behaviors

The dependent variable of interest for this analysis was unprotected vaginal or anal intercourse with partner(s) of HIV negative or unknown serostatus (susceptible partners) in the previous six months. Participants reported their specific sexual activities in the previous six months, first by type of partners, then by type of sex. One series of questions asked about sexual activity by partner type. Participants were asked to quantify (1) each type of partner (main or love partner, partner with whom participant exchanged sex for money/drugs, or casual partner), then for each category of partner, (2) number of partners who the participant perceived to be HIV positive, HIV negative, and unknown

serostatus, and (3) whether condoms were used consistently with each of those partner type-serostatus combinations (yes/no). Another series of questions asked about sexual activity by type of sex. Men reported (1) number of times they participated in insertive/receptive anal intercourse with male partners and vaginal and anal intercourse with female partners, (2) perceived serostatus of partners engaging in each type of sex, and (3) whether condoms were used all the time during each sex type-serostatus combination. Women reported (1) number of times they engaged in vaginal or anal intercourse with male partners, (2) perceived serostatus of partners engaging in each type of sex, and (3) whether condoms were used all the time during each sex type-serostatus combination.

The outcome of interest for this analysis was unprotected vaginal or anal intercourse with susceptible partners (subsequently referred to as "high risk sex"). High risk sex was defined as less than 100% condom use during vaginal or anal intercourse with susceptible partners. This definition was used because only consistent condom use is associated with reduced transmission of HIV.[54] Due to the face-to-face nature of the A-CAPI interviews and the hospital setting, social desirability bias toward underreporting of high risk sex was expected. Therefore, if high risk sex was reported in either of the two series of sexual behavior questions, it was considered to be present.

Demographic Characteristics

Demographic variables included gender, age, race, self-identified sexual orientation, marital status, highest level of education completed, employment status, and annual income. Because self-identified sexual orientation is known to correlate poorly

with sexual behavior,[55] men were also categorized by gender of their partners. Based on self-reported sexual behaviors over the last six months, men were classified as either MSM (men who have sex with men, including men who have sex with both men and women) or MSW (men who have sex with women only). Women were not sub-categorized by partner gender, as only vaginal and anal intercourse were considered to be high risk. Homelessness was determined by participants' answer to the question "Currently, do you consider yourself to be homeless?" and by whether they reported sleeping in a shelter, on the streets, in an empty building, or in a public place in the last week.

Clinical Characteristics

Variables included time since initial HIV diagnosis, patient knowledge of CD4 count (yes/no), self-reported CD4 count, patient knowledge of viral load (yes/no), self-reported viral load, and current use of HIV-related medications (yes/no).

Sexual Behavior, Substance Use and Psychosocial Factors

Subjects reported number of sexual partners and participation in transactional sex in the past six months. Number of sexual partners was dichotomized as one partner or more than one partner. Categorization of this variable into a greater number of categories (1, 2-5, >5 or 1, 2-10, >10) was examined but did not add any additional information or significance compared to the original categorization. Participation in transactional was determined by the answer to the question "Of the people you had vaginal or anal sex with in the past 6 months, how many were trade partners, that is, you and he or she exchanged

sex for money or drugs?" with any answer greater than zero indicating participation in transactional sex.

Use of alcohol was reported, including any alcohol use (yes/no), frequency of alcohol use in prior six months (daily/less than daily), and binge drinking behavior in prior six months (consuming ≥5 drinks in any day). Drug use measures included lifetime use of injection drugs (yes/no), current injection drug use (yes/no), and frequency of crack cocaine use (daily/less than daily). Substance use during most recent sexual encounter (yes/no) was also reported.

Social support was measured by the 19-item Medical Outcomes Study (MOS) Social Support Scale. The scale measures social support on four subscales: emotional/informational (e.g. "someone to give you advice about a crisis"), tangible (e.g. "someone to take you to the doctor if you needed it"), affectionate (e.g. "someone who hugs you"), and positive social interaction (e.g. "someone to have a good time with") with responses measured by 5-point Likert scales ranging from "none of the time" to "all of the time." The overall support index was determined by averaging responses from the 19 items, as described by Sherbourne,[56] then dichotomizing the mean scores with the cut point between the scores corresponding to "some of the time" and "most of the time." This dichotomy was believed to represent the most meaningful division between high social support (average answer of at least "most of the time") and low social support (average answer "some of the time" or less).

The 6-item Brief Symptom Inventory Depression Scale was used to measure depression, and was scored by combining the items (range 0-24, higher score indicating more depressive symptoms). As described in the scoring instructions, participants were

dichotomized with cut-off scores of ≥7 for men and ≥9 for women, to identify participants exhibiting depression.[57] In single-item questions, subjects reported any adult history of physical (yes/no) and sexual abuse (yes/no).

Mediators of Sexual Behavior

Knowledge of HIV prevention methods was considered to be an important foundation for safe sexual behavior, and was measured by two scales. Knowledge about HIV prevention and self-care was measured by an 18-item scale of true-false items used in the Interventions with Seropositive Injection Drug Users (INSPIRE) study.[10] A scale score was calculated by computing number of correct answers for both general knowledge and for knowledge specific to prevention of sexual transmission. Both scores were dichotomized, with ≥80% correct answers indicating a high level of knowledge.

Motivation to practice safe sexual behaviors was believed to be a product of perceived risk of unprotected sex, personal responsibility for avoiding transmission and negative attitudes toward condom use, as described by multiple models of behavior change.[18, 19, 22] Perceived risk of unprotected sex was measured by the question "If you had anal or vaginal sex without a condom today with a partner who does not have HIV, what risk do you think there is that you would transmit the virus to that partner?" Answers were reported on a 10-point Likert scale, with higher score indicating higher risk perception, then were dichotomized (low to moderate versus high perceived risk). Perceived personal responsibility was measured by an 11-item scale originally developed for a study of HIV-positive MSM[17] and previously adapted for INSPIRE,[10] which assessed the extent to which participants believe that the burden lies with HIV positive

individuals to protect their susceptible partners in a variety of scenarios. Answers were reported on 5-point Likert scales indicating strength of participant agreement with statements placing responsibility for safe sex on HIV positive individuals. Scores were computed by averaging participant responses, then dichotomized (disagreement to ambivalence versus agreement). Negative condom beliefs, or beliefs that condoms would reduce sexual pleasure (e.g. “condoms ruin the mood”) were measured on a 4-item scale used previously in INSPIRE[10] and adapted from the “hedonistic outcome expectancy” scale developed for a study of HIV positive MSM.[58] Answers were on 5-point Likert scales indicating strength of participant agreement with negative statements about condoms. A negative belief score was calculated by averaging participant responses, then dichotomized (positive to neutral condom beliefs versus negative condom beliefs).

Self-efficacy for condom use was measured by a 10-item scale which inquired about participants’ confidence to use condoms in a variety of situations. Self-efficacy to disclose HIV status to partners in a range of situations was measured by a seven item scale. Self-efficacy to avoid being high or intoxicated during sexual activity was measured by a three items, each specific to a category of partner (main, trade, casual). General personal empowerment was assessed by the 28-item Empowerment Scale developed by Rogers.[59] All self-efficacy and empowerment items employed five-point Likert scales and were previously used in INSPIRE.[10] Scores for each scale were calculated by averaging responses, with higher scores representing greater self-efficacy, then dichotomized (“pretty sure” or “absolutely sure I can” versus “absolutely sure I cannot” to “not sure”).

Past behavioral intention was measured by eight questions related to participants' history of behaviors related to safe sex preparedness (e.g. "I found out my partner's HIV status ahead of time," "I have kept condoms with me in my pocket or my purse"). Score was calculated as proportion of "yes" responses, then dichotomized (≥50% versus <50% of behaviors reported).

Data Analysis

In univariate analysis, the study population was characterized by demographic factors, clinical status, psychosocial variables, and hypothesized behavioral mediators. These characteristics were described for the entire study population and for strata by gender. For the stratified analysis, χ^2 tests or Fisher exact tests (if expected value of any cell was <5) were performed to detect differences in distribution of variables between male and female participants.

Bivariate analyses were performed to identify the factors independently associated with the outcome of high risk sex, both in the overall study population and in the population stratified by gender. Association of each predictor with the outcome was assessed using χ^2 tests or Fisher exact tests (if expected value of any cell was <5).

Multivariate logistic regression models were conducted to identify variables associated with the dependent variable while controlling for confounding. Because mediators of sexual behavior were hypothesized to be gender-specific, separate models were constructed for (1) the overall study population, (2) males, and (3) females. All independent variables with p values ≤0.20 in bivariate associations with the dependent variable were included in the initial model. Forward stepwise selection was used to arrive

at the final model, with variables entered into the model in the following order: behavioral mediators, variables describing sexual behavior, variables describing substance use, variables describing clinical/medical status, demographic characteristics. A significance level of p=0.1 required for each variable to be entered into the model, and the same significance level was used for each variable to be kept in the model. SAS version 9.2.0 was used for statistical analysis.

Results

Sample Characteristics

Between August 2006 and March 2010, 3267 HIV-infected patients who were hospitalized at Grady Memorial Hospital or Jackson Memorial Hospital were screened for eligibility for Project HOPE. Of those, 413 who were HIV-infected and were users of crack cocaine were enrolled and completed a baseline interview. Characteristics of screened patients have been reported elsewhere.[60] Two participants reported zero sexual partners over the prior six months, possibly due to deception at the time of screening. They were excluded from the current analysis because it could not be determined whether their lack of sexual activity was motivated by a desire to avoid transmission risk, or to other personal or partner-related factors. Therefore, 411 participants were included in this analysis.

High Risk Sexual Behavior

Presence of absence of high risk sex in the six months prior to survey could be determined for 407 participants. Of those, 141 individuals (34.6%) had engaged in high

risk sexual behavior. Prevalence varied across gender strata, with 28.4% of men and 40.5% of women reporting high risk sex.

Demographic Characteristics

Individual characteristics of the study population are presented in Table 1. Mean age of the study sample was 44.4 years (SD 7.3 years), most were African American (89.2%), heterosexual (80.3%), and single (66.2%). Educational attainment was low with 216 participants (52.6%) reporting less than a high school diploma or equivalent. Most participants (97.1%) reported no steady employment, and 263 (64.9%) reported annual income less than or equal to $5,000, with 37 (9.1%) reporting no income. At the time of baseline survey administration, 162 individuals (39.7%) were homeless.

Men were significantly more likely than women to be single and never married (p=0.0257 for trend), to have completed high school or a GED (55.3% versus 40.6%, p=0.0028), to be employed (5.1% versus 0.9%, p=0.0133), to have higher annual income (p=0.0050 for trend), and to be homeless (45.2% versus 34.6%, p=0.0291).

When males' self-reported sexual orientation was compared with their sexual behavior (Table 2), all men (100.0%) who reported homosexual orientation, plus 3 (2.2%) participants who reported heterosexual orientation were found to be behaviorally MSM. Among those who reported bisexual orientation, nearly one-third (29.2%) were actually exclusively heterosexual. The two subjects who reported "other" sexual orientation were behaviorally MSM. The overall prevalence of discrepancy between self-reported orientation and behavior among men was 6.1%. Behavioral orientation was deemed to more appropriately represent sexual risk for the sake of subsequent analyses.

Clinical Characteristics

Initial HIV diagnosis occurred more than five years prior to study entry for 261 participants (70.0%). A majority of subjects (79.3%) had attended HIV care since their diagnosis, and 210 (64.0%) had attended HIV care in the prior six months. Personal knowledge of clinical markers was low, with 167 participants (40.6%) aware of their CD4 count and 68 participants (16.6%) aware of their HIV-1 viral load. Of those, approximately half (52.1%) reported a CD4 count of less than 200 cells/μL, and approximately half (53.0%) reported an undetectable HIV-1 viral load (<400 copies/ml). A minority of study participants (28.5%) reported taking any medications related to their HIV diagnosis. Results are displayed in Table 3a.

Gender differences are shown in Table 3b. Male participants had been diagnosed with HIV for longer than females (p=0.0288 for trend), were more likely to have attended HIV care (84.9% versus 74.1%; p=0.0071), and were more likely to know their CD4 count (45.5% versus 36.2%; p=0.0050) or HIV-1 viral load (21.6% versus 11.7%; 0.0065).

The variables for lifetime attendance to HIV care, recent HIV care, knowledge of CD4 count, knowledge of HIV-1 viral load, and use of HIV-related medications were suspected to exhibit collinearity and so were tested for correlation. Ever having attended HIV care and recent HIV care were strongly correlated (rho=0.79; p<0.0001), but recent HIV care was weakly correlated with knowledge of CD4 count (rho=0.15; p=0.0063), knowledge of viral load (rho=0.29; p<0.0001), and use of HIV medications (rho=0.36; p<0.0001).

Psychosocial Factors

Table 3a also displays distribution of sexual behavior, substance use, and psychosocial factors in the study population. Multiple sexual partners were reported by 165 participants (40.2%) and 103 participants (25.4%) reported trading sex for money or drugs in the prior 6 months. A significant minority (19.2%) used alcohol daily, and half (49.4%) reported any heavy alcohol consumption (≥5 drinks in one day). Prevalence of injection drug use was low, with 89 participants (21.7%) reporting ever using injection drugs and 15 participants (3.7%) currently using injection drugs. Daily use of crack cocaine was reported by 149 participants (36.9%). Approximately half (48.9%) reported being intoxicated during their most recent sexual encounter. Approximately half the study population (55.3%) had high social support. A significant minority (35.0%) had evidence of depression. Adult history of victimization was prevalent, with 166 (40.7%) individuals reporting physical abuse and 131 (32.4%) reporting sexual abuse.

Men were significantly more likely than women to report any alcohol use (75.8% versus 62.9%; p=0.0049), heavy alcohol use (54.6% versus 44.6%; p=0.0439), ever having used injection drugs (28.8% versus 15.1%; p=0.0008), and recent injection drug use (5.6% versus 1.9%; p=0.0480). More men than women reported multiple sexual partners, but this association did not reach statistical significance. (44.4% versus 36.2%; p=0.0865). Women were significantly more likely to report daily use of crack cocaine (43.3% versus 29.9%; p=0.0052). Women also had higher social support (62.7% versus 47.2% categorized as “high”; p=0.0016) and were more likely to report a history of

physical attack/abuse (56.1% versus 24.0%; p<0.0001) or sexual abuse (53.4% versus 10.2%; p<0.0001).

Despite the relatively low number of MSM, further analysis was undertaken of the male population in an attempt to determine whether greater health service utilization exists among MSM compared to MSW. MSM were more likely than MSW to know their CD4 count (59.7% versus 39.7%; p=0.0108), and there were trends toward having ever attended HIV care (91.2% versus 82.3%; p=0.1114), having attended HIV care in the past six months (76.1% versus 63.0%; p=0.1132), and knowing their HIV-1 viral load (28.1% versus 19.2%; p=0.1681).

Variables that were suspected for collinearity were tested for correlation. There was a moderate correlation between having multiple sexual partners and engaging in transactional sex (rho=0.55; p<0.0001). Transactional sex was not well correlated with physical (rho=0.05; p=0.3324) or sexual attack (rho=0.04; p=0.4712). Daily alcohol use and heavy alcohol use were moderately correlated (rho=0.38; p<0.0001). Daily crack use was weakly correlated with having been intoxicated during the most recent sexual encounter (rho=0.25; p<0.0001). Daily alcohol use was negligibly correlated with intoxication during most recent sexual encounter (rho=0.13; p=0.0094). Adult physical and sexual attack/abuse were moderately correlated (rho=0.59; p<0.0001).

Behavioral Mediators

Most participants (83.8%) answered at least 80% true/false questions regarding HIV prevention principles correctly. Knowledge specific to sexual transmission was similar, with 76.6% of participants answering correctly at least 80% of the time. Men

were significantly more likely than women to have high knowledge (88.8% versus 79.3%; p=0.0090 and 82.1% versus 71.6%; p=0.0126).

Variables measuring motivation for safe sexual behavior varied. Perceived risk of HIV transmission associated with personal unprotected sex with an HIV negative partner was high, with 347 participants (84.6%) reporting high to very high perceived risk. Men and women did not significantly differ in their risk perception. Perceived personal responsibility for preventing HIV transmission was low, with 22.1% of participants reporting agreement with most statements related to the responsibility of HIV infected individuals to reduce risk in a variety of situations. Negative beliefs about condoms' impact on the quality of sex were also prevalent, with 31.3% possessing negative beliefs and attitudes about condoms. While risk perception did not differ between gender, men were significantly more likely than women to possess negative condom beliefs (38.1% versus 25.0%; p=0.0044). Self-efficacy for condom use was high, with many participants (59.1%) reporting that they felt at least "pretty sure" that they could use condoms in a variety of situations. Self-efficacy was also high for avoidance of intoxication during sexual intercourse (68.3%), but lower for disclosing HIV seropositivity to sexual partners (high for 46.2% of participants). General personal empowerment was very low, with 5.9% of the population reporting high general empowerment. Self-efficacy not differ significantly by gender, but men were significantly more likely to have high empowerment than women (8.6% versus 3.3%; p=0.0220).

Many individuals (74.2%) reported that they had performed at least half of the named risk reduction and preparatory behaviors in the prior six months, and there was a

trend toward greater prevalence of these behaviors in women, though this difference did not reach statistically significance (77.9% versus 70.2%; p=0.0734).

Behavioral mediators were not studied for correlation; they were hypothesized to correlate to some degree based on their interrelationships in the frameworks of behavioral theories from which they were drawn.

Bivariate Analysis

Bivariate analyses examining the unadjusted relationships between the independent variables and high risk sex are presented in Tables 4a-c. In the overall study population (Table 4a), high risk sex was associated with female gender, younger age, white race (compared to black), self-identification as bisexual (compared to heterosexual), current homelessness, more recent HIV diagnosis (≤1 year versus >5 years), never having attended HIV primary care, and not currently taking HIV-related medications. Sexual, substance abuse-related, and psychosocial characteristics associated with high risk sex included having multiple sexual partners, participation in transactional sex, daily crack use, intoxication during most recent sexual encounter, adult history of physical abuse, and adult history of sexual abuse. High risk sex was not associated with general HIV prevention knowledge score, nor with knowledge score for sexual prevention. There were significant associations with lower perception of risk, negative attitudes toward condoms, and lower self-efficacy for condom use. The unadjusted associations for lower self-efficacy for HIV status disclosure and lower self-efficacy for avoidance of substance use during sex approached, but did not achieve, statistical

significance. High risk sex was inversely associated with performance of risk avoidance and preparatory behaviors, and this association was significant.

For men (Table 4b), unadjusted predictors of high risk sex included white ethnicity (compared to black), having sex exclusively with women (compared to having any male sexual partners), not being on HIV-related medications, having multiple partners, participating in transactional sex, and having been intoxicated during the most recent sexual encounter. Less than one year duration of HIV diagnosis (compared to >5 years), daily crack use, and adult history of sexual abuse or attack approached, but did not achieve statistical significance. Behavioral mediators that were significantly associated with high risk sex among men included lower perceived risk of transmission, negative condom attitudes, lower self-efficacy for condom use, and performance of fewer risk reduction and preparatory behaviors.

For women (Table 4c), unadjusted predictors of high risk sex included younger age, current homelessness, never having been to HIV care, having multiple partners, participating in transactional sex, daily crack use, and having been intoxicated during the most recent sexual encounter. White race (compared to black), self-reported CD4 cell count less than 200 cells/μL, and lower social support approached, but did not achieve, statistical significance. Behavioral mediators that were associated with high risk sex among women included lower perceived risk of transmission, lower self-efficacy for condom use, and lower self-efficacy for avoidance of intoxication during sex.

Multivariate Analysis

The multivariate analysis of the total study population is presented in Table 5a. Significant predictors of high risk sex included low self-efficacy for condom use (aOR=2.22; 95%CI 1.37 to 3.60), low perceived risk of sexual transmission during a single sexual encounter (aOR=2.58; 95%CI=1.37 to 4.87), multiple sexual partners (aOR=2.59; 95%CI=1.60 to 4.21), and having been intoxicated during most recent sexual encounter (aOR=1.72; 95%CI=1.05 to 2.79). There were negative (protective) associations with black ethnicity (aOR=0.41; 95%CI=0.20 to 0.86) and male same-gender (MSM) sexual behavior (aOR=0.40; 95%CI=0.24 to 0.68). Not taking HIV-related medications approached, but did not achieve, statistical significance (aOR=1.60; 95%CI 0.92 to 2.78) as a predictor of high risk sexual behavior.

Stratified models for males and females resulted in a different predictor set for each gender (Tables 5a-b). For males, significant predictors of high risk sex included few preparatory behaviors for safe sex (aOR=2.35; 95%CI=1.08 to 5.12), low self-efficacy for condom use (aOR=3.27; 95%CI=1.52 to 7.04), having sex exclusively with female partners (aOR=2.96; 95%CI 1.34 to 6.56), and engaging in transactional sex (aOR=2.56; 95%CI=1.14 to 5.71). Not taking HIV-related medications again approached, but did not achieve statistical significance (aOR=2.27; 95%CI=0.96 to 5.40). For females, significant predictors of high risk sex included low self-efficacy for condom use (aOR=2.56; 95%CI=1.26 to 5.21), low perceived risk of sexual transmission (aOR=3.03; 95%CI=1.21 to 7.61), multiple sexual partners (aOR=4.53; 95%CI=2.19 to 9.34), and low social support (aOR=2.02; 95%CI=1.00 to 4.06). Black ethnicity was inversely correlated with high risk sex (aOR=0.22; 95%CI=0.06 to 0.74).

Discussion

This study sought to describe predictors of high risk sex among HIV positive crack users in two urban, southeastern cities. The population described here consisted of HIV positive individuals who had been hospitalized on the inpatient wards of two inner-city hospitals. Compared with the previous studies of sexual risk behavior among HIV positive individuals, which have often recruited patients from clinics or other health services, the hospital based recruitment used in this strategy allowed for a substantial portion of the population to be comprised of individuals who do not seek regular health services. Patients in the inpatient setting are in acute health crises, and thus likely represent a substantially less healthy group of individuals, compared to those attending outpatient services, HIV outreach services, or from street-based recruiting. Therefore, the present study population likely represented a uniquely disfranchised population, compared with other studies of sexual behavior in HIV positive and/or drug using individuals.

Direct mediators that have been theorized to predict health behaviors, such as knowledge, motivation, self-efficacy, and behavioral intention, were assessed in an exploratory manner. Self-efficacy for condom use was a significant predictor of sexual risk in the overall sample, and in both gender strata. Condom self-efficacy was the predictor with the largest magnitude relationship with high risk sex, both in the overall sample and among males.

Risk perception was significant among the overall study population, but was only significant for females in the stratified analysis. If causal, this interaction would suggest

that females would be more likely than males to be motivated by concern for reducing transmission. An extension of this explanation would suggest that females are motivated to protect their partners. However, the variable that directly assessed perceived personal responsibility for preventing transmission to one's sexual partners was not significant in any of the bivariate analyses (overall sample, males, females), nor in the multivariate analyses. Therefore, the nature of the differential mediation of risk reduction by risk perception among men and women remains unclear, and may be further understood in future studies by inquiring specifically about how risk perception translates into motivation for safe sex among women.

Finally, among males, history of preparatory and risk reduction behaviors was protective, but this variable was not significant for women and did not achieve significance in the total sample. In bivariate analysis, males were less likely to have exhibited these preparatory behaviors. This may suggest that, while women are performing preparatory and risk reduction behaviors, these behaviors more often fail to result in safe sex. Men's performance of the same behaviors, on the other hand, may be more likely to result in the desired outcome of safe sex. Among women, frequent performance of positive behaviors without achieving the desired result may be an underlying cause of low self-efficacy for safe sex.

The association of African American ethnicity with decreased sexual risk behavior was consistent with recent data disputing the longstanding role of black race as a risk factor for unprotected sex.[34, 61, 62] This may be due to targeting of public health efforts to ethnic minority populations. Similarly, the fact that men who have sex with men were less likely to engage in sexual risk behavior, compared with exclusively

heterosexual males, was unexpected. Knight et al. recently reported that, among HIV-infected injection drug users, behaviorally bisexual men were more likely than MSM to exhibit sexual risk behavior.[63] However, high risk sex did not differ significantly between MSM and exclusively heterosexual males in that study. The difference here between MSM and exclusively heterosexual males may be due to increased health service utilization and prevalence of HIV services targeted to MSM populations. In support of this explanation is the fact that males were more likely than females to have ever been to HIV care, were more likely to be aware of their clinical indicators, and were more likely to be taking HIV-related medications, all of which indicate greater health care utilization of males in the study population. Among males, MSM were more likely than MSW to report these health care utilization characteristics, though most did not reach statistical significance, likely due to small sample size within strata resulting in inadequate statistical power.

The health care utilization variable that was most strongly associated with the outcome in this study was use versus nonuse of HIV-related medications. Being on HIV-related medications was negatively associated with high risk sex among the overall sample and the male stratum (though neither achieved statistical significance at the $p=0.05$ level). If this trend were significant, it would be consistent with previous findings associating being in care with decreased sexual risk behavior in the general HIV-infected population.[64]

Having multiple sexual partners was significantly associated with high risk sex in the total sample; this association persisted in the female stratum but was not significant for males. In the male stratum, however, participation in transactional sex was a

significant predictor. This pattern is explained by the moderate correlation between multiple partners and participation in transactional sex. Each adjusted multivariate model appropriately retained only the one of these two variables that was most strongly correlated with high risk sex. Intoxication during the most recent sexual encounter was a significant predictor in the overall sample, but did not persist in the stratified analysis. Finally, high social support was a significantly protective factor among women, but was not present in the adjusted model for men, nor for the overall sample. The importance of social support as a predictor of behavior among women is well described.

Limitations

As evidenced by the discussions above, one limitation of this study was its inability to identify causation, due to its cross-sectional nature. Condom use self-efficacy, for example, may be causative of safe sex, as suggested here, or may be a result of individuals' successful accomplishment of safe sex. Additionally, this study focused on the individual-level mediators of sexual risk, which are the most directly modifiable in behavioral interventions. However, partner-level (e.g. does this individual have negotiating power within his/her relationship?) and social (e.g. how prevalent and acceptable is condom use within this individual's peer group?) variables also contribute to the outcome of high risk sex, and may be included in future studies.

Stratification of analysis was limited by the relatively small size of this study, but future, larger studies may stratify data by partner type (main/trade/casual) or partner serostatus to achieve a more detailed description of the factors driving unprotected sex. Finally, the method of analysis chosen, in which the outcome of high risk sex was

dichotomized, allowed for a general assessment of behavior, but more descriptive information may be achieved by quantifying proportions of high risk sex.

A-CAPI data collection, in which an interviewer assists each participant as he or she interacts with the computerized questionnaire, was deemed more feasible than A-CASI, in which no member of the team is present, due to the physical limitations of the hospital setting. However, social desirability bias is a known limitation of interview-based data collection methods. Also, all data were self-reported, and thus subject to incorrect recall and additional social desirability bias.

Study Implications

This study established new information regarding the predictors of high risk sexual behavior in a unique population of HIV infected crack cocaine users that may drive the direction and content of clinical and public health intervention in this population. Specifically, behavioral interventions should prioritize efforts to increase participants' self-efficacy for condom use and perceived risk of sexual transmission. Demographically, while it will continue to be important to target racial and sexual minorities, public health practitioners and clinicians should know that those in majority groups may now be more likely than minorities to practice risky behavior. The effect of the behavioral intervention from which this baseline data was drawn (HOPE), which will target the main predictors of sexual risk, among other cognitive-psychological constructs, will be an immediate and important validation of the conclusions made here.

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TABLES

Table 1a. Demographic characteristics of study participants (n=411).

	Total (n=411)	
	N	**%**
City		
Atlanta	233	56.7
Miami	178	43.3
Age		
<40	98	23.8
≥40	313	76.2
Ethnicity (n=409)		
African American	365	89.2
White	24	4.9
Hispanic	13	3.2
Other	7	1.7
Sexual orientation, self-identified		
Straight, heterosexual	330	80.3
Gay, homosexual	37	9.0
Bisexual	42	10.2
Other	2	0.5
Marital status		
Married (legal or commonlaw)	34	8.3
Divorced, separated, widowed	105	25.6
Single, never married	272	66.2
Education completed (n=409)		
At least high school or GED	195	47.7
Did not complete high school or GED	214	52.3
Employment status (n=409)		
Full-time or steady part time	12	2.9
Occasional work or not working	397	97.1
Income, annual (n=405)		
0	37	9.1
$1 to $5000	226	55.8
$5001 to $10,000	108	26.7
>$10,000	34	8.4
Homelessness (n=408)		
Currently homeless	162	39.7
Not currently homeless	246	60.3

Table 1b. Demographic characteristics of study participants, by gender (n=411).

	Male (n=198)		Female (n=213)	
	N	%	N	%
City				
Atlanta	111	56.1	122	57.3
Miami	87	43.9	91	42.7
Age				
<40	39	19.7	59	27.7
≥40	159	80.3	154	72.3
Ethnicity				
African American	174	88.3	191	90.1
White	9	4.6	15	7.1
Hispanic	9	4.6	4	1.9
Other	5	2.5	2	0.9
Sexual orientation				
Straight, heterosexual	137	69.2	193	90.6
Gay, homosexual	35	17.7	2	0.9
Bisexual	24	12.1	18	8.5
Other	2	1.0	0	0.0
Marital status				
Married (legal or commonlaw)	13	6.6	21	9.9
Divorced, separated, widowed	41	20.7	64	30.1
Single, never married	144	72.7	128	60.1
Education completed				
At least high school or GED	109	55.3	86	40.6
Did not complete high school or GED	88	44.7	126	59.4
Employment status				
Full-time or steady part time	10	5.1	2	0.9
Occasional work or not working	187	94.9	210	99.1
Income, annual				
0	11	5.6	26	12.4
$1 to $5000	102	52.3	124	59.1
$5001 to $10,000	59	30.3	49	23.3
>$10,000	23	11.8	11	5.2
Homelessness				
Currently homeless	89	45.2	73	34.6
Not currently homeless	108	54.8	138	65.4

Table 2. Sexual orientation of male study participants: self-reported orientation versus behavior (n=198).

Self-identified sexual orientation	Behaviorally MSM, n(%)	Behaviorally exclusively heterosexual, n(%)	Total
Heterosexual	3 (2.2)	134 (97.8)	137
Homosexual	35 (100.0)	0 (0.0)	35
Bisexual	17 (70.8)	7 (29.2)	24
Other	2 (100.0)	0 (0.0)	2
Total	57	141	198

Table 3a. Clinical, Psychosocial, and behavioral characteristics of study participants (n=411).

	Total (n=411)	
	N	%
Clinical		
Time since HIV diagnosis (n=373)		
≤1 year	60	16.1
1-5 years	52	13.9
>5 years	261	70.0
HIV care, ever (n=410)	325	79.3
HIV care, last 6 months (n=328)	210	64.0
Knowledge of CD4 count	167	40.6
CD4 count, if known (n=167)		
<200 cells/μL	87	52.1
200-500 cells/μL	62	37.1
≥500 cells/μL	18	10.8
Knowledge of viral load	68	16.6
Viral load, if known (n=66)		
<400 copies/ml (undetectable)	35	53.0
≥400 copies/ml	31	47.0
Currently taking any HIV medications	117	28.5
Psychosocial		
Multiple sexual partners, prior 6 months	165	40.2
Transactional sex, prior 6 months (n=405)	103	25.4
Any alcohol use, prior 6 months	284	69.1
Daily alcohol use	79	19.2
Any heavy alcohol use (>5 drinks), prior 6 months	203	49.4
Use of injection drugs, ever (n=410)	89	21.7
Use of injection drugs, prior 6 months (n=410)	15	3.7
Daily crack cocaine use, prior 6 months (n=404)	149	36.9
Intoxicated during most recent sexual encounter	201	48.9
Social support high (average ≥"most of the time") (n=409)	226	55.3
Depression (n=409)	143	35.0
Adult physical attack/abuse, ever (n=408)	166	40.7
Adult sexual attack/abuse, ever (n=404)	131	32.4
Behavioral		
Knowledge		
General HIV knowledge ≥80% (n=408)	342	83.8
HIV knowledge, prevention of sexual transmission ≥80% (n=406)	311	76.6
Motivation		
Perceived risk high (n=410)	347	84.6
Condom beliefs overall negative (n=409)	128	31.3
High perceived personal responsibility (n=408)	90	22.1
Self-efficacy		
High self-efficacy for condom use	243	59.1
High self-efficacy for HIV status disclosure	190	46.2

High self-efficacy for avoidance of intoxication during sex (n=398)	272	68.3
High general empowerment	24	5.9
Behavioral Intention		
Safe sex preparation behaviors ≥50%	305	74.2

Table 3a. Clinical, Psychosocial, and behavioral characteristics of study participants, by gender (n=411).

	Male (n=198)		Female (n=213)			
	N	%	N	%	χ^2	*p*
Clinical						
Time since HIV diagnosis (n=373)					7.09	0.0288
≤1 year	23	12.9	37	19.0		
1-5 years	19	10.6	33	17.0		
>5 years	137	76.5	124	63.9		
HIV care, ever (n=410)	168	84.9	157	74.1	7.26	0.0071
HIV care, last 6 months (n=328)	103	66.9	107	61.5	1.03	0.3102
Knowledge of CD4 count	90	45.5	77	36.2	3.68	0.0550
CD4 count, if known (n=167)					0.81	0.6668
<200 cells/μL	47	52.2	40	52.0		
200-500 cells/μL	35	38.9	27	35.1		
≥500 cells/μL	8	8.9	10	13.0		
Knowledge of viral load	43	21.6	25	11.7	7.40	0.0065
Viral load, if known (n=66)					0.78	0.3757
<400 copies/ml (undetectable)	20	48.8	15	60.0		
≥400 copies/ml	21	51.2	10	40.0		
Currently taking any HIV medications	64	32.2	53	24.9	2.79	0.0949
Psychosocial						
Multiple sexual partners, prior 6 months	88	44.4	77	36.2	2.94	0.0865
Transactional sex, prior 6 months (n=405)	57	28.9	46	22.0	2.48	0.1153
Any alcohol use, prior 6 months	150	75.8	134	62.9	7.93	0.0049
Daily alcohol use	38	19.2	41	19.3	<0.01	0.9883
Any heavy alcohol use (>5 drinks), prior 6 months	108	54.6	95	44.6	4.06	0.0439
Use of injection drugs, ever (n=410)	57	28.8	32	15.1	11.3	0.0008
Use of injection drugs, prior 6 months (n=410)	11	5.6	4	1.9	3.91	0.0480
Daily crack cocaine use, prior 6 months (n=404)	58	29.9	91	43.3	7.82	0.0052
Intoxicated during most recent sexual encounter	106	53.5	95	44.6	3.28	0.0702
Social support high (average ≥"most of the time") (n=409)	93	47.2	133	62.7	9.96	0.0016
Depression (n=409)	68	34.5	75	35.4	0.03	0.8555
Adult physical attack/abuse, ever (n=408)	47	24.0	119	56.1	43.63	<0.0001
Adult sexual attack/abuse, ever (n=404)	20	10.2	111	53.4	85.79	<0.0001
Behavioral						
Knowledge						
General HIV knowledge ≥80% (n=408)	174	88.8	168	79.3	6.82	0.0090

HIV knowledge, prevention of sexual transmission ≥80% (n=406)	160	82.1	151	71.6	6.22	0.0126
Motivation						
Perceived risk high (n=410)	173	87.4	174	82.1	2.21	0.1371
Condom beliefs overall negative (n=409)	75	38.1	53	25.0	8.11	0.0044
High perceived personal responsibility (n=408)	46	23.4	44	20.9	0.37	0.5433
Self-efficacy						
High self-efficacy for condom use	122	61.6	121	56.8	0.98	0.3218
High self-efficacy for HIV status disclosure	95	48.0	95	44.6	0.47	0.4900
High self-efficacy for avoidance of intoxication during sex (n=398)	141	72.3	131	64.5	2.78	0.0955
High general empowerment	17	8.6	7	3.3	5.25	0.0220
Behavioral Intention						
Safe sex preparation behaviors ≥50%	139	70.2	166	77.9	3.21	0.0734

Table 4a. Variables tested for association with unprotected anal or vaginal intercourse with at-risk partners in the past 6 months, bivariate analysis (n=407).

	Total sample (n=407)			
	High Risk Sex (n=141) N (%)	**No High Risk Sex (n=266)** N (%)	**unadjusted OR (95% CI)**	***p***
Demographic Characteristics				
Gender				
Female	85 (40.5)	125 (59.5)	1.71 (1.13, 2.59)	0.0107
Male	56 (28.4)	141 (71.6)		
Age				
<40 years	45 (46.4)	52 (53.6)	1.93 (1.21, 3.07)	0.0053
≥40 years	96 (31.0)	214 (69.0)		
Ethnicity				
White	14 (63.6)	8 (36.4)	3.65 (1.49, 8.94)	0.0027
Hispanic	5 (38.5)	8 (61.5)	1.30 (0.33, 4.63)	0.7644
Other	4 (57.1)	3 (42.9)	2.78 (0.46, 19.22)	0.2240
Black	118 (32.4)	246 (67.6)	REF	
Sexual orientation, self-identified				
Homosexual	13 (36.1)	23 (63.9)	1.17 (0.57, 2.39)	0.6725
Bisexual	21 (51.2)	20 (48.8)	2.17 (1.13, 4.17)	0.0183
Heterosexual	107 (32.6)	221 (67.4)	REF	
Marital status				
Divorced, separated, widowed	37 (35.6)	67 (64.4)	0.66 (0.30, 1.47)	0.3083
Single, never married	89 (33.0)	181 (67.0)	0.59 (0.28, 1.23)	0.1537
Married (legal or commonlaw)	15 (45.5)	18 (54.6)	REF	
Education completed				
Less than high school	81 (37.9)	133 (62.2)	1.34 (0.89, 2.02)	0.1631

Table 4b. Variables tested within the male stratum for association with unprotected anal or vaginal intercourse with at-risk partners in the past 6 months, stratified bivariate analyses (n=197).

	Men (n=197)			
	High Risk Sex (n=56) N (%)	**No High Risk Sex (n=141)** N (%)	**unadjusted OR (95% CI)**	***p***
Demographic Characteristics				
Age				
<40 years	14 (35.9)	25 (54.1)	1.55 (0.74, 3.25)	0.2481
≥40 years	42 (26.6)	116 (73.4)		
Ethnicity				
White	5 (62.5)	3 (37.5)	4.51 (0.83, 29.84)	0.0438
Hispanic	2 (22.2)	7 (77.8)	0.77 (0.08, 4.26)	1.0000
Other	2 (40.0)	3 (60.0)	1.80 (0.15, 16.18)	0.6155
Black	47 (27.0)	127 (73.0)	REF	
Sexual orientation (behavioral)				
Sex with women only	31 (22.0)	110 (78.0)	2.86 (1.48, 5.54)	0.0015
Any sex with men	25 (44.6)	31 (55.4)		
Marital status				
Divorced, separated, widowed	16 (39.0)	25 (60.1)	1.02 (0.28, 3.69)	0.9711
Single, never married	35 (24.5)	108 (75.5)	0.52 (0.14, 2.16)	0.3203
Married (legal or commonlaw)	5 (38.5)	8 (61.5)	REF	
Education completed				
Less than high school	29 (33.0)	59 (67.1)	1.47 (0.79, 2.75)	0.2201
High school or more	27 (25.0)	81 (75.0)		
Employment status				
No regular employment	52 (28.0)	134 (72.0)	0.58 (0.13, 2.93)	0.4755
Regular full-time or part-time	4 (40.0)	6 (60.0)		
Income, annual				
≤$5000	31 (27.4)	82 (72.6)	0.85 (0.45, 1.59)	0.6031
>$5000	25 (30.9)	56 (69.1)		
Homelessness				
Currently homeless	28 (31.5)	61 (68.5)	1.30 (0.70, 2.41)	0.4142
Not currently homeless	28 (26.2)	79 (73.8)		
Clinical Characteristics				
Duration of HIV diagnosis				
≤1 year	10 (43.5)	13 (56.5)	2.22 (0.89, 5.51)	0.0806
1-5 years	5 (26.3)	14 (73.7)	1.03 (0.27, 3.31)	1.0000
>5 years	35 (25.7)	101 (74.3)	REF	
Ever been to HIV primary care				
Never been to HIV primary care	10 (33.3)	20 (66.7)	1.32 (0.57, 3.02)	0.5175
Ever been to HIV primary care	46 (27.5)	121 (72.5)		
HIV Care, last 6 months				
No HIV care in last 6 months	15 (29.4)	36 (70.6)	1.22 (0.58, 2.58)	0.6057
Any HIV care in last 6 months	26 (25.5)	76 (74.5)		
Knowledge of CD4 count				

No	29 (27.1)	78 (72.9)	0.87 (0.47, 1.61)	0.6534
Yes	27 (30.0)	63 (70.0)		
CD4 count, if known				
>200 cells/μL	8 (18.6)	35 (81.4)	1.98 (0.86, 4.59)	0.1063
≤200 cells/μL	48 (31.2)	106 (68.8)		
Knowledge of viral load				
No	44 (28.6)	110 (71.4)	1.03 (0.49, 2.19)	0.9319
Yes	12 (27.9)	31 (72.1)		
Viral load, if known				
≥400 copies/ml	6 (28.6)	15 (71.4)	0.93 (0.24, 3.58)	0.9200
<400 copies/ml	6 (30.0)	14 (70.0)		
Currently taking any HIV medications				
No	45 (33.8)	88 (66.2)	2.46 (1.17, 5.17)	0.0153
Yes	11 (17.2)	53 (82.8)		
Psychosocial Factors				
Number of sexual partners, prior 6 months				
>1 partner	31 (35.6)	56 (64.4)	1.88 (1.01, 3.52)	0.0461
1 partner	25 (22.7)	85 (77.3)		
Transactional sex, prior 6 months				
Yes	22 (38.6)	35 (61.4)	2.02 (1.04, 3.91)	0.0355
No	33 (23.7)	106 (76.3)		
Alcohol use, ever				
Yes	39 (26.2)	110 (73.8)	0.65 (0.32, 1.30)	0.2170
No	17 (35.4)	31 (64.6)		
Frequency of alcohol use, prior 6 months				
Daily	9 (24.3)	28 (75.7)	0.77 (0.34, 1.76)	0.5393
Less than daily	47 (29.4)	113 (70.6)		
Frequency of heavy drinking (≥5 drinks/day), prior 6 months				
Any heavy drinking	34 (31.8)	73 (68.2)	1.44 (0.77, 2.70)	0.2558
No heavy drinking	22 (24.4)	68 (75.6)		
Use of injection drugs, ever				
Yes	18 (31.6)	39 (68.4)	1.24 (0.63, 2.42)	0.5314
No	38 (27.1)	102 (72.9)		
Use of injection drugs, prior 6 months				
Yes	4 (36.4)	7 (63.4)	1.47 (0.30, 6.07)	0.5113
No	52 (28.0)	134 (72.0)		
Frequency of crack cocaine use, prior 6 months				
Daily	22 (37.9)	36 (62.1)	1.82 (0.94, 3.50)	0.0736
Less than daily	34 (25.2)	101 (74.8)		
Intoxicated during most recent sexual encounter				
Yes	38 (35.9)	68 (64.2)	2.27 (1.18, 4.35)	0.0127
No	18 (19.8)	73 (80.2)		
Social support score				
Low	33 (31.7)	71 (68.3)	1.39 (0.74, 2.61)	0.2979
High	23 (25.0)	69 (75.0)		
Depression screen (BSID-D)				

Depression	21 (31.3)	46 (68.7)	1.23 (0.64, 2.34)	0.5359
No depression	35 (27.1)	94 (72.9)		
Physical attack/abuse, adult				
Yes	17 (37.0)	29 (63.0)	1.72 (0.85, 3.46)	0.1313
No	38 (25.5)	111 (74.5)		
Sexual attack/abuse, adult				
Yes	9 (45.0)	11 (55.0)	2.29 (0.89, 5.89)	0.0781
No	46 (26.3)	129 (73.7)		
Behavioral Mediators				
Knowledge				
HIV knowledge score, general prevention				
<80% correct	9 (40.9)	13 (59.1)	1.87 (0.75, 4.66)	0.1740
≥80% correct	47 (27.0)	127 (73.0)		
HIV knowledge score, prevention of sexual transmission				
<80% correct	12 (34.3)	23 (65.7)	1.42 (0.65, 3.10)	0.3775
≥80% correct	43 (26.9)	117 (73.1)		
Motivation				
Perceived sexual transmission risk				
Low to moderate	13 (52.0)	12 (48.0)	3.25 (1.38, 7.66)	0.0052
High	43 (25.0)	129 (75.0)		
Condom attitude				
Negative	29 (38.7)	46 (61.3)	2.19 (1.17, 4.13)	0.0138
Neutral to good	27 (22.3)	94 (77.7)		
Perceived personal responsibility				
Disagree or ambivalent	45 (30.0)	105 (70.0)	1.36 (0.64, 2.92)	0.4240
Agree	11 (23.9)	35 (76.1)		
Self-efficacy				
Self-efficacy for condom use				
Low	31 (41.3)	44 (58.7)	2.73 (1.45, 5.16)	0.0016
High	25 (20.5)	97 (79.5)		
Self-efficacy for HIV status disclosure				
Low	32 (31.4)	70 (68.6)	1.35 (0.72, 2.52)	0.3422
High	24 (25.3)	71 (74.7)		
Self-efficacy for avoidance of intoxication during sex				
Low	15 (28.3)	38 (71.7)	0.96 (0.48, 1.94)	0.9153
High	41 (29.1)	100 (70.9)		
Empowerment, general				
Low	52 (29.1)	127 (71.0)	1.33 (0.39, 5.86)	0.7825
High	4 (23.5)	13 (76.5)		
Behavioral Intention				
Safe sex preparation behaviors				
<50% of behaviors reported	26 (44.8)	32 (55.2)	2.95 (1.53, 5.69)	0.0010
≥50% of behaviors reported	30 (21.6)	109 (78.4)		

Table 4c. Variables tested within the female stratum for association with unprotected anal or vaginal intercourse with at-risk partners in the past 6 months, stratified bivariate analyses (n=210).

	Women (n=210)			
	High Risk Sex (n=85) N (%)	No High Risk Sex (n=125) N (%)	unadjusted OR (95% CI)	*p*
Demographic Characteristics				
Age				
<40 years	31 (53.5)	27 (46.6)	2.08 (1.13, 3.85)	0.0180
≥40 years	54 (35.5)	98 (64.5)		
Ethnicity				
White	9 (64.3)	5 (35.7)	3.02 (0.86, 11.86)	0.0851
Hispanic	3 (75.0)	1 (25.0)	5.03 (0.39, 266.13)	0.1561
Other	2 (100.0)	0 (0.00)	infty (0.47, infty)	0.1433
Black	71 (37.4)	119 (62.6)	REF	
Sexual orientation, self-identified				
Homosexual	1 (50.0)	1 (50.0)	1.48 (0.02, 117.22)	1.0000
Bisexual	7 (41.2)	10 (58.8)	1.04 (0.38, 2.84)	0.9446
Heterosexual	77 (40.3)	114 (59.7)	REF	
Marital status				
Divorced, separated, widowed	21 (33.3)	42 (66.7)	0.50 (0.18, 1.39)	0.1795
Single, never married	54 (42.5)	73 (57.5)	0.74 (0.29, 1.90)	0.5306
Married (legal or commonlaw)	10 (50.0)	10 (50.0)	REF	
Education completed				
Less than high school	52 (41.3)	74 (58.7)	1.09 (0.62, 1.91)	0.7741
High school or more	33 (39.3)	51 (60.7)		
Employment status				
No regular employment	84 (40.4)	124 (59.6)	0.68 (0.01, 53.80)	1.0000
Regular full-time or part-time	1 (50.0)	1 (50.0)		
Income, annual				
≤$5000	19 (32.2)	40 (67.8)	1.67 (0.89, 3.16)	0.1098
>$5000	66 (44.3)	83 (55.7)		
Homelessness				
Currently homeless	37 (52.1)	34 (47.9)	2.04 (1.14, 3.65)	0.0157
Not currently homeless	48 (34.8)	90 (65.2)		
Clinical Characteristics				
Duration of HIV diagnosis				
≤1 year	18 (50.0)	18 (50.0)	1.67 (0.79, 3.54)	0.1751
1-5 years	14 (43.8)	18 (56.3)	1.30 (0.59, 2.86)	0.5111
>5 years	46 (37.4)	77 (62.6)	REF	
Ever been to HIV primary care				
Never been to HIV primary care	28 (52.8)	25 (47.2)	1.95 (1.04, 3.65)	0.0370
Ever been to HIV primary care	57 (36.5)	99 (63.5)		
HIV Care, last 6 months				

No HIV care in last 6 months	32 (49.2)	33 (50.8)	1.67 (0.89, 3.12)	0.1091
Any HIV care in last 6 months	39 (36.8)	67 (63.2)		
Knowledge of CD4 count				
No	52 (38.2)	84 (61.8)	0.77 (0.43, 1.37)	0.3698
Yes	33 (44.6)	41 (55.4)		
CD4 count, if known				
>200 cells/μL	20 (54.1)	17 (46.0)	0.51 (0.25, 1.05)	0.0638
≤200 cells/μL	65 (37.6)	108 (62.4)		
Knowledge of viral load				
No	73 (39.5)	112 (60.5)	0.71 (0.31, 1.63)	0.4142
Yes	12 (48.0)	13 (52.0)		
Viral load, if known				
≥400 copies/ml	4 (40.0)	6 (60.0)	0.58 (0.08, 3.83)	0.6882
<400 copies/ml	8 (53.3)	7 (46.7)		
Currently taking any HIV medications				
No	68 (43.3)	89 (56.7)	1.62 (0.84, 3.12)	0.1496
Yes	17 (32.1)	36 (67.9)		
Psychosocial Factors				
Number of sexual partners, prior 6 months				
>1 partner	47 (62.7)	28 (37.3)	4.28 (2.35, 7.80)	<0.0001
1 partner	38 (28.2)	97 (71.9)		
Transactional sex, prior 6 months				
Yes	28 (62.2)	17 (37.8)	3.20 (1.62, 6.36)	0.0006
No	55 (34.0)	107 (66.1)		
Alcohol use, ever				
Yes	52 (39.7)	79 (60.3)	0.92 (0.52, 1.62)	0.7664
No	33 (41.8)	46 (58.2)		
Frequency of alcohol use, prior 6 months				
Daily	16 (39.0)	25 (61.0)	0.93 (0.46, 1.86)	0.8328
Less than daily	69 (40.8)	100 (59.2)		
Frequency of heavy drinking (≥5 drinks/day), prior 6 months				
Any heavy drinking	32 (34.8)	60 (65.2)	0.65 (0.37, 1.15)	0.1377
No heavy drinking	53 (44.9)	65 (55.1)		
Use of injection drugs, ever				
Yes	11 (35.5)	20 (64.5)	0.78 (0.35, 1.73)	0.5396
No	74 (41.3)	105 (58.7)		
Use of injection drugs, prior 6 months				
Yes	1 (33.3)	2 (66.7)	0.73 (0.01, 14.29)	1.0000
No	84 (40.6)	123 (59.4)		
Frequency of crack cocaine use, prior 6 months				
Daily	48 (53.3)	42 (46.7)	2.60 (1.47, 4.60)	0.0009
Less than daily	36 (30.5)	82 (69.5)		
Intoxicated during most recent sexual encounter				
Yes	46 (48.9)	48 (51.1)	1.89 (1.08, 3.31)	0.0246

No	39 (33.6)	77 (66.4)		
Social support score				
Low	38 (48.7)	40 (51.3)	1.72 (0.97, 3.04)	0.0614
High	47 (35.6)	85 (64.4)		
Depression screen (BSID-D)				
Depression	32 (43.8)	41 (56.2)	1.24 (0.70, 2.20)	0.4691
No depression	53 (38.7)	84 (61.3)		
Physical attack/abuse, adult				
Yes	52 (44.4)	65 (55.6)	1.45 (0.83, 2.55)	0.1888
No	33 (35.5)	60 (64.5)		
Sexual attack/abuse, adult				
Yes	48 (44.0)	61 (56.0)	1.28 (0.73, 2.23)	0.3912
No	37 (38.1)	60 (61.9)		
Behavioral Mediators				
Knowledge				
HIV knowledge score, general prevention				
<80% correct	17 (39.5)	26 (60.5)	0.94 (0.47, 1.87)	0.8650
≥80% correct	68 (41.0)	98 (59.0)		
HIV knowledge score, prevention of sexual transmission				
<80% correct	24 (40.7)	35 (59.3)	1.02 (0.55, 1.88)	0.9567
≥80% correct	60 (40.3)	89 (59.7)		
Motivation				
Perceived sexual transmission risk				
Low to moderate	22 (57.9)	16 (42.1)	2.36 (1.15, 4.82)	0.0169
High	63 (36.8)	108 (63.2)		
Condom attitude				
Negative	25 (47.2)	28 (52.8)	1.43 (0.76, 2.68)	0.2648
Neutral to good	60 (38.5)	96 (61.5)		
Perceived personal responsibility				
Disagree or ambivalent	66 (39.8)	100 (60.2)	0.83 (0.42, 1.64)	0.5984
Agree	19 (44.2)	24 (55.8)		
Self-efficacy				
Self-efficacy for condom use				
Low	45 (50.0)	45 (50.0)	2.00 (1.14, 3.51)	0.0149
High	40 (33.3)	80 (66.7)		
Self-efficacy for HIV status disclosure				
Low	52 (44.8)	64 (55.2)	1.50 (0.86, 2.63)	0.1535
High	33 (35.1)	61 (64.9)		
Self-efficacy for avoidance of intoxication during sex				
Low	36 (51.4)	34 (48.6)	1.89 (1.05, 3.41)	0.0329
High	47 (35.9)	84 (64.1)		
Empowerment, general				
Low	82 (40.4)	121 (59.6)	0.90 (0.15, 6.33)	1.0000
High	3 (42.9)	4 (57.1)		
Behavioral Intention				

Safe sex preparation behaviors				
<50% of behaviors reported	21 (45.7)	25 (54.4)	1.31 (0.68, 2.54)	0.4183
≥50% of behaviors reported	64 (39.0)	100 (60.1)		

Table 5a. Variables associated with unprotected anal or vaginal sex with HIV negative or unknown serostatus partners, total sample, multivariate logistic regression analysis (n=380)

Variable	Adjusted Odds Ratio	*p*
White race	0.41 (0.20, 0.86)	0.0174
Male, sex with men (MSM)	0.40 (0.24, 0.68)	0.0007
Not currently taking HIV-related medications	1.60 (0.92, 2.78)	0.0943
Multiple sexual partners	2.59 (1.60, 4.21)	0.0001
Intoxicated during most recent sexual encounter	1.72 (1.05, 2.79)	0.0298
Low self-efficacy for condom use	2.22 (1.37, 3.60)	0.0012
Low perceived risk of transmission	2.58 (1.37, 4.87)	0.0033
Few preparatory behaviors for safe sex	1.68 (0.98, 2.88)	0.0578

Table 5b. Variables associated with unprotected anal or vaginal sex with HIV negative or unknown serostatus partners, males, multivariate logistic regression analysis (n=170)

Variable	Adjusted Odds Ratio	*p*
Sex with women only	2.96 (1.34, 6.56)	0.0039
Not currently taking HIV-related medications	2.27 (0.96, 5.40)	0.0590
History of transactional sex	2.56 (1.14, 5.71)	0.0069
Low self-efficacy for condom use	3.27 (1.52, 7.04)	0.0012
Few preparatory behaviors for safe sex	2.35 (1.08, 5.12)	0.0212

Table 5c. Variables associated with unprotected anal or vaginal sex with HIV negative or unknown serostatus partners, females, multivariate logistic regression analysis (n=179)

Variable	Adjusted Odds Ratio	*p*
African American ethnicity	0.22 (0.06, 0.74)	0.0158
Multiple sexual partners	4.53 (2.19, 9.34)	<0.0001
Any heavy alcohol use (>5 drinks/day)	0.52 (0.25, 1.06)	0.0711
Low social support	2.02 (1.00, 4.06)	0.0478
Low self-efficacy for condom use	2.56 (1.26, 5.21)	0.0145
Low perceived risk of transmission	3.03 (1.21, 7.61)	0.0163

CHAPTER III: SUMMARY, PUBLIC HEALTH IMPLICATIONS, AND FUTURE DIRECTIONS

This study described predictors of high risk sex among HIV positive crack users in two urban, southeastern cities. The population described here consisted of HIV positive individuals who had been hospitalized on the inpatient wards of two inner-city hospitals, representing a uniquely disenfranchised population.

Self-efficacy for condom use was a significant predictor of sexual risk in the overall sample, and in both gender strata. Risk perception was significant among the overall study population, but was only significant for females in the stratified analysis. However, the variable that directly assessed perceived personal responsibility for preventing transmission to one's sexual partners was not significant in any of the bivariate analyses (overall sample, males, females), nor in the multivariate analyses. Therefore, the nature of the differential mediation of risk reduction by risk perception among men and women remains unclear, and may be further understood in future studies. Finally, among males, history of preparatory and risk reduction behaviors was protective, but this variable was not significant for women and did not achieve significance in the total sample. In bivariate analysis, males were less likely to have exhibited these preparatory behaviors. This suggests that men's performance of risk reduction and preparatory behaviors are more likely than those of women to result in the desired outcome of safe sex. Among women, frequent performance of positive behaviors without achieving the desired result may be an underlying cause of low self-efficacy for safe sex.

Black race and male same-gender sexual behavior were both protective for sexual risk behavior. This may be due to increased health service utilization and prevalence of HIV services targeted to racial minority and MSM populations. Having multiple sexual

partners was significantly associated with high risk sex in the total sample; this association persisted in the female stratum but was not significant for males. In the male stratum, however, participation in transactional sex was a significant predictor. Intoxication during the most recent sexual encounter was a significant predictor in the overall sample, but did not persist in the stratified analysis. Finally, high social support was a significantly protective factor among women, but was not present in the adjusted model for men, nor for the overall sample.

This study established new information regarding the predictors of high risk sexual behavior in a unique population of HIV infected crack cocaine users that may drive the direction and content of clinical and public health intervention in this population. Specifically, behavioral interventions should prioritize efforts to increase participants' self-efficacy for condom use and perceived risk of sexual transmission. Demographically, while it will continue to be important to target racial and sexual minorities, public health practitioners and clinicians should know that those in majority groups may now be more likely than minorities to practice risky behavior. The effect of the behavioral intervention from which this baseline data was drawn (HOPE), which will target the main predictors of sexual risk, among other cognitive-psychological constructs, will be an immediate and important validation of the conclusions made here.

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