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HIV Sexual Risk Behaviors among Ketamine and Non-Ketamine Using Criminal Offenders Prior to Prison Entry

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Abstract

This study is the first to examine ketamine use and its association with HIV sexual risk behaviors among a criminal offending population in the United States. Data were collected from 716 inmates as part of the Transitional Case Management (TCM) protocol within the Criminal Justice Drug Abuse Treatment Studies (CJ-DATS) cooperative agreement. Bivariate analyses were used to identify differences between ketamine users (n=44) and non-ketamine users (n=672). Three Poisson regression models were used to identify the significant correlates of high risk sexual behaviors in the 30 days prior to incarceration-- (1) number of times had unprotected sex while high, (2) number of times had unprotected vaginal sex, and (3) number of times had unprotected anal sex. Results indicate that ketamine was a significant correlate in all of the Poisson regression models. Findings add to the literature and indicate that ketamine use may be a marker for engaging in HIV risk behaviors among criminal offenders.

Keywords

Ketamine; criminal offenders; HIV risk behaviors; unprotected sex; prisoners

INTRODUCTION

There is an elevated prevalence of participation in risky behaviors among criminal justice populations. In the United States, about two-thirds of state prisoners reported regular drug use at some time during their lives (Mumola and Karberg 2006). Over half (53%) of state prisoners

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met DSM-IV criteria for drug dependence or abuse during the past 12 months, which is well above the 2% prevalence of drug dependence or abuse in the general U.S. population during the same timeframe as indicated by the National Epidemiologic Survey of Alcohol and Related Conditions (NESARC) (Mumola and Karberg 2006). The use of psychoactive drugs places individuals at greater risk for engaging in unprotected sex (Kelly 2005; Kurtz 2005; Maxwell 2005; Patterson et al. 2005); however, participation in risky sexual behaviors varies by type of substance used. One under-explored drug that could place individuals at risk for contracting infectious diseases such as human immunodeficiency syndrome (HIV) is ketamine, a liquid pharmaceutical anesthetic.

The purpose of this study is to examine the relationship between illicit ketamine use and engagement in high-risk sexual behaviors prior to incarceration among a sample of drug users undergoing prison-based drug abuse treatment in the United States. Drug using criminal offenders whose repertoire includes having ever used ketamine at least once in their lifetime will be defined as 'ketamine users.' It should be noted that while the extent and context of ketamine use is unknown, this study is a first step in understanding the association between ketamine use and unprotected sexual behaviors in a criminal offending population.

Ketamine, a dissociative drug, was developed by the pharmaceutical company Parke-Davis in the United States in the 1960s (Corssen and Domino 1966). Originally it was developed as a rapid-acting general anesthetic that was a medical alternative to phencyclidine (PCP) because PCP had adverse side effects such as irrationality and violence (Dotson et al. 1995). Ketamine has been used as a surgical anesthetic for children, elderly, and wounded military personnel on the battlefield (Dotson et al. 1995). Currently, the clinical use of ketamine is not commonplace because its side effects can produce vivid dreaming, hallucinations, and confused states; however, ketamine is still regularly used as a veterinary anesthetic (Curran and Morgan 2000; Fine et al. 1974; Lankenau and Clatts 2002; Perel and Davison 1976). Ketamine also has analgesic actions and has been used in radiation therapy as well as in the treatment of severe burn victims or individuals with chronic pain (Dotson et al. 1995; Fine 1999). It should be noted that lower doses of ketamine are used recreationally, as compared to higher doses used in medical settings, and the use of an anxiolytic before medical treatment with ketamine can help control adverse psychological effects (Krystal et al. 1994).

Non-medical use of ketamine was first observed in the late 1960s. Users included medical professionals, educated individuals, and recreational drug users who were seeking altered states of consciousness (Jansen 2001; Lankenau and Clatts 2002). Recreational drug users obtained ketamine through underground 'medicinal chemists' (Jansen 2001) and most illegal ketamine on the streets was diverted from veterinary offices. The abuse potential of ketamine was noted in the 1970s (Reie, 1971) and the National Institute on Drug Abuse responded by publishing pamphlets, reports, and manuscripts on ketamine as a drug of abuse (NIDA 2001; Mathias 2003). In 1999, ketamine was classified as a Schedule III drug under the Controlled Substances Act making ketamine possession for non-medical purposes illegal in the United States.

Ketamine has various street names including Special K, vitamin K, K, Special LA Coke, Super Acid, Super C, green, and cat Valium (Dotson et al. 1995; NIDA 2001). It is a unique drug because it is manufactured as an injectable liquid but is available on the street in liquid, powder, or pill forms (Lankenau and Clatts 2005). There are various modes of ketamine administration in that it can be swallowed, smoked, drunk, snorted, injected intra-muscularly, or injected intravenously (Mathias 2003). Some drug users take ketamine to achieve a psychological and physical state called the 'k-hole,' which is more easily achieved by injection (Mathias 2003). Being in the k-hole lasts less than an hour and produces hallucinations and an intense distortion of time and space (Mathias 2003). In reference to the k-hole, the use of ketamine may impede sexual functioning and/or make a user vulnerable to engaging in unprotected sex since

judgment may be impaired. Other users, such as infrequent recreational users, may try to avoid the k-hole (Mooney 2008).

The non-medical use of ketamine can place the user at increased risk for contracting and transmitting blood borne pathogens, such as HIV. However, the existing literature on the relationship between ketamine use and engagement in HIV risk behaviors raises three additional questions. The first question surrounds the classification of ketamine as a club drug and users are described as youth who attend raves (Curran and Morgan 2000; Dillon et al. 2003; Dotson et al. 1995) or men who have sex with men (MSM) (Clatts et al. 2005; Patterson et al. 2005; Rusch et al. 2005); however, there are no known studies of ketamine use among individuals under criminal justice supervision despite that fact that criminal offenders are frequently the first to try 'new' illicit drugs (Yacoubian et al. 2002). Consequently, it is also important to examine prisoners because their risky drug using behaviors before incarceration have lead to a high prevalence of HIV. In fact, the most recent Bureau of Justice Statistics report indicates that the overall rate of confirmed AIDS among prisoners was more than three times the rate in the general U.S. population (Maruschak 2006). Moreover, there is a gender disparity in the prevalence of HIV among prison inmates with 2.6% of female inmates being HIV seropositive as compared to 1.8% of male inmates (Maruschak 2006).

The second area in need of further examination is the role of injecting ketamine as a risk factor for contracting or transmitting blood born pathogens. It is common for ketamine injectors to share vials of liquid ketamine or injection equipment such as cookers (Lankeau and Clatts 2002; Lankeau et al. 2007). It should be noted that in a study of young ketamine users, the majority injected ketamine intramuscularly which is not as high risk as intravenous injections because the user is not drawing blood into the syringe barrel (Lankenau and Clatts 2004). Nonetheless, the effects of ketamine are short-lived. Therefore, ketamine users may have to inject multiple times within a short period of time to maintain euphoria (Maxwell 2005). This places the injecting ketamine user at risk for contracting or transmitting infectious diseases because users who are under the influence of ketamine may be less likely to engage in safe injection practices. Ketamine injectors may also underestimate their risks for HIV because injecting ketamine is viewed with less stigma because it is manufactured by pharmaceutical companies and is available in sterile vials (Lankenau and Clatts 2004).

According to the Centers for Disease Control and Prevention (CDC), in 2005 injection drug use accounted for approximately 26% of the HIV/AIDS transmission cases for females and 18% of the HIV/AIDS transmission cases for males in the U.S. (Department of Health and Human Services, 2007). Unfortunately, the Bureau of Justice Statistics (BJS) doesn't collect information on the number of diagnoses of HIV/AIDS among individuals in the criminal justice system by transmission category.

A third under-explored area in the ketamine literature is on the relationship between ketamine use and participation in risky sexual behaviors. For example, the current literature focuses on ketamine use for men who have sex with men at circuit parties (Kurtz 2005; Kurtz and Inciardi 2003; Mattison et al. 2001). However, there are no known studies that explore the relationship between ketamine use and sexual behaviors among criminal offenders despite research that suggests that individuals under criminal justice supervision are known to have engaged in risky sexual behaviors (Braithwaite and Stephens 2005; Cotten-Oldenburg et al. 1999; Oser et al. 2006; Oser et al. 2006). In the U.S., sexual contact accounts for the majority of HIV transmission. In fact, the two most common transmission categories for HIV/AIDS for U.S. males are heterosexual contact with a person known to have or to be at high risk for HIV (13%) and men who have sex with men (61%) (Department of Health and Human Services, 2007). In addition, the high risk heterosexual contact transmission category accounts for almost three-fourths (72%) of female U.S. HIV/AIDS cases (Department of Health and Human Services

2007). As such, the combination of risky drug use and sexual practices places criminal offenders at higher risk for contracting and transmitting HIV and other infectious diseases.

This study contributes to the literature because it is the first known study to examine the relationship between ketamine use and participation in unprotected sex behaviors among a high risk group – criminal offenders. Using data from the Criminal Justice Drug Abuse Treatment Studies (CJ-DATS) cooperative's Transitional Case Management (TCM) protocol (Prendergast, Cartier, & Hall, 2007), bivariate analyses were used to identify differences in sociodemographic characteristics, substance use history, criminal justice history, and HIV sexual risk behaviors between ketamine users (n=44) and non-ketamine users (n=672). In addition, three Poisson regression models were used to identify the significant correlates of high-risk sexual behaviors in the 30 days prior to incarceration -- (1) number of times had unprotected sex while high, (2) number of times had unprotected vaginal sex, and (3) number of times had unprotected anal sex.

METHODS

Sample

Data were collected from 717 participants as part of the Transitional Case Management study (TCM) under the auspices of the NIDA funded Criminal Justice Drug Abuse Treatment Studies (CJ-DATS) cooperative (see Fletcher and Wexler, 2005 for additional details on CJ-DATS studies). CJ-DATS is comprised of 10 Research Centers across the U.S. which are designing, implementing, and testing multi-site studies to improve outcomes for criminal offenders with substance use disorders. The TCM protocol is one these multi-site protocols. Four CJ-DATS Research Centers participated in the TCM protocol, including the University of California Los Angeles, University of Kentucky, National Development and Research Institutes (NDRI), and the Connecticut Department of Mental Health and Addiction Services. Participants were recruited from prison-based substance abuse treatment programs. Eligibility criteria for prison inmates included: (1) being over 18 years of age; (2) being within three months of release from prison to the community; (3) having a referral to community-based substance abuse treatment upon release into the community; and (4) paroling to a metropolitan area where transitional case management would be available. Sex offenders and individuals receiving other case management services were excluded from participating. These analyses include 716 cases because one person did not answer the questions about the use of ketamine. Additional details on the TCM methodology are discussed elsewhere (Prendergast and Cartier 2007; Staton-Tindall et al. 2007).

Trained research staff from each participating Research Center contacted the targeted correctional institutions to set up a convenient time for recruitment and data collection. Specifically, research staff contacted potential participants, screened for eligibility, described the study, and answered any questions. If the potential inmate was interested in participating in the study, informed consent was obtained and a face-to-face interview was conducted in a private room in the correctional facility. A federal Certificate of Confidentiality was obtained to protect the participant's information from being released under subpoena or other legal process. Respondents who completed the 1–2 hour prison-based interview were reimbursed $10 for their time and effort. Each of the four participating CJ-DATS Research Centers obtained approval from their respective Institutional Review Boards (IRB) to conduct human subjects research with prisoners.

Measures

The purpose of the current analysis is to examine lifetime ketamine use in the context of HIV sexual risk behaviors among criminal offenders. To define ketamine use, participants were

asked if they had ever used ketamine at least once in their lifetime. If they answered in the affirmative, it was coded as a 1. Those who had not used ketamine were coded as 0.

Independent variables of interest included sociodemographic characteristics, substance use history, and criminal history. Sociodemographic characteristics included the dichotomous measures of male gender and having received a high school degree (0=no; 1=yes). Data were also collected on race/ethnicity (1=White, 2=African American, 3=Hispanic, 4=Other race/ethnicity), employment status (1=full time, 2=part-time, and 3=unemployed), and the state in which data was collected (1=Colorado; 2=Connecticut; 3=Kentucky; 4=Oregon). Age was measured in number of years. Marital status (1=married/cohabitating, 2=single/never married, 3=separated/divorced/widowed) and living situation before incarceration (1=inmate's home, 2=other's home, 3=homeless/shelter, 4=other living situation) were also assessed.

Participants were asked if they had ever used any of 12 psychoactive substances (e.g., alcohol, marijuana, cocaine, and sedatives) or ever injected drugs. Lifetime substance use for each psychoactive substance was coded where 0=no and 1=yes. Substance abuse treatment history was measured by the self-reported number of prior treatment admissions.

Criminal history was assessed by ten variables. Participants were asked the number of lifetime arrests, the number of juvenile arrests, and the number of arrests while using/getting drugs. In addition, age at first arrest and total months in jail/prison were continuous measures. Participants were also asked the number of times they had ever committed a number of offenses in their lifetime, regardless of whether the offense resulted in an arrest. Specifically, they were asked about the number of times they had committed drug offenses, driven while intoxicated (DWI), engaged in sex work (i.e., prostitution or pimping), committed property offenses, and committed violent offenses.

Three dependent variables are examined. Specifically, the HIV sexual risk behaviors of interest were: 1) the number of sexual encounters without a condom while high in the 30 days prior to incarceration; 2) the number of times had vaginal sex without a condom in the 30 days prior to incarceration; and 3) number times had anal sex without a condom in the 30 days prior to incarceration.

Statistical Analyses

Bivariate analyses were conducted to examine the associations between having ever used ketamine at least one in their lifetime and sociodemographic variables, substance abuse history, criminal history, and HIV sexual risk behaviors. The chi-square statistic was used to determine statistically significant differences in ketamine use and categorical variables and the Wilcoxon Rank-Sum test was used for continuous variables.

To examine the independent correlates of HIV sexual risk behaviors prior to incarceration, three separate stepwise Poisson regression models were constructed. Poisson regression was chosen since the outcome variables were representative of count data (Long & Freese, 2001). The primary independent variable of interest for all three models was having ever used ketamine at least once in their lifetime. Models were also adjusted for covariates that were significantly associated with lifetime ketamine use at the bivariate level. These covariates were entered in one at a time to examine their effect on the model estimates. If not significant at the $p<0.05$ level, they were not retained in the final model.

RESULTS

Of the 716 participants, most were male (76.3%) and white (48.7%), and the median age was 33.9 years (interquartile range [IQR]: 27.1–41.3). The majority of the participants were single,

unemployed and lacked a high school education. Almost half were living in a home that was not their own and by study design, there were similar proportions of participants from each of the four study sites (Table 1).

The lifetime prevalence of ketamine use was 6.1% in this criminal offender population. The average age at first ketamine use was 22. Among the ketamine users, 11% had injected ketamine at least once in their lifetime. There were regional differences in the prevalence of ketamine use (χ^2=20.26, p<.001). The prevalence of ketamine use prior to incarceration in these criminal offenders was 13.0% for the Colorado site, 1.8% for the Connecticut site, 3.6% for the Kentucky site, and 6.9% for the Oregon site (results not shown).

As seen in Table 2, ketamine users were significantly more likely to be male, white and approximately five years younger than non-ketamine users. HIV risk behaviors, such as having sex without a condom while high, vaginal sex without a condom and anal sex without a condom were also significantly greater among those who reported lifetime use of ketamine. Injection drug use was also almost twice as prevalent among the ketamine users versus the non-users (52.3% vs 32.3%, p=0.008).

Other drug use was also highly associated with having ever used ketamine in one's lifetime. Specifically, lifetime use of hallucinogens, crack, cocaine, heroin, other opiates (prescription opiates other than methadone), methamphetamine, and sedatives were significantly more common among the ketamine users. Finally, when examining criminal involvement among the participants, ketamine users were more likely to have committed DWI and property offenses than non-users.

Examining the independent correlates of HIV sexual risk behaviors, having ever used ketamine in one's lifetime was significantly associated with each sexual behavior. As seen in Table 3, those who reported having ever used ketamine were 55% more likely to have a greater number of unprotected sexual encounters while high in the 30 days prior to incarceration, even after adjusting for race, gender, age and other drug use. Likewise, in Table 4 it was found that ketamine users were 27% more likely to have had more vaginal encounters without a condom in the 30 days prior to incarceration than non-users, after adjustment for race, gender, age and other drug use. Finally, Table 5 demonstrates that ketamine users were 86% more likely to have a greater number of anal sex encounters without a condom in the 30 days prior to incarceration compared with non-users, after controlling for race, gender, age and lifetime cocaine use.

DISCUSSION

This is the first study to examine the relationship between the use of ketamine and participation in unprotected sexual behaviors by criminal offenders involved in prison-based substance abuse treatment in the United States. There is a high prevalence of HIV among correctional populations (Maruschak 2006). Participation in high risk behaviors such as ketamine use and unprotected sex is an important issue because over 95% of state prisoners in the U.S. will re-enter the community (Hughes and Wilson 2003). However, future studies on criminal offending populations are needed to examine if there is an increased risk of contracting infectious diseases while under the influence of ketamine.

Ketamine was used by 6.1% of the criminal offenders in this study, but it is unknown if this is higher or lower than the prevalence of ketamine use in the U.S. general population. For example, the National Survey on Drug Use & Health (NSDUH) does not specifically ask respondents about ketamine use. However, this study provides a "snapshot" of ketamine use among inmates before entering prison-based substance abuse treatment. Ketamine is not the most prevalent drug used by prison inmates, but this study supports other research which

suggests that ketamine use may serve as a maker for high risk behaviors such as unprotected sex and more serious and varied drug use (Purcell et al. 2005). In fact, ketamine emerged as a significant correlate of unprotected sexual behaviors prior to incarceration even when controlling for other drug use. As such, this study has demonstrated that criminal offenders who use ketamine are at higher risk for both contracting and transmitting infectious diseases; however, it should be noted that it is unclear from this study if the engagement in risky behaviors occurs while under the influence of ketamine.

In this study, ketamine users differed from non-ketamine users on demographic characteristics, substance use history, criminal history, and HIV sexual risk behaviors. Consistent with previous studies of non-criminal offenders (Lankenau and Clatts 2002; Lankenau et al. 2007), inmates in this study who had used ketamine before entering prison were more likely to be young, white males. In addition, and as expected, ketamine users had more extensive substance use histories and were overrepresented among the injection drug users; however, there was no statistically significant difference between ketamine and non-ketamine users in the number of substance abuse treatment admissions. Ketamine users were significantly more likely to have engaged in DWI and property offenses than non-ketamine users. Almost all of these criminal offenders had engaged in drug-related offenses such as illegal drug use before prison, thus accounting for the lack of statistically significant differences between the two groups. This was expected because only individuals who were participating in prison-based substance abuse treatment were included in the study suggesting that all participants had engaged in drug-related offenses because of their previous drug using histories. The differences in substance use and criminal histories may suggest that ketamine users are more drug-involved and have not received needed substance abuse treatment services before incarceration.

The three multivariate models suggest that ketamine use is one of the most robust correlates of engaging in unprotected vaginal sex, unprotected anal sex, and unprotected sex while high among criminal offenders prior to incarceration. This is consistent with a previous study that found that ketamine users were 1.8 times more likely than non-ketamine users to engage in unprotected insertive anal intercourse with any partner in a sample of young men who have sex with men (Rusch et al. 2004). While it is unknown if ketamine use was predictive of unprotected sex, this study provides a first look into the relationship between ketamine use and unprotected sex among criminal offenders. These multivariate findings present challenges to both public health and correctional officials since it is very difficult to change an individual's sexual practices. In fact, Cottler and colleagues (1998) found that individuals are more likely to change their drug-related HIV risk behaviors than their sex-related HIV risk behaviors. However, correctional institutions should be a prime locale for the delivery of HIV interventions to a high risk population (Oser et al. 2007; Oser, Staton-Tindall and Leukefeld, 2007).

There are several study limitations. First, self-report data was collected from participants in correctional institutions. It is possible that recall bias may be a problem among prison inmates with lengthy prison sentences or that misclassification bias could have occurred as participants may not all recognize the name ketamine or may have thought it was some other drug. Also, despite the fact that participation in the study was voluntary, the self-reported nature of the data could also impact how truthful participants were; however, it should be noted that previous research supports the validity of self-report data among drug users (Darke 1998; Harrison and Hughes 1997). Second, this study was part of a larger transitional case management study within CJ-DATS. It is possible that other variables not included in this study could better explain the relationship between ketamine use and engagement in unprotected sexual behaviors. For example, future studies should examine data on the context of sexual relationships (e.g., monogamous, homosexual, etc.) and ketamine use immediately before sexual encounters to better disentangle the relationships between ketamine use and unprotected

sex. Additional data is needed to further understand the discourse, identities, and meanings associated with ketamine using criminal populations. Third, the current study utilized cross-sectional data to examine the correlates of the number of unprotected sexual encounters. This study cannot determine if a causal relationship exists or if some additional variable may be a more significant contributing factor to using ketamine and engaging in unprotected sex. For example, previous research suggests that sensation seeking may be related to both substance use and sexual risk taking behaviors (Dolezal et al. 1997; Kalichman et al. 1996; Ostrow 2000). Thus, future research should examine the predictive impact of ketamine use on unprotected sex, while controlling for personality traits (i.e., sensation seeking).

Despite these limitations, this study provides additional information regarding ketamine use and high risk behaviors among criminal offenders prior to incarceration. This is the first known study of criminal offenders to examine differences between ketamine users and non-ketamine users across demographic characteristics, substance use history, criminal history, and HIV sexual risk behaviors in the U.S. Due to inmates' high levels of both risky drug use and sexual practices, additional research is needed to examine ketamine use because studies suggest that it can no longer be called just a club drug (Halkitis and Palamer 2006; Lankenau and Clatts 2002). In fact, the substantial finding from this study was that ketamine use can be a marker for engaging in high risk sexual behaviors among criminal offenders. Future studies should examine ketamine and sexual event-level measures (Stall and Purcell 2000) to determine if criminal justice populations are using ketamine to attain unprotected sex (McKirnan et al. 2001) or if intoxication impairs judgment about practicing safe sex.

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Table 1
Participant sociodemographic characteristics

	N=716	
	n	**%**
Gender		
Male	544	76.3
Female	169	23.7
Site		
Colorado	154	21.5
Connecticut	164	22.9
Kentucky	196	27.4
Oregon	202	28.2
Race/Ethnicity		
White	349	48.7
African-American	225	31.4
Hispanic	39	5.4
Other Race/Ethnicity	103	14.4
Age, median (IQR)	33.9 (27.1–41.3)	
Living Situation		
Your home	247	34.5
Other home	353	49.3
Homeless/Shelter	53	7.4
Other living situation	63	8.8
Marital Status		
Married/cohabitating	127	17.8
Single, never married	396	55.4
Separated/divorce/widowed	192	26.9
Employment		
Full-time	251	35.1
Part-time	93	13.0
Unemployed	372	51.9
Education		
No HS Degree	481	67.2
HS Degree	235	32.8

Table 2

Characteristics of Ketamine Users and Non-Users

	Ketamine Use n=44		No Ketamine Use n=672		
	n	**%**	**n**	**%**	**p-value**
Gender					
Male	39	88.6	505	75.5	**0.046**
Female	5	11.4	164	24.5	
Race/Ethnicity					
White	36	81.8	313	46.6	**<0.001**
African-American	2	4.5	223	33.2	
Hispanic	1	2.3	38	5.7	
Other Race/Ethnicity	5	11.4	98	14.6	
Age, median (IQR)	29.3 (25.6–34.8)		34.6 (27.3–41.8)		**0.001**
Living Situation					
Your home	14	31.8	233	34.7	0.344
Other home	19	43.2	334	49.7	
Homeless/Shelter	4	9.1	49	7.3	
Other living situation	7	15.9	56	8.3	
Marital Status					
Married/cohabitating	10	22.7	117	17.4	0.529
Single, never married	21	47.7	375	55.9	
Sep/div/widow	13	29.5	179	26.7	
Employment					
Full-time	14	31.8	237	35.3	0.898
Part-time	6	13.6	87	12.9	
Unemployed	24	54.5	348	51.8	
Education					
No HS	24	54.5	457	68.0	0.070
HS Degree	20	45.5	215	32.0	
Number times had vaginal sex w/o condom, median (IQR)	20 (5.5–30)		10 (1–30)		**0.011**
Number times had anal sex w/o condom, median (IQR)	0 (0–2.75)		0 (0–0)		**0.003**
Number times had sex high w/o condom, median (IQR)	22 (3.5–60)		5 (0–21)		**<0.001**

	Ketamine Use n=44		No Ketamine Use n=672		
	n	**%**	**n**	**%**	**p-value**
Lifetime Substance Use					
Alcohol	44	100.0	661	98.5	1.00
Marijuana	44	100.0	643	95.7	0.248
Hallucinogens	43	97.7	353	52.5	**<0.001**
Crack	35	79.5	384	57.1	**0.004**
Cocaine	42	95.5	482	71.7	**<0.001**
Heroin	22	50.0	175	26.0	**0.001**
Methadone	6	13.6	84	12.5	0.814
Other opiates	28	63.6	221	32.9	**<0.001**
Speedball	12	27.3	104	15.5	0.055
Methamphetamine	43	97.7	360	53.6	**<0.001**
Amphetamine	13	29.5	121	18.0	0.071
Sedatives	15	34.1	11	1.6	**<0.001**
Number of treatment admissions, median (IQR)		2 (0.25–3)		1 (0–3)	0.563
Lifetime IDU	23	52.3	217	32.3	**0.008**
Number of lifetime arrests, median (IQR)		14.5 (9.25–24.5)		15 (6–25)	0.401
Age at first arrest, median (IQR)		15.5 (13.25–18)		16 (14–20)	0.126
Total months in jail, median (IQR)		60 (34.25–84)		48.5 (25–96)	0.995
Number arrests while using/getting drugs, median (IQR)		11.5 (5–20)		8 (3–20)	0.249
Number of juvenile arrests, media (IQR)		2 (0–4)		1 (0–4)	0.589
Criminal History					
Drug Charge	44	100.0	657	97.8	0.616
DWI	43	97.7	557	83.0	**0.005**
Sex Work	6	13.6	98	14.6	1.00
Property Crime	40	90.9	473	70.4	**0.003**
Violent Crime	10	22.7	201	29.9	0.394

Table 3

Independent Correlates of Number of Sexual Encounters without a Condom while High

Variable	Adjusted Risk Ratio	95% Confidence Interval
Lifetime Ketamine Use	1.55	1.46–1.63***
Race[1]		
Black	0.77	0.73–0.80***
Hispanic	0.86	0.80–0.93***
Other Race	0.90	0.86–0.95***
Female Gender	0.87	0.84–0.95***
Age (1 year increments)	0.98	0.98–0.99***
Lifetime Heroin Use	1.09	1.04–1.13***
Lifetime Sedative Use	1.28	1.22–1.35***
Lifetime Cocaine Use	1.60	1.14–2.24***

[1] White is referent group

* p<0.05;

** p<0.01;

*** p<0.001

Table 4

Independent Correlates of Number of Vaginal Sexual Encounters without a Condom

Variable	Adjusted Risk Ratio	95% Confidence Interval
Lifetime Ketamine Use	1.27	1.19–1.35***
Race[1]		
Black	0.94	0.92–1.00
Hispanic	1.24	1.15–1.33***
Other Race	0.97	0.92–1.03
Female Gender	0.73	0.69–0.76***
Age (1 year increments)	0.98	0.98–0.99***
Lifetime Heroin Use	1.05	1.01–1.09*
Lifetime Cocaine Use	1.22	1.17–1.30***

[1] White is referent group

* p<0.05;

** p<0.01;

*** p<0.001

Table 5

Independent Correlates of Number of Anal Sexual Encounters without a Condom

Variable	Adjusted Risk Ratio	95% Confidence Interval
Lifetime Ketamine Use	1.86	1.60–2.17***
Race[1]		
Black	0.49	0.43–0.57***
Hispanic	1.02	0.84–1.25
Other Race	0.41	0.34–0.50***
Female Gender	0.70	0.61–0.80***
Age (1 year increments)	0.99	0.98–0.99***
Lifetime Cocaine Use	1.27	1.10–1.45**

[1] White is referent group

* p<0.05;

** p<0.01;

*** p<0.001