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Crack and Cocaine Use among Adolescents in Psychiatric Treatment: Associations with HIV Risk

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Abstract

Crack and cocaine use among adults has been associated with co-occurring psychiatric disorders as well as other drug use and unprotected sex. However, this issue is relatively unstudied in adolescents. This study collected data from 282 adolescents (mean age=14.9 years) treated in intensive psychiatric treatment settings to understand the relationship between crack/cocaine use and HIV risk. Thirteen percent of youth reported ever using crack or cocaine. Use was not associated with age, gender, race/ethnicity or SES. After controlling for known factors that influence unprotected sex, the odds that those with a history of crack/cocaine use engaged in inconsistent condom use was six times greater than that for those youth who did not ever use. Thus, crack/cocaine use is prevalent even among younger adolescents with psychiatric disorders who are not in drug treatment. Its use is associated with high rates of sexual and other risk behaviors. A history of use should alert clinicians to a wide variety of possible behavioral risks. These results can also inform future adolescent HIV prevention intervention development.

Keywords

adolescent; crack; cocaine; sexual risk behavior; HIV; psychopathology

1. Introduction

Although HIV infection rates are declining in the US, rates of infected adolescents continue to increase. Estimates suggest at least half of all new HIV infections are among individuals under the age of 25 (Centers for Disease Control and Prevention, 2003; Centers for Disease Control and Prevention, 2001) and infections diagnosed in young adulthood often stem from risk behavior, such as unprotected sexual intercourse, during adolescence.

Some factors associated with increased risk for adolescent HIV/STI infection include psychiatric impairment (Brown, Danovsky, Lourie, DiClemente, & Ponton, 1997), a history of legal involvement (Tolou-Shams et al., 2007), increased sensation-seeking (Devieux et al., 2002), impulsivity (Cooper, Orcutt, & Albino, 2003), other health risk behaviors such as self-cutting (Houck et al., 2006) and substance use or abuse (Castrucci & Martin, 2002). Youth with psychiatric disorders are more likely than their peers to exhibit negative emotional arousal and impulsivity as well as to engage in self-injurious behaviors and

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substance use (Brown, Houck, Hadley, & Lescano, 2005; Fritsch, Donaldson, Spirito, & Plummer, 2000; Deas, 2006). Therefore, these youth tend to be at greater risk for HIV infection than those without a psychiatric history.

Studies that have examined the relationship between adolescent substance use and sexual risk taking behavior have generally focused on the relationship between alcohol and sexual risk-taking because alcohol is the most common substance used by adolescents (Deas, 2006). More recently there has been an emphasis on understanding the relationship between marijuana use and sexual risk taking behaviors, particularly among juvenile offenders (Kingree & Betz, 2003; Kingree & Thompson, 2007). These studies present mixed findings; some have indicated that alcohol and/or marijuana use just prior to or during sex increases the likelihood of unprotected sex (Fortenberry, 1998), others have found an association between more general (particularly earlier) use of alcohol and/or marijuana and sexual risk taking (Stueve & O'Donnell, 2005) while others have found differential associations between alcohol use and adolescent HIV risk behavior depending on race/ethnicity (Cooper, Peirce, & Huselid, 1994) or gender (Bryan, Ray, & Cooper, 2007). Mixed findings are perhaps due to the complex nature of proximal and distal factors involved, including co-occurring other drug use.

Unlike studies with adults, few studies have focused on the relationship between adolescent sexual risk and other drugs besides marijuana, such as cocaine, methamphetamines or heroin. Studies among adults demonstrate that use of non-injection crack cocaine substantially increases the risk for risky sexual activity (e.g., Maranda, Han, & Rainone, 2004; Edlin et al., 1994). Within various subpopulations, such as the adult MSM (men who have sex with men) community, other substances such as methamphetamines and club drugs, such as ecstasy, have also been linked to increased rates of unprotected sex (Shoptaw & Reback, 2007). Of the few adolescent studies conducted, one study found that among primarily non-White adolescent male detainees (23% of whom reported recent crack or cocaine use), lifetime use of intranasal cocaine was associated with less frequent condom use ((Kang, Magura, & Shapiro, 1994). (Word & Bowser, 1997)) found that crack use in a community sample of African American adolescents/young adults was related to the presence of STI's implying that crack cocaine use is associated with unprotected sexual activity. Castrucci and Martin (2002) also found that among incarcerated adolescents, females had higher rates of regular cocaine use (10%) concurrent with higher rates of STI's. While Castrucci and Martin's (2002) study also found these adolescents had high rates of early sexual debut, multiple partners and inconsistent condom use, they did not examine the direct relationship between regular cocaine use and recent sexual risk behavior. More recently, the Centers for Disease Control has published findings that indicate methamphetamine use, which is on the rise among adolescents, is also associated with greater adolescent sexual risk behavior (Centers for Disease Control and Prevention, 2006b). Thus, although rates of adolescent crack/cocaine and other drug use are generally lower than rates of adolescent alcohol or marijuana use (Centers for Disease Control and Prevention, 2006a), there are some data to suggest that the use of substances like crack cocaine can heighten adolescent HIV risk.

To our knowledge, none of these studies controlled for potential associated factors of sexual risk-taking behavior such as impulsivity or co-occurring alcohol and marijuana use. In addition, no study has focused on youth with psychiatric disorders, who tend to be more emotionally and behavioral dysregulated, exhibiting higher degrees of impulsivity and sensation-seeking as well as higher rates of substance use. While juvenile offenders have high rates of psychiatric disorders, the prevalence of psychiatric disorders in Castrucci and Martin's (2002) study was not reported. Therefore to further inform HIV prevention interventions for high-risk youth, this study's primary aim was to examine the relationship

between substance use (including other drugs besides alcohol and marijuana) and sexual risk behavior among adolescents with a psychiatric disorder while accounting for previously supported predictors of adolescent HIV risk (e.g., impulsivity). More specifically, this study examines the association between adolescent crack and/or cocaine use and sexual risk behavior given the strong association with sexual risk behavior in adulthood. We hypothesized that greater crack and/or cocaine use would be associated with more inconsistent condom use after controlling for other co-occurring HIV risk factors.

2. Methods

2.1 Participants

This study investigated youth risk behavior within a sample of adolescents recruited from therapeutic day programs, including therapeutic school and partial hospital settings (Brown, Lourie, Zlotnick, & Cohn, 2000a). With approval from the Hospital Institutional Review Board, participants were recruited during the time period of 1997-1999 if they were enrolled in participating psychiatric day schools and residential facilities, aged between 13 and 18 years, were English speaking, and provided informed written consent from their parent or guardian, as well as their own informed written assent. Participants were excluded from the study if they evidenced active psychosis and were unable to participate in group activities. Of the 382 youths that met eligibility criteria, 81% ($N = 310$) agreed to participate. As the focus of this analysis was on the correlates of substance use, we limited these analyses to the subset of participants for whom there were data on substance use ($N = 282$).

Participants were an average of 14.85 years old ($SD = 1.48$). Most were male (59%) and Caucasian (83.5%). The remaining participants reported their ethnicity as African American (7.2%), Hispanic (2.0%), Asian American (0.4%), and Other (6.8%). This sample's ethnic composition (Caucasian 83.5%, racial/ethnic minority 16.5%) was reflective of the general population served by the participating sites (Caucasian 85%, racial/ethnic minority, 15%; US Census, 2000). Participants exhibited a range of psychiatric disorders, such as mood disorders (42.6%), post-traumatic stress disorder (9%), and disruptive behavior disorders (41.8%). Forty-three percent of youth were diagnosed with a single, primary psychiatric disorder and 57% were diagnosed with a secondary, co-occurring psychiatric disorder. Adolescents with a primary diagnosis of substance use disorder ($n=4$) were excluded from these analyses.

2.2 Measures

The following measures assessed the four domains of demographic information, information on co-occurring psychopathology, sexual risk taking behaviors, and previous and current substance use.

Medical chart review provided information regarding the participants' age, gender, ethnicity/race, Medicaid status, primary and secondary (if applicable) psychiatric diagnosis, and history of substance abuse treatment. History of sexual abuse was assessed and determined by the participants' psychiatric clinical treatment teams, who had extensive psychosocial histories of the patients. Project staff contacted participants' primary clinician for confirmation of participants' sexual abuse history (Brown, Kessel, Lourie, Ford, & Lipsitt, 1997).

Participants completed the self-restraint scale from the Weinberger Adjustment Inventory (WAI). Self-restraint was derived from two subscales, impulse control and suppression of aggression. The WAI has gained empirical support for use with clinical and nonclinical populations. It has excellent test-retest reliability, inter-item reliability, and convergent

validity. Subscales are reported to have good internal consistencies ($\alpha \geq .70$) and to be adequate freestanding measures (Weinberger & Schwartz, 1990).

HIV-related behavior and substance use histories were collected via self-report. Participants completed forms indicating self-report of lifetime history of sexual intercourse, pregnancy/fatherhood, sexually transmitted diseases, sharing of intravenous needles, self-cutting, and sharing of cutting instruments as well as recent number of sexual partners (over the past 12 months). Consistent with prior research, consistent condom use was defined as using condoms “always or almost always” and inconsistent condom use was defined as using condoms only “sometimes” “never” or “rarely” (Brown et al., 2000a). In addition, lifetime frequency of alcohol, marijuana, cocaine and crack cocaine use (asked separately from cocaine use) were queried, yielding rates of use across “never used, used once, used a few times, weekly use and daily use” (see Table 1). All items were based on instruments used in projects with similar populations (Brown, DiClemente, & Beausoleil, 1992; DiClemente, Lanier, Horan, & Lodico, 1991).

2.3 Data Analysis

To evaluate the proposed hypotheses, the following analyses were conducted. We employed chi-square tests to detect significant differences in demographic and behavioral variables between those with and without a history of using “crack and/or cocaine” ($N=282$). Logistic regression was used to determine the association between inconsistent condom use and various demographic, psychological and substance use variables among the subsample of adolescents who reported any history of sexual activity ($n=191$). Continuous independent variables were dichotomized for ease of results interpretation. Rates of substance use were collapsed across “weekly or more” use versus “less than weekly” use for all bivariate and logistic regression analyses. Median splits were utilized to dichotomize adolescent age and the continuous measure of self-restraint into “high” and “low” self-restraint groups. Independent variables included in the logistic regression were derived from previously empirically established risk factors for inconsistent condom use (Brown et al., 2000a). Due to the limited number of comparisons, no correction was made for Type I error. All conducted analyses were 2-tailed.

3. Results

A substantial percentage of the participants reported using having used crack and/or cocaine during their lifetime (13%; see Table 1). In addition, most participants reported using alcohol at least once (74%) and over half reported marijuana use (57%).

An examination of the participants who had tried crack and/or cocaine (C/C) with those who had never used C/C using chi-square analyses revealed no significant demographic differences (see Table 2). Comparisons of sexual risk behavior using chi-square analyses revealed a strong relationship between C/C use and all sexual risk behaviors assessed. Of the 282 participants, 191 reported a history of sexual activity. Having tried crack and/or cocaine was associated with a higher rate of lifetime sexual activity ($\chi^2 = 9.62, p = .002$). Among those with a history of sexual activity ($n=191$), inconsistent condom use ($\chi^2 = 7.01, p = .008$), and having a history of sexually transmitted diseases ($\chi^2 = 4.93, p = .03$) were associated with having tried crack and/or cocaine at least once. Having had more than one sexual partner within the prior 12 months was not associated with lifetime crack and/or cocaine use ($\chi^2 = 2.32, p = .13$). The C/C group also evidenced significantly higher substance use including having a history of having received prior substance abuse treatment ($\chi^2 = 15.50, p = .001$), as well as using alcohol or marijuana weekly or more ($\chi^2 = 37.58, p < .0001$; $\chi^2 = 31.95, p < .0001$, respectively). Finally, the C/C participants also had significantly higher levels of co-occurring psychopathology, including a greater number of psychiatric

diagnoses ($\chi^2 = 4.23, p = .04$), lower self-restraint ($\chi^2 = 7.83, p = .007$), greater levels of self-cutting ($\chi^2 = 16.31, p < .0001$), and more episodes of sharing their cutting instruments ($\chi^2 = 5.87, p = .02$).

Inconsistent condom use is a primary mode of transmission among adolescents (Crosby, 2005). Thus, rather than predict less direct measures of HIV risk (e.g., lifetime sexual activity) and/or measures that did not show differences between C/C and non C/C users in bivariate analyses (e.g., number of partners), the current analysis included only the subset of sexually active adolescents ($n=191$) for whom condom use data were available. Due to listwise deletion methods inherent in multivariate logistic regression analyses, the final sample was reduced to 143 participants. The following variables known to be associated with condom use were entered into a multivariate logistic regression model: gender, age, race, sexual abuse history, psychiatric status (presence of comorbid disorder), low-self restraint, alcohol (weekly or daily use), marijuana (weekly or daily use), and crack and/or cocaine use (any). Of those variables, only crack/cocaine use emerged as having a significant relationship ($AOR = 5.99, p = .002$) with inconsistent condom use (see Table 3).

4. Discussion

This is one of the few studies to identify rates of crack cocaine use among adolescents as well as to demonstrate a specific association between crack and/or cocaine use and HIV risk through unprotected sexual activity. During the time when these data were collected, rates of crack cocaine use among the general adolescent population were estimated to be approximately 2.7-2.2% (Johnston, O'Malley, & Bachman, 2000), which is less than one quarter of the self-reported use by our adolescent sample with psychiatric disorders. African American young adults and adolescents have been found to have higher rates of crack cocaine use and this has been associated with sexual risk behaviors and increased rates of HIV/STIs (Word et al., 1997). Our data suggest that the association between crack cocaine use and unprotected sexual activity is not limited to African American youth. Rather, we found that this association is also relevant and important for young, primarily Caucasian adolescents who experience multiple co-occurring risk factors, such as mental health issues and other substance use besides crack cocaine. Even after controlling for known adolescent HIV risk factors, such as gender, race, age, psychiatric status, impulsivity and alcohol and marijuana use, those adolescents who used crack cocaine at least once in their lifetime had sixfold greater odds of being in the inconsistent condom use group than their peers who had never used crack cocaine.

These results have important implications both for clinical practice and research designs. Treatment providers who work with youth might want to reconsider the factors that prompt screening "hard" drug use since crack and/or cocaine use was equally prevalent among Caucasian girls with a depressive disorder as among behaviorally disturbed boys. Likewise, clinical research trials that focus on even early to middle adolescent risk behaviors might consider including more detailed substance abuse measures that not only capture alcohol and marijuana use, but also include specific quantity and frequency questions about other drug use. Additionally, treatment providers who encounter psychologically distressed adolescents in their practice perhaps should attempt to have more detailed conversations regarding their mental health status, substance use and associated sexual risk behaviors as a way to reduce adolescent HIV risk.

Contrary to other studies of adolescent HIV risk behavior, sexual abuse history was unrelated to crack cocaine use as well as inconsistent condom use when accounting for crack cocaine use. Yet, prior studies have demonstrated that sexual trauma history is related to increased rates of substance use during adolescence as well as into adulthood (e.g., (Widom,

Marmorstein, & White, 2006; Moran, Vuchinich, & Hall, 2004). A history of sexual abuse has also been closely linked to increased rates of unprotected sexual activity among adolescents and adults (Senn, Carey, Vanable, Coury-Doniger, & Urban, 2006; Silverman, Rai, Mucci, & Hathaway, 2001). One difference between these studies and ours may be the relatively high prevalence of sexual abuse history in our sample, which would limit the ability to detect associations between sexual abuse history and outcomes due to a statistical “ceiling” effect (Cohen & Cohen, 2003). High rates of sexual abuse history would be anticipated in this sample (versus community samples of the aforementioned studies) given that these adolescents were recruited from intensive therapeutic day programs wherein substantial proportions of youth have abuse histories (Brown, Lourie, Zlotnick, & Cohn, 2000b; Brown et al., 2000a).

Although these data can make a significant contribution to the field of adolescent substance abuse and HIV risk, several limitations should be noted. Data for this study were collected approximately ten years ago and might not reflect current trends in adolescent crack and/or cocaine use. Recent data show that use among psychiatrically hospitalized youth is even higher than found in the current study; among a sample of 636 psychiatrically hospitalized youth approximately 45% endorsed lifetime cocaine use (Cropsey, Weaver, & Dupre, 2008). Thus, adolescents with psychiatric disorders are clearly continuing to endorse cocaine use at high rates, thereby incurring great risk for a host of negative outcomes (Cropsey et al., 2008). Data collected relied entirely on self-report and there were no collateral drug toxicology screens to confirm adolescent reports of substance use. Studies relying on self-report may underestimate the rates of substance use and sexual risk behavior, so our findings may underestimate the magnitude of the problem. Additionally, the generalizability of the current study is limited because of the predominantly White, clinical samples of youth from the Northeast United States. But, rates among more ethnically diverse and urban adolescents could be even higher. As is the case with many studies of substance use and adolescent sexual risk behavior, this study was unable to discern a temporal relationship between crack cocaine use and unprotected sex. Future studies with adolescent clinical samples might wish to obtain retrospective, self-report data on crack cocaine use before or during sexual activity to determine whether it is specific or general patterns of crack cocaine use that are associated with unprotected sexual activity. It will be helpful to be able to compare frequent and infrequent crack cocaine users on inconsistent condom use so as to further inform risky subgroups and more tailored intervention development. The current study sample size was too small, however, to be able to appropriately conduct such analyses.

5. Conclusions

Our findings have important implications for reducing HIV infection among youth with co-occurring mental health issues and drug use. Crack cocaine use appears to be as or even more influential in heightening adolescent HIV risk behavior than other factors repeatedly demonstrated to increase adolescent HIV risk, which are routinely included as part of adolescent HIV prevention intervention content. Unless there is a specific research focus on reducing HIV risk among cocaine-using youth, most adolescent HIV prevention interventions focus on alcohol and marijuana use and rarely address in their intervention content possible strategies to reduce use of other drugs, such as crack cocaine. Future adolescent HIV prevention interventions with youth with psychiatric, including substance use disorders (even if only alcohol or marijuana use), should include specific content concerning other drug use, particularly cocaine use and its relation to unprotected sexual activity. Likewise, clinicians who treat adolescents (e.g., pediatricians, substance abuse counselors, social workers, psychologists, psychiatrists) should routinely include a discussion with all adolescent patients about mental health history, lifetime use of all

substances and sexual activity as well as provide appropriate intervention when necessary to reduce the likelihood of subsequent HIV infection among these high-risk adolescents.

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Table 1

Rates of Substance Use Among Adolescents in Psychiatric Treatment (N=282)

	Never	Once	A few times	Weekly	Daily
Alcohol	26%	9%	38%	19%	8%
Marijuana	43%	5%	26%	13%	13%
Crack/cocaine	87%	5%	6%	0.4%	1%

Table 2Comparisons between adolescent crack/cocaine users and non-users ($N=282$)

Variable	Crack/Cocaine Use		χ^2 (df)	<i>p</i>
	No (<i>n</i> =245) ^a	Yes (<i>n</i> =37) ^a		
<i>Demographics</i>				
Age (% < 15 yrs)	85/228 (37.3%)	11/33 (33.3%)	0.19 (1)	ns
Gender (% Male)	141/239 (59%)	22/36 (61%)	0.06 (1)	ns
Ethnicity/Race (% Caucasian)	178/214 (83%)	27/30 (90%)	0.91 (1)	ns
Medicaid	21/87 (24%)	3/10 (30%)	0.94 (2)	ns
<i>Substance Use</i>				
Alcohol (weekly or more)	49/245 (20%)	25/37 (68%)	37.58 (1)	<.0001
Marijuana (weekly or more)	51/245 (21%)	24/37 (65%)	31.95 (1)	<.0001
Past Substance Abuse Trmt	75/221 (34%)	23/33 (70%)	15.50 (1)	<.0001
<i>Co-occurring Psychopathology</i>				
Disruptive disorder	89/219 (41%)	15/31 (48%)	1.29 (3)	ns
Comorbid disorder (yes)	120/220 (55%)	23/31 (74%)	4.23 (1)	0.04
Low self-restraint	107/235 (46%)	26/37 (70%)	7.83 (1)	0.007
Self-cut more than 3 times ^b	23/123 (19%)	13/22 (59%)	16.31 (1)	<.0001
Shared cutting instrument	12/108 (11%)	8/27 (30%)	5.87 (1)	0.02
<i>Sexual Risk</i>				
History of Sexual Abuse	86/212 (41%)	16/30 (53%)	1.76 (1)	ns
Sexually active	157/235 (67%)	34/37 (92%)	9.62 (1)	0.002
>1 sex partner last year ^c	78/155 (50%)	22/34 (65%)	2.32 (1)	ns.
Consistent condom use ^c	111/157 (71%)	16/34 (47%)	7.01 (1)	0.008
STD history	7/156 (4%)	5/34 (15%)	4.93 (1)	0.03

^aDenominators and percentages within columns vary according to missing data^bOf 145 adolescents who endorsed cutting behaviors^cOf 191 adolescents who endorsed any sexual activity

Table 3

Association of demographic, psychological and substance use variables with inconsistent condom use

Variable	Bivariate Association with Inconsistent Condom Use (n=196) ^a				Multiple Logistic Regression Predicting Inconsistent Condom Use (n=143) ^b			
	Unadjusted OR	95% CI		p	AOR ^c	95% CI		p
		Lower	Upper			Lower	Upper	
Gender (Female)	1.62	.89	2.95	.12	1.68	.74	3.83	.21
Age (≥ 15)	1.39	.72	2.67	.33	1.47	.63	3.43	.38
Race (White)	2.45	.94	6.38	.07	1.78	.58	5.46	.31
Sexual Abuse History	2.25	1.16	4.35	.02	1.96	.88	4.41	.10
Comorbid Disorder	1.24	.64	2.37	.53	1.25	.56	2.79	.59
Self-Restraint	1.18	.64	2.17	.59	1.06	.45	2.48	.90
Alcohol (Weekly or more)	1.30	.60	2.79	.51	1.92	.58	6.37	.28
Marijuana (Weekly or more)	1.38	.71	2.67	.35	1.14	.35	3.71	.83
Crack/Cocaine (Any use)	2.72	1.28	5.78	.01	5.99	1.93	18.65	.002

^a N's may vary slightly according to missing data on certain items

^b Due to listwise deletion methods inherent in multivariate logistic regression analyses, the final model sample size was reduced to 143 sexually active participants

^c AOR = Adjusted Odds Ratios among sexually active participants, Model = $\chi^2(9) = 20.63, p = .01, 73\%$ of cases predicted.