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Methamphetamine Use and High-Risk Sexual Behaviors among Incarcerated Female Adolescents with a Diagnosed STD

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ABSTRACT *Juvenile detention settings provide an important venue for addressing the health-related needs of adolescent populations, who often have high rates of sexually transmitted diseases (STDs) and concomitant drug use. This study examines factors associated with methamphetamine use and risky sexual behaviors among 539 incarcerated female adolescents between ages 12–18 years with an STD diagnosis. Data were obtained from interviews with detainees receiving STD case management services within a California juvenile detention facility in January 2006–June 2007. High-risk behaviors characterized the sample, such as low use of condoms consistently (43.3%), prior STD infection (25%), pregnancy history (26%), arrest charge for prostitution or drug use (23%), and a history of prostitution (18%). Half of the sample reported weekly alcohol or drug use; most commonly used drugs were marijuana (37%), alcohol (21%), and methamphetamine (16%). In multivariate analysis, African Americans had a lower odds of methamphetamine use (odds ratio [OR]=.163) compared with whites. Detainees who reported inconsistent condom use had over twice the odds of methamphetamine use (OR=2.7) compared with consistent condom users. In addition, those who reported alcohol use had twice the odds of methamphetamine use (2.0). There was a significant interaction between Latina ethnicity and having an arrest charge for drugs or prostitution; Latinas who had this charge had over 11 times the odds of using methamphetamine compared with those with other arrest charges (OR=11.28). A better understanding of the relationship between drug use and sexual risk behaviors of STD-positive incarcerated female adolescents can inform the development of appropriate corrections and community-based interventions serving this segment of high-risk adolescents.*

KEYWORDS *Adolescents, Girls, Incarceration, Methamphetamine, Sexually transmitted diseases, Substance use, Sexual behavior*

INTRODUCTION

Methamphetamine use continues to be a major public health problem in the United States.[1] Its use and association with high-risk sexual behaviors has been well-documented among studies of gay and bisexual men[2] and heterosexual men and women.[3] Less well known are if there are sexual risk factors associated with

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methamphetamine use among adolescents, particularly incarcerated adolescents. This gap in the literature is cause for concern, given the use of methamphetamines among young adults and the strong linkages between drug use, risky sexual behavior, and delinquency among adolescents.[4,5] This paper examines associations between methamphetamine use and sexual behaviors among adolescent girls in 3 juvenile detention centers in a large urban setting in California.

Health Concerns among Incarcerated Female Adolescents

According to recent national data, there are approximately 12,000 female offenders housed on any given day in juvenile justice residential facilities, representing approximately 15% of the total population of detained juveniles.[6] Most juvenile detainees live in and are detained in urban areas throughout the United States.[7] Similar to the adult incarcerated population, significant racial disparities are present in the juvenile justice system; approximately two-thirds of the girls in the juvenile justice system are ethnic minorities and are primarily African American and Latina,[8,9] come from families of low socioeconomic status,[10] and have low educational attainment.[11] These adolescents are medically underserved and often present with significant health, mental health, and reproductive health concerns compared with their female counterparts in the community. These conditions include both unintended and high-risk pregnancies,[12] early age of sexual debut,[13] and high rates of Chlamydia and gonorrhea.[14] Chlamydia is often asymptomatic, and adolescent girls bear a disproportionate burden of serious sequelae from STDs, including increased risks for HIV transmission, pelvic inflammatory disease, ectopic pregnancy, and infertility.[15]

Incarcerated girls also report more traumas such as sexual abuse and rape[16] or mental health disorders than incarcerated boys, factors that are also associated with risky sexual behavior among girls.[17] Incarcerated girls also report more sexual and drug-related risk behaviors and initiate them at younger ages than incarcerated boys.[18] Such behaviors include multiple sex partners, exchanging sex for money or drugs and unprotected sex while under the influence of alcohol or drugs.[19] Toulou-Shams and colleagues[20] found that incarceration history is itself a risk marker for adolescent HIV risk, substance abuse, and mental health disorders.

Studies on methamphetamine use among community samples of adolescents have shown that its use is associated with multiple sex partners and inconsistent condom use, and that stronger associations are reported among girls than boys.[21,22] Other methamphetamine-associated sexual risks include being pregnant or getting someone pregnant[23] and early age of sexual debut.[24] Girls also appear to have more psychiatric problems related to methamphetamine use than boys,[25] and greater treatment-seeking for methamphetamine.[26] The limited research on methamphetamine use among incarcerated adolescents has shown high rates of use among this population. Kim and Fendrich's analysis of national juvenile arrestee drug use data collected between 1990 and 1992 found that among 4,640 arrestees interviewed, 12% of girls and 8.5% of boys reported lifetime methamphetamine use, with higher rates of methamphetamine dependence reported by girls than boys.[27] More recent work by McDonnell et al.[28] reported methamphetamine use among 26% of incarcerated female adolescents who were screened for Chlamydia in a detention setting in Northern California.

Studies that have assessed the impact of other types of substances used on sexual behavior among incarcerated youth have primarily focused on alcohol or marijuana use,[29,30] with girls being more likely to test positive by urinalysis for marijuana use

than any other drug.[31] Kingree and Phan[32] showed that marijuana use was associated with greater HIV risk behavior among younger, but not older, adolescent offenders, both boys and girls. Another study found that marijuana use, but not alcohol, was strongly associated with unprotected sexual intercourse among adolescents who were in youth detention centers, and that girls had significantly higher odds of unprotected sexual encounters than boys.[33] Furthermore, the relationship of alcohol use to risky sexual behavior may be specific to defined subgroups of adolescents; Schmiege and colleagues[34] showed that this relationship was strongest among adolescent offenders who had low self-esteem, were male, were younger, and were not in a relationship.

Studies that have assessed the impact of ethnicity on types and frequency of adolescent substance use have found persistent racial/ethnic differences in alcohol and marijuana consumption rates among adolescents. Data from 3 large national surveys—the Youth Risk Behavior Survey, Monitoring the Future, and the National Survey on Drug Use and Health—have consistently documented higher rates of lifetime and recent alcohol and marijuana use among Latinos and whites compared with African Americans.[35]

The purpose of this study was to examine associations between risky sexual behaviors and methamphetamine use among incarcerated female adolescents with a newly diagnosed STD in order to inform the development of interventions for this group. Secondary analyses were conducted with data obtained from case records of female adolescents who were receiving STD case management services during their incarceration in juvenile hall in a large, urban county. Consistent with the literature that reports increased risk behaviors associated with methamphetamine use, we hypothesized that incarcerated girls with a current STD diagnosis who also reported recent methamphetamine use would be more likely to engage in higher risk sexual behaviors than those who reported no regular use.

METHODS

Study Population, Setting, and Procedures

Since 1996, an STD screening and case management program in a California juvenile detention program provides Chlamydia and gonorrhea screening and partner services to all incarcerated girls.* Prior to the inception of this program, high rates of STD re-infection were reported among detainees due to the lack of timely screening, treatment and partner services offered.[36] Since the program's inception, all incarcerated girls are screened for STDs within 2 hours of admission to the juvenile halls. During the intake process, all females are taken to the medical unit for a health exam that includes the collection of a urine specimen for chlamydia and gonorrhea testing, and a blood specimen for syphilis testing. Within 5 days of admission, test results are available and clinical staff at the juvenile halls initiates STD treatment for all STD-positive female detainees. Public health case managers from the local health department follow-up all STD-positive females who are either still in the juvenile halls or have been recently released from custody to ensure that timely STD treatment, which consists of a single-dose oral antibiotic, was initiated.

*Due to issues of confidentiality, the name and location of the project has been omitted.

At the same time, the case managers provide partner elicitation, where staff elicit the names of the detainee's sexual partners to encourage them to get treated and will provide treatment to the partner as needed. For those female detainees who are released from custody prior to receiving treatment, staff provide extensive field follow-up to locate and treat them.

Following treatment initiation and eliciting partner information, the case managers provide an individualized STD/HIV risk assessment interview and offer referrals to appropriate medical and social services. The risk assessment interview is conducted by the case manager via paper and pencil, lasts approximately 25 minutes, and consists of 100 items. Questions include demographics, arrest charge, sexual risk behaviors, reproductive health status, STD history, substance use, sexual/physical abuse history, education, housing status, mental health needs, and related social service needs. A number of steps are taken to ensure accuracy of responses. Firstly, prior to the interview, all clients are told that they will be asked a series of questions related to their health history and that all responses will be kept confidential. Case managers have been trained to establish rapport, are warm and empathic, and convey a lack of judgment or consequence for positive reports of sexual or drug-related behaviors, which reduces the likelihood of reporting bias. Secondly, to address issues of low literacy among clients, case managers read the questions to the client and check for understanding through active listening and repeating back what the client has said. Reincarcerated arrestees are retested and treated for STD infection each time they are reincarcerated, but only are administered the interview during their first incarceration.

The lead author extracted case file data for all completed interviews conducted during 2006 and the first half of 2007. Inclusion criteria for selection of case files was restricted to any female diagnosed with an STD in juvenile hall during the study period who was eligible to receive a risk assessment interview (i.e., being incarcerated with an STD for the first time). Those who had a previous STD diagnosed during a prior juvenile hall stay (before the study period) were not part of the eligible sample because they completed the risk assessment interview during their earlier stay in juvenile hall. Our rationale for selection of the sampling frame was to closely align the current sex or drug use behavior with the current STD diagnosis in order to more closely approximate the temporal ordering of events.

The total eligible sample during the study period was $N=719$. Of these, 144 STD-positive detainees were excluded because they did not receive an interview due to the inability to locate them, or their having been released early. An additional 36 cases were excluded due to missing data or because the participant was incoherent or unable to understand the questions, leaving a final sample $N=539$. An interview was excluded if a respondent was missing data on 3 or more items. There were no significant differences in the 36 interviews with missing data/client incoherence by ethnicity or age. A listwise deletion was performed on all missing cases.

Measures

With the exception of current STD diagnosis, which was verified through laboratory confirmation, all responses were self-reported. The following data were extracted from the interview: age, race/ethnicity, arrest charge, sexual/reproductive history, and alcohol and drug use. Sexual history questions were as follows: age at first sex, number of partners (lifetime and past 6 months), frequency of condom use (at last

sexual encounter and in general), pregnancy history, sex trading history, sexual assault history, STD history, and current STD diagnosis. Two variables measuring frequency of condom use (in general and at last sexual encounter) were each originally listed on a 5-point ordinal scale where *1=every time, 2=most times, 3=sometimes, 4=almost never*, and *5=never.* Consistent with other studies on frequency of adolescent condom use,[37,38] these 2 variables were each recoded to categorical variables for frequency of condom use (in general) or frequency of condom use (at last sexual encounter) as 1=consistent use (*every time/most times);* 2=inconsistent use *(sometimes/almost never);* and 3=*no use/never)*.

Alcohol and substance use was assessed with the following items: "Have you ever used any of the following: (alcohol, marijuana, coke, crack, methamphetamine, heroin, hallucinogens, other). If the respondent replied affirmatively, the respondent was asked, "If so, how often?" We defined problematic alcohol and substance use as weekly or more frequent use, consistent with other studies of high-risk adolescents such as The Drug Abuse Treatment Outcome Study of Adolescents. This was a national treatment outcome study of youth in substance abuse treatment, which defined regular substance use as weekly or more frequent use, as this pattern of drug use has been found to be indicative of problematic substance use, even in the absence of a formal diagnosis of substance abuse or dependence.[39,40] Responses for each category of drug and alcohol use were recoded into a categorical variable: (*weekly*=regular use; *less than weekly or no use*=no regular use) for each individual drug separately and for alcohol use.

DATA ANALYSIS

All data were analyzed using SPSS 11.0 (Chicago, IL). We tabulated descriptive statistics and conducted bivariate analyses to compare demographic data and sexual risk behaviors among detainees who reported regular methamphetamine use or no regular methamphetamine use.

To determine the unique background and sexual risk characteristics associated with methamphetamine use, a multivariate logistic regression model was also constructed. We first ran crosstabs between the independent variables and methamphetamine use to assess: (1) if there were a sufficient number of cases in each cell to make the multivariate logistic model viable and (2) if the results of the chi-square tests were statistically significant at ($p<.05$). The rationale for which variables to include in the multivariate logistic regression model was a combination of the p value results from the chi-square tests, in which a Bonferroni's correction was applied (05/15 observations=$p \leq .003$), as well as variables that were theoretically relevant. Variables were entered into the model using a simultaneous ordering of entry. OR and 95% confident intervals are reported.

The following variables were entered into the logistic regression model: race (a 4-level categorical variable; dummy variables for Latino, African American and Other, with white coded as the reference group); arrest charge for drug use or prostitution which was recoded as a composite variable (e.g., arrest for drug sales, possession, use or prostitution; coded as yes/no); frequency of condom use in general (consistent/inconsistent/none); alcohol use; marijuana use (regular use/no regular use); and STD history (yes/no). In order to assess the unique relationships between sexual risk behaviors and methamphetamine use across ethnic groups, interaction

terms for ethnicity by the sexual risk variables were entered and retained in the model if significant at $p<.05$.

RESULTS

Demographics

Demographics, substance use, and sexual risk behaviors among the sample are summarized in Table 1. The sample ranged in age from 12 to 18 years, with a mean age of 15.8 years. Almost one-half of the sample was African American (49.3%), followed by Hispanic (37.0%), "other" ethnic group (7.4%), and white (7%). Over two-fifths of the sample (42.2%) received an arrest charge for a warrant or violation of probation (e.g., lack of school attendance, no show for court date); 18% were arrested for a property-related crime, 16.3% for a violent crime, 12% for a prostitution-related charge (including loitering with intent), and 11% for a drug-related arrest (including possession, sales, public intoxication/drug use, and violating terms of drug parole).

TABLE 1 Methamphetamine use and sexual behavior

	Meth use ($N=86$)	No meth use ($N=453$)	Total ($N=539$)	$\chi^2_{(df)}$	$F_{(df)}$
Mean age (SD)					
Range, 12–18	16.1 (1.1)	15.8 (1.2)	15.8 (1.2)		4.43 (1)*
Ethnicity (%)				87.0 (3)***	
African American	3.5	58.0	49.3		
Hispanic	71.0	30.0	37.0		
Other	15.1	6.0	7.4		
White	11.0	6.0	7.0		
Criminal justice charge (%)				34.1 (4)***	
Warrant/violation	37.2	43.0	42.2		
Property	16.3	18.1	18.0		
Violence	11.0	17.4	16.3		
Prostitution-related	1.2	14.0	12.0		
Drug-related	36.0	6.2	11.0		
Sexual behavior					
Mean (SD) age first sex (range, 9–17)	14 (1.9)	14 (1.9)	14.0 (1.2)		0.289 (1)
Mean (SD)/median number lifetime partners (range, 1–300)	10 (33.8)/4.0	8 (15.9)/4.0	9.0 (20.7)/4.0		0.850 (1)
Condom use last sex (%)	24.0	42.0	39.1	10.77 (1)**	
Consistent condom use (%)	30.0	46.0	43.3	11.12 (2)**	
Prior pregnancy (%)	34.0	25.0	26.0	2.98 (1)	
Ever trade sex (%)	7.4	20.0	18.0	7.16 (1)**	
Ever sexually assaulted (%)	23.0	23.0	23.0	0.001 (1)	
Prior STD infection (%)	25.0	25.0	25.0	0.001 (1)	
Substance Use (%)					
Any drug use	100.0	35.2	55.0	123.7 (1)***	
Marijuana	49.0	34.1	37.0	6.63 (1)**	
Alcohol	36.0	18.0	21.0	14.67 (1)***	
Polydrug	57.0	13.2	20.2	85.68 (1)***	

*$p<.05$; ** $p<.01$; *** $p<.001$

Sexual Risk Behaviors and Substance Use

Risky sexual behaviors and substance use were commonly reported. With regard to sexual risk behaviors, the average age of first sexual contact was 14 years (SD = 1.9) with a range of 9–17 years. The median number of lifetime sexual partners reported among respondents was 4 (mean = 9.0. SD = 20.7; range, 1–300). Thirty-nine percent of respondents reported they used condoms at their last sexual encounter, and 43.3% of respondents reported using condoms consistently. Twenty-six percent of respondents reported a prior pregnancy, 18% reported ever trading sex for money or drugs, 23% percent reported a sexual assault history, and a prior STD diagnosis was reported by one-fourth of the sample. Consistent with the study design, all respondents ($n = 539$) tested positive for at least one STD while incarcerated; 72% for Chlamydia, 12% for gonorrhea, and 17% for both chlamydia and gonorrhea (data not shown).

One half of the sample (55%) reported regular (weekly) drug use. Marijuana was the most frequently used substance (37%), followed by alcohol (21%), and methamphetamine (16%), while one-fifth (20.2%) reported polydrug use.

Correlates of Current Methamphetamine Use

Ethnicity was associated with methamphetamine use ($p < .001$). A greater proportion of methamphetamine users were Hispanic (71%) and of "other" ethnicities, (15.1%), white (11%) and African American (3.5%). Criminal justice charge was also associated with methamphetamine use ($p < .001$). A greater proportion of methamphetamine users were arrested for a warrant/violation (37.2%) or drug-related charge (36.0%) than for other causes. Methamphetamine use was significantly associated with regular use of any drug ($p < .001$), marijuana use ($p < .01$), alcohol use ($p < .001$), and polydrug use ($p < .001$). Methamphetamine users were less likely than non-users to use condoms at their last sexual encounter (24% vs. 42%; $p < .01$) or consistently (30% vs. 46%; $p < .01$).They were also less likely than non-users to report trading sex for drugs or money (7.4% vs. 20%; $p < .01$).

Multivariate Predictors of Methamphetamine Use

Results of the logistic regression model predicting weekly methamphetamine use are shown in Table 2. The overall effect of ethnicity was significant in predicting methamphetamine use, with African Americans having lower odds of methamphetamine use (OR = .163) compared with whites. Those who reported alcohol use had twice the odds of methamphetamine use (OR = 2.0) compared with those reporting no alcohol use. In addition, detainees who reported inconsistent condom use had over twice the odds of methamphetamine use (OR = 2.7) compared with consistent condom users. There was a significant interaction between Latina ethnicity and having an arrest charge for drugs or prostitution; Latinas who had this charge had over 11 times the odds of methamphetamine use compared with those with other arrest charges (OR = 11.2). Nonsignificant variables were marijuana use and having a prior STD.

DISCUSSION

Prior research has shown that youth involved with the juvenile justice system are at high risk for HIV and other STDs.[41] This study extends research in this area by identifying unique characteristics associated with methamphetamine use among high-risk adolescent girls in a large, urban juvenile justice system. One-half of the

TABLE 2 Multivariate predictors of methamphetamine use[a]

	OR	95% CI
African American[b]	0.163***	0.05, 0.48
Latino ethnicity by drug/sex charge	11.20*	1.50, 8.40
Inconsistent condom use	2.76**	1.40, 5.30
Alcohol use	2.00*	1.50, 8.40

[a]Controls for Hispanic and other ethnicity
[b]Referent group, white
*$p<.05$; **$p<.01$; ***$p<.001$

sample reported any prior drug use; consistent with other studies, marijuana and alcohol were the most prevalent substances used.[42] Although methamphetamine users were a minority (16%) among the sample, the prevalence was higher in this sample from California as compared with samples of incarcerated youth in other geographic locations. Moreover, since the sample was selected exclusively from juvenile facilities serving girls, the study is unique in its composition, as girls are usually a minority within studies of juvenile-justice-involved youth.[43]

In the multivariate analysis, girls reporting methamphetamine use exhibited a higher drug and sex risk profile than non-methamphetamine users, as seen in their higher use of alcohol and lower use of condoms. Methamphetamine use was also strongly differentiated by ethnicity, as African Americans were less likely to use compared with whites. Additionally, the interaction of Latina ethnicity and having a drug or prostitution charge was associated with higher odds of using methamphetamine.

In the bivariate analyses, methamphetamine-using youth reported more risky sexual behaviors, such as less consistent condom use in general and at last sexual encounter, yet they were also less likely to report involvement in sex trading and more likely to use marijuana and alcohol. Methamphetamine use may therefore be a marker for greater progression in drug-use involvement, as is seen in its association with drug-related charges.

In both analyses, greater use of methamphetamine was reported among Latinas and lower use among African Americans. This pattern is also apparent among adult treatment samples.[26] Furthermore, these findings are comparable to national trends in adolescent substance abuse, which show that African American youth in the general population have substantially lower rates of use of most licit and illicit drugs compared with whites and Latinos.[44] This finding suggests that Latina adolescents are especially likely to combine methamphetamine use and high-risk sexual behavior. Culturally competent interventions that address the particular influences among these adolescent girls, and the factors that promote their initiation into methamphetamine use, are critical for developing effective prevention interventions for this targeted group. This also may suggest that there are differential pathways into drug use by ethnicity, which is important for designing culturally specific programming.

Study Limitations

Results from this study are subject to several limitations. We were unable to collect data on STD-negative incarcerated girls in the juvenile halls and therefore cannot determine if non-participants would differ in their sexual risk behaviors or drug use

profiles from STD-positive detainees. Secondly, all data were collected through self-report; therefore, social desirability or lack of willingness to self-disclose sexual and/or drug use behavior may have affected participants' responses. However, as noted previously, case managers are highly skilled, empathic staff persons who convey nonjudgmental attitudes upon disclosure of clients' sexual or drug-using behaviors, which should minimize respondent bias.

The lack of mental health measures is also a study limitation, since other research has shown a strong association between mental health and substance use disorders among juvenile-justice-involved and community youth.[45,46] Additionally, those with co-occurring mental and substance use disorders have the highest risk for engaging in high-risk sexual behaviors that put them at risk for HIV and other STDs.[47] Lastly, given the correlational nature of the study analyses, we cannot discern causal relationships between drug use and sexual risk behaviors, although the study highlights several specific ways in which these behaviors are associated.

Implications for Public Health Programming

Urban health issues such as substance abuse and risky sexual behavior are often magnified among youth in correctional settings. For this reason, juvenile detention facilities are important venues for screening high-risk youth who may not otherwise access services to address these issues.[48] Given the usually transient nature of youth involvement in the juvenile justice system, and their concomitant high-risk sexual and drug use behaviors, service delivery to this population while they are incarcerated is essential. Services must also be coordinated across the range of needs presented by jailed youth, who are often both medically underserved and marginalized from traditional health services. Such needs include primary health care, mental health and substance abuse treatment and education, and related services.

Nevertheless, challenges exist in the implementation of such programs. The typically short stays in juvenile detention settings and lack of coordination of programs within juvenile justice settings often contributes to a fragmented service delivery system for incarcerated youth. As such, greater coordination between community services and correctional facilities is urgently needed to address the overlapping high-risk behaviors of adolescent female offenders.[49]

In our study, very-high-risk behaviors characterized our sample of young female offenders. Nearly one-fourth were arrested for drug use/possession or prostitution; 25% had a prior STD infection, over one-quarter had a prior pregnancy and 18% reported trading sex at some point in their lives. Findings from this study therefore suggest that one mode of intervention for these vulnerable youth may be through public health case managers, some of whom already provide disease prevention services such as STD screening in juvenile detention settings throughout the United States. Screenings such as these can be coupled with assessments of other high-risk behaviors, such as substance abuse, as well as brief motivational interventions and other theory-driven interventions, which have been shown to be promising in addressing risky behaviors among high-risk youth in urban settings.[50,51] Moreover, a critical intervention point may be attitudes, self-efficacy, and expectancies about future behavior, as recent studies have suggested that cognitive processes mediate marijuana use and risky sexual behavior among adolescent offenders.[52] The study findings suggest that it would be advisable to extend these interventions to address methamphetamine use, given its association with high-risk sexual behaviors in this sample. Additionally, the disproportionate number of juvenile offenders who are

ethnic minorities requires a sensitivity to and awareness of the need for programs that take into account the role of culture and ethnicity on assessment, intervention, and treatment in juvenile justice settings.[53] Evidence-based interventions are needed that include prevention strategies specifically targeted for the juvenile justice setting. A meta-analysis of HIV prevention programs for juvenile offenders showed that most existing programs have not addressed the critical impact of family, mental health, and substance use on HIV risk.[54]

In summary, the identification of incarcerated girls' health and mental health needs, including the relationship between their drug use and sexual behaviors, illustrates the urgent need for tailored interventions and pre-release coordination of services for young female offenders. These activities are imperative in order to disrupt the cycle to high-risk behaviors and recidivism among incarcerated female adolescents in the United States.

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