

To Print: Click your browser's PRINT button.

NOTE: To view the article with Web enhancements, go to:

<http://www.medscape.com/viewarticle/502007>

Childhood Sexual Abuse and Age at Initiation

Danielle C. Ompad, PhD; Robin M. Ikeda, MD, MPH; Nina Shah, MS; Crystal M. Fuller, PhD; Susan Bailey, PhD; Edward Morse, PhD; Peter Kerndt, MD, MPH; Carey Maslow, PhD; Yingfeng Wu; David Vlahov, PhD; Richard Garfein, PhD, MPH; Steffanie A. Strathdee, PhD; for the Collaborative Injection Drug Users Study II

Am J Public Health. 2005; 95 (4): 703-709. ©2005 American Public Health Association

Abstract and Introduction

Abstract

Objectives: We examined the relation between childhood sexual abuse and injection drug use initiation among young adult injection drug users.

Methods: We used mixed effect linear models to compare age at first injection among 2143 young injection drug users by first sexual abuse age categories.

Results: The participants were predominantly male (63.3%) and White (52.8%). Mean age and age at first injection were 23.7 and 19.6 years, respectively; 307 participants (14.3%) reported childhood sexual abuse. After adjustment for gender, race/ethnicity, noninjection drug use before first injection drug use, and recruitment site, childhood sexual abuse was independently associated with younger age at first injection.

Conclusions: Childhood sexual abuse was associated with earlier initiation of injection drug use. These data emphasize the need to integrate substance abuse prevention with postvictimization services for children and adolescents.

Introduction

Approximately 8% of US high school students have been forced to have sexual intercourse.^[1] Studies suggest that the experience of forced sex or, more broadly, sexual abuse (defined variably as forced sex, genital fondling, and the like) is associated with depression,^[2,3] substance use and abuse,^[4-6] risky sex and substance use,^[7-11] and subsequent higher rates of HIV infection.^[12-15] A variety of possible mechanisms for this relation have been examined, including the association between trauma (and posttraumatic stress disorder) and substance use, in which trauma and

posttraumatic stress disorder can be precipitating factors for substance use.^[16,17] Childhood trauma, in particular, has long been posited to be an important antecedent to substance abuse.^[18] Generating inferences about associations between childhood sexual abuse and negative health outcomes is complicated by variations in definitions and study designs.^[19,20] The degree to which associations between sexual abuse and these outcomes differ by gender remains to be clarified; most studies have been conducted exclusively among females.^[4,21-26] In addition, limited data suggest that the age at which sexual abuse occurs might be influential in differentiating risk for substance abuse and for HIV infection.^[7,10,27-29]

We explored the association between age at first forced sex, an early life stressor, and age at initiation of injection drug use in a multicenter study of young adults who had recently become injection drug users. It is well known that risk for HIV and other blood-borne infections is particularly acute during the period immediately after the initiation of injection drug use.^[30,31] Elucidating the risk factors for initiating injection drug use is important for the development of comprehensive and appropriate prevention and treatment intervention strategies.

Methods

Study Sample

Researchers for the Collaborative Injection Drugs Users Study (CIDUS II), a prospective study, recruited young (18 to 30 years of age) or recently initiated (≤ 5 years) injection drug users to estimate prevalence and incidence of blood-borne infections among members of this group and to identify risk factors for these infections.^[32-34] From 1997 through 1999, 2198 current injection drug users (injected at least once during the past 6 months) aged 18 to 30 years of age were recruited to participate in CIDUS II. Community outreach was used to recruit a convenience sample of participants for the multisite study conducted at 6 research institutions in 5 US cities [Baltimore, Md; Chicago, Ill; New Orleans, La; Los Angeles, Calif; and two sites in New York, NY (Harlem and the Lower East Side)]. A uniform protocol was developed for recruitment, eligibility criteria, and baseline and follow-up assessments.

Areas of high drug traffic were investigated to determine specifically where adolescent and young adult injection drug users congregated. Trained street outreach workers then approached young persons in these areas. Participants also were recruited through flyers, newspaper ads, and referrals from other participants. Recruitment efforts focused on enrolling young (18-30 years) or recently initiated injection drug users (persons who had been injecting for ≥ 35 years) who were currently injecting drugs. Those who agreed to participate received information about the study and provided informed consent. After completing a face-to-face interview and HIV testing and counseling, participants were reimbursed for their time and travel.

Data Collection

To reduce bias, trained interviewers administered a private, standardized, face-to-face questionnaire to participants before HIV pretest counseling and testing. The data collected included

sociodemographic information, recent (past 6 months) and lifetime use and route of administration of illicit drugs, and recent (past 6 months) behaviors concerning injection drug use (e.g., needle sharing).

To determine sexual abuse, participants were asked, "Have you ever been forced to have sex against your will?" and "How old were you the first time you were forced to have sex?" The large sample allowed the investigation of several categories of sexual abuse. The categories, based on those used by Spak et al.,^[35] included no sexual abuse reported, first sexual abuse at younger than 13 years of age, first sexual abuse at 13 to 17 years of age, and first sexual abuse at older than 18 years of age; the categories generally conform to the definitions of childhood, adolescence, and young adulthood for cognitive development. Participants were categorized only by their age at sexual abuse so that those who experienced childhood sexual abuse before injection were included with those who experienced childhood sexual abuse after injection. The analysis was done in this manner for two reasons: (1) if only those who experienced childhood sexual abuse before injection were analyzed, the findings would be positive, that is, younger age at first rape would be associated with younger age at injection by design, and (2) we did not specifically ask whether people experienced childhood sexual abuse before injection, and temporality could not be confirmed in a few cases when the age at sexual abuse and the age at injection initiation were the same.

Laboratory Tests

After the interview, participants were given HIV pretest counseling, including ways to reduce the risky behaviors associated with the acquisition of HIV infection. Participants underwent venipuncture for HIV antibody testing. All participants were given an appointment at which they received their test results and posttest counseling. During that visit, regardless of the test results, participants received referrals for appropriate medical services. Telephone, mail, or outreach efforts were used to provide results and HIV posttest counseling to participants who missed their visits.

Statistical Analysis

This study was a post hoc analysis of data collected during CIDUS II; it was aimed at examining the relation between age at first forced sex and age at initiation of injection drug use. We investigated associations between sexual abuse, injection drug use, and injection-related behaviors of the participants who provided information on both injection drug use and sexual abuse at the baseline visit. Of 2198 persons, 55 were excluded from this analysis because of missing data on age at sexual abuse, resulting in a sample of 2143 injection drug users. The Asian/Pacific Islander, American Indian, Eskimo, Aleut, mixed, and other categories were collapsed into "other/mixed" race/ethnicity category because the samples in the individual categories were small.

The outcome of interest was age at initiation of injection drug use. We used percentages and means to calculate univariate descriptive statistics. We used c^2 statistics to compare categories of sexual abuse for binary variables and Mantel-Haenszel c^2 statistics for variables with more than 2 categories. Analysis of variance was used to compare continuous variables.

Typically, researchers describe the link between sexual abuse, drug use, and HIV infection among women, especially women who are members of racial/ethnic minorities. Because gender is an

important correlate of sexual abuse and substance abuse, we evaluated demographics, drug use, and sexual abuse by gender.

To evaluate the effect of sexual abuse on the age at subsequent initiation of injection drug use, we used mixed-effect linear models (PROC MIXED, SAS 8.0, SAS Institute, Cary, NC) to construct multivariate models. We constructed multivariate mixed effect linear models to estimate the adjusted mean age at the initiation of injection drug use, controlling for key variables known to be associated with sexual abuse or injection drug use. Potential covariates included gender,^[36,37] race,^[37] education,^[38] living in a foster home or orphanage as a child,^[39-41] sexual identity,^[42] noninjection drug use, and HIV serostatus.^[36] We investigated potential interactions, focusing on interactions between site and other covariates. To account for the correlation between participants at the same site, we included site as a random effect. The multivariate models included variables that had reached statistical significance at the 5% level in univariate analyses.

Results

The sample was 63.3% male and 20.4% African American, 52.8% White, 18.9% Hispanic, and 7.9% other/mixed ([Table 1](#)). The mean age at study entry was 23.7 years (SD=3.8). HIV seroprevalence was 4.6%. With respect to history of drug use, the mean ages at first use of marijuana and at first use of other noninjection drugs (heroin, crack, cocaine, and methamphetamines by sniffing, snorting, or smoking) were 13.5 years (SD=3.1) and 16.2 years (SD=2.8), respectively. The mean age at the initiation of injection drug use was 19.6 years (SD=4.2). Almost half (43.8%) of the participants had injected drugs daily during the 6 months before the baseline interview.

Almost 20% of the participants reported sexual abuse (n=422), and 307 (14.3%) reported sexual abuse before age 18 (data not shown). The mean age at the first experience was 14.2 years (SD=6.2). Among the 422 participants who reported sexual abuse, 71.8% reported that it occurred before they first injected drugs (data not shown). Among those who reported sexual abuse before the initiation of injection drug use, the mean age at first sexual abuse was 11.8 years (data not shown).

The gender differences by site were significant: the proportions of women were higher at the Baltimore and New Orleans sites. Significantly more of the women were HIV- positive, had traded sex for money or drugs during the past 6 months, self-identified as lesbian or bisexual, and had used noninjection drugs before they began to inject drugs. Significantly more of the men had graduated from high school, had been homeless during the past 6 months, and had used marijuana before the initiation of injection drug use. On average, men were younger than women when they initiated the use of marijuana, alcohol, other noninjection drugs, and injection drugs. Women were significantly more likely than men to have experienced sexual abuse (41.4% vs 6.9%, respectively). Men were significantly younger than women at first sexual abuse (12.6 vs 14.6 years of age, respectively).

The four groups (no sexual abuse, first sexual abuse at ≥ 18 years of age, first sexual abuse at 13-17 years, first sexual abuse at <13 years) did not differ significantly by site, race/ethnicity, education, use of marijuana or other noninjection drug (heroin, crack, cocaine or methamphetamine) before the initiation of injection drug use, or in the frequency of injections during the 6 months before the

baseline interview ([Table 2](#)). Women were more likely than men to have experienced sexual abuse before the initiation of injection drug use. Participants who had been in a foster home or an orphanage were more likely to have experienced sexual abuse before the initiation of injection drug use or younger than age 18, as were participants who self-identified as gay, lesbian, or bisexual and those who were HIV-positive.

We then investigated the relation between sexual abuse and age at initiation of drug use ([Table 3](#)). There were significant differences between the categories of sexual abuse and the age at initiation of drug use: younger age at sexual abuse tended to be associated with younger age at initiation of drug use. There were significant differences in the mean age at first use of marijuana, alcohol, and inhalants by persons who had experienced sexual abuse at younger than 13 years of age, 13 to 17 years of age, and older than 18 years of age. A similar trend was observed between the age at sexual abuse and the age at first use of other noninjection drugs (heroin, crack, cocaine, and methamphetamines). In addition, the mean age of the initiation of injection drug use differed significantly among participants who had experienced sexual abuse at younger than 13 years of age, 13 to 17 years of age, and older than 18 years of age: the ages at initiation of injection drug use were 17.7 years, 18.8 years, and 20.9 years, respectively ($P < .01$).

On the basis of the univariate associations, we constructed a multivariate mixed effect linear model ([Table 4](#)) to assess the relation between sexual abuse and the initiation of injection drug use. We examined interactions between age at sexual abuse and gender/race and gender/age; however, the interaction terms were not significant in the final model. Among those who experienced sexual abuse at younger than 13 years of age, 13 to 17 years of age, and older than 18 years of age, the adjusted mean age at initiation of injection drug use was 17.4 years, 18.0 years, and 19.8 years, respectively (controlling for gender; race/ethnicity; noninjection use of heroin, crack, cocaine, or methamphetamines before the initiation of injection drug use; and recruitment site). Among those who had not experienced sexual abuse, the mean age at the initiation of injection drug use was 19.1 years. Race/ethnicity was significantly associated with age at first injection: the adjusted mean age of White participants was younger than that of Hispanics and African Americans (17.5 years, 19.0 years, and 20.0 years, respectively). Site also was associated (not significantly) with age at first injection: the youngest adjusted mean age at initiation of injection drug use was reported from New Orleans (16.4 years), and the oldest was reported from Baltimore (19.9 years) ($P = .06$).

Discussion

In this large, multisite study of young adult injection drug users, childhood sexual abuse was associated with age at initiation of injection drug use. The proportion of young adults in our study who had experienced childhood sexual abuse (14.3%) is higher than that of the general population (8%). [1,4] Approximately 72% of those who had experienced childhood sexual abuse had been abused before the initiation of injection drug use.

A primary focus of interest was that childhood sexual abuse was associated with earlier initiation of injection drug use. This finding persisted after adjustment for gender, race/ethnicity, and site. The interaction between race/ethnicity and gender was not significant. Although men were less likely than women to have experienced sexual abuse, men who had been sexually abused had a younger mean

age at first sexual abuse compared with women.

The link between sexual abuse and HIV risk (especially drug use) is not entirely unidirectional. Drug use is associated with both sexual and physical abuse,^[12,14,27] suggesting a complex, multifactorial relation. Because this study was cross-sectional, we do not know whether this association is causal. However, we examined childhood sexual abuse that predated the initiation of injection drug use, thereby building the case for a causative link. The mechanism, although not explicitly developed in this study, that childhood sexual abuse leads to depression, substance abuse, and other risky behaviors, has been postulated elsewhere.^[4,43] Others have suggested that sexual abuse is associated with an increased number of negative life events, revictimization, and internalizing and externalizing behaviors.^[37,44] Exposure to these stressors earlier in life may be the mechanism through which early substance abuse and early injection drug use occurs. Therefore, preventing childhood sexual abuse, or at least providing for collaboration in treating substance abuse and preventing violence, is an essential component for addressing this problem.

To fully understand the effect of sexual abuse on injection drug use, it will be necessary to study and describe the pathways through which such associations occur and to examine the rate at which people transition through one form of drug use to another (e.g., noninjection to injection drug use). In addition, it will be necessary to examine potential confounders such as the use of drugs by parents and peers.

These findings should be considered in the context of several limitations. We have reported findings only from cross-sectional data. These data represent retrospective, self-reported data on the history of sexual abuse and drug use. We therefore cannot determine whether the associations we have observed are causal. In addition, self-reported data have limitations, particularly when they concern highly stigmatized life events such as sexual abuse and drug use. We expect that childhood sexual abuse was underreported, thereby leading to an underestimate of the association between childhood sexual abuse and drug use. Participants may have had difficulty remembering their drug use history accurately. Interviewers were trained to use major life events such as births, deaths, and graduations to help orient participants in time. Furthermore, because we recruited young injection drug users, accurate sequencing of the initiation of the use of specific drugs may have been enhanced because the events were more recent.

Researchers have been challenged by the lack of a generally accepted definition of sexual abuse.^[19] Sexual abuse can include a range of behaviors, including forced sex and genital fondling. Noncontact behaviors (e.g., exhibitionism, solicitations, and the like) also have been considered abuse.^[20] Our assessment of sexual abuse was limited to forced sex and thus excluded other forms of sexual abuse. In addition, we focused on the first occurrence of forced sex and did not investigate multiple instances of abuse. Our definition of sexual abuse was narrow and therefore underestimated the true prevalence of sexual abuse in this cohort. However, these data do provide evidence for a strong association between forced sex and the initiation of injection drug use.

Recruitment site was an important covariate in this analysis. It was associated with many covariates, including gender, race/ethnicity, and noninjection drug use, and was marginally significantly associated with age at first injection as a random effect in the mixed effect linear model. However, we

cannot determine from these data whether the recruitment site was also the place where the sexual abuse or the injection initiation took place. Despite this limitation, previous analyses in CIDUS II have demonstrated the importance of recruitment site as a covariate, because there are significant geographic differences in the demographic profile of each site and in the types of drugs used.^[34]

It is becoming increasingly clear that childhood sexual abuse frequently occurs in conjunction with other forms of abuse (e.g., physical abuse, emotional abuse, neglect) and adverse childhood exposures (e.g., witnessing violence, parental drug use).^[45-48] Because data on such exposures were not ascertained, these findings are limited by our inability to control for other adverse childhood events or to examine potential interactions between childhood sexual abuse and other adverse events.

Although further investigation is needed to fully elucidate the association between sexual abuse and the initiation of substance use, we can conclude that childhood sexual abuse is strongly associated with early initiation of injection drug use and vulnerability to HIV infection among these young injection drug users. Furthermore, we observed, as have other researchers,^[49,50] that sexual abuse is associated with higher rates of trading sex for money or drugs. Whether or not the relation between sexual abuse and the initiation of injection drug use is causal, childhood sexual abuse can be considered a valuable marker of risk for behaviors that compromise the health of young adults. The integration of substance abuse interventions with postvictimization and protective services for children and adolescents is warranted.

Table 1. Baseline Characteristics of 2143 Young Adult Injection Drug Users: 5 US Cities, 1997-1999

	Total (N=2143)	Male (n=1357)	Female (n=786)	P
Site, %				<.01
Baltimore	11.3	6.9	18.8	
Chicago	32.8	33.7	31.3	
Los Angeles	15.8	15.9	9.7	
New Orleans	10.7	11.3	33.2	
New York: Harlem	9.3	10.4	7.4	
New York: Lower East Side	20.2	21.9	17.3	
Demographics				
Mean age, y (SD)	23.7 (3.8)	23.7 (3.7)	23.7 (4.0)	.79
Race/ethnicity, %				.17
African American	20.4	16.8	26.7	

White	52.8	53.7	51.3	
Hispanic	18.9	21.3	14.8	
Other/mixed	7.9	8.3	7.3	
Recent homelessness, %	48.9	50.8	45.7	.02
HIV+, %	4.6	3.5	6.5	<.01
High school or general equivalency diploma, %	51.4	53.0	48.6	.05
Foster home/orphanage, %	18.6	17.8	20.0	.21
Gay/lesbian/bisexual, %	16.9	9.4	30.0	<.01
Drug use behavior				
Injects daily, ^a %	43.8	42.8	45.6	.21
Mean age at 1st use, y				
Marijuana (SD)	13.5 (3.1)	13.2 (3.0)	13.9 (3.1)	<.01
Alcohol (SD)	14.3 (3.1)	14.2 (2.9)	14.5 (3.3)	.06
Inhalants (SD)	14.9 (3.4)	14.9 (3.3)	14.7 (3.5)	.44
Other noninjection drugs ^b (SD)	16.2 (2.8)	16.0 (2.7)	16.4 (2.9)	<.01
Injection drugs (SD)	19.6 (4.2)	19.3 (4.1)	20.1 (4.4)	<.01
Used before injection drug use, %				
Marijuana	90.3	92.0	87.4	<.01
Inhalants	29.6	30.4	28.2	0.30
Other noninjection drugs ^b	74.9	73.3	77.6	0.03
Sexual abuse history				
Forced to have sex, ever, %	19.7	6.9	41.4	<.01
Mean age at 1st forced sex, y	14.2 (6.2)	12.6 (6.9)	14.6 (6.0)	<.01
Forced to have sex prior to 1st injection, ^a %	14.0	5.0	29.7	<.01
Age at 1st forced sex, %				<.01
<13	5.4	3.8	12.5	
13-17	7.2	1.2	17.4	
>/=18	7.1	1.9	11.7	

^aHeroin, crack, cocaine and methamphetamine injection.

^bHeroin, crack, cocaine, and methamphetamine sniffing, snorting and smoking.

Table 2. Correlates of Sexual Abuse Among 2143 Young Adult Injection Drug Users: 5 US Cities, 1997-1999

	No Forced Sex Reported (n=1721)	Age at Time of Forced Sex			P ^a
		≥ 18 y (n=115)	13-17 y (n=155)	<13 y (n=152)	
Site, %					.23
Baltimore	11.2	15.7	11.0	9.2	
Chicago	33.6	35.7	30.3	24.3	
Los Angeles	13.7	10.9	22.6	29.0	
New Orleans	10.1	8.7	16.8	13.2	
New York: Harlem	10.9	4.4	1.3	3.3	
New York: Lower East Side	20.7	14.8	18.1	21.1	
Demographics					
Female, %	26.6	77.4	89.7	65.8	<.01
Male, %	73.4	22.6	10.3	34.2	
Mean age, y (SE)	23.7 (0.1)	25.2 (0.3)	22.7 (0.3)	23.2 (0.3)	<.01 ^b
Race/ethnicity, %					.61
African American	20.2	25.2	20.0	20.4	
White	52.2	50.4	58.7	55.3	
Hispanic	20.6	15.7	11.6	9.9	
Other/mixed	7.1	8.7	9.7	14.5	
Recent homelessness, %	46.6	47.8	59.4	61.2	<.01
Foster home/orphanage, %	16.4	19.5	22.1	38.8	<.01
High school or general equivalency diploma, %	51.3	51.3	60.0	44.1	<.75
Gay/lesbian/bisexual, %	10.4	42.6	47.3	41.2	<.01
HIV+, %	3.7	8.0	8.6	7.3	<.01
Drug use behavior					
Injects daily, ^c %	44.0	49.6	38.7	42.1	.41
Mean age at 1st use, y					
Marijuana (SE)	13.6 (0.1)	14.1 (0.3)	13.0 (0.2)	12.1 (0.2)	<.01 ^b

Alcohol (SE)	14.4 (0.1)	14.4 (0.3)	14.1 (0.3)	12.9 (0.3)	<.01 ^b
Inhalants (SE)	14.8 (0.1)	17.0 (0.5)	14.6 (0.4)	14.3 (0.4)	<.01 ^b
Other noninjection drugs ^d (SE)	16.3 (0.1)	16.7 (0.3)	15.6 (0.2)	14.8 (0.3)	<.01 ^b
Used before injection drug use, %					
Marijuana	90.1	92.2	92.9	88.8	.80
Inhalants	28.0	30.0	42.6	34.9	<.01
Other noninjection drugs ^d	74.4	76.5	80.7	73.0	.54
Mean age at 1st injection drug use (SE)	19.7 (0.1)	21.0 (0.4)	18.8 (0.3)	17.9 (0.4)	<.01 ^b

^aMantel-Haenszel *P* values unless indicated otherwise.

^bAnalysis of variance *P* value.

^cHeroin, crack, cocaine or methamphetamine injection.

^dHeroin, crack, cocaine and methamphetamine sniffing, snorting and smoking

Table 3. Correlates of Age at Initiation of Injection Drug Use Among 2143 Young Adult Injection Drug Users: 5 US Cities, 1997-1999

Characteristic	Mean Age at Initiation, y (SD)	<i>P</i> ^a
Site		
Baltimore	22.9 (3.9)	<.001 ^b
Chicago	20.5 (3.9)	
Los Angeles	17.7 (3.9)	
New Orleans	17.6 (3.8)	
New York: Harlem	20.1 (4.0)	
New York: Lower East Side	18.3 (3.9)	
Demographics		
Female	20.0 (4.4)	<.001
Male	19.2 (4.1)	
Mean age (SE)	19.5 (4.2)	
Race/ethnicity		

African American	21.8 (4.6)	<.001 ^b
White	18.6 (3.7)	
Hispanic	20.4 (4.2)	
Other/mixed	18.0 (4.2)	
Recent homelessness	18.4 (4.0)	<.001
Foster home/orphanage	17.9 (4.4)	<.001
High school or general equivalency diploma	19.9 (4.1)	<.001
Gay/lesbian/bisexual	18.4 (4.1)	<.001
HIV+	20.1 (5.1)	.17
Injects daily	19.5 (4.3)	.99
Sexual abuse history		
Age at 1st forced sex		<.001 ^b
Never	19.7 (4.2)	
<13	17.7 (4.8)	
13-17	18.8 (4.1)	
>/=18	20.9 (3.9)	

^aMantel-Haenszel *P* values unless indicated otherwise.

^bAnalysis of variance *P* value.

Table 4. Multivariate Models Predicting the Adjusted Mean Age at 1st Injection Among 2143 Young Adult Injection Drug Users: 5 US Cities, 1997-1999

	Mixed Effect Linear Model	
	Adjusted Mean Age at 1st Injection, y (SE)	P
No reported forced sex	19.1 (0.5)	<.01
Age at 1st forced sex <13 y	17.4 (0.6)	
Age at 1st forced sex 13-17 y	18.0 (0.6)	
Age at 1st forced sex >/=18 y	19.8 (0.6)	
Gender		.01
Female	18.8 (0.5)	

Male	18.3 (0.5)	
Race/ethnicity		<.01
White	17.5 (0.5)	
African American	20.0 (0.6)	
Hispanic	19.0 (0.6)	
Other/mixed	17.7 (0.6)	
Used noninjection drugs prior to 1st injection drug use		<.01
No	16.9 (0.5)	
Yes	20.2 (0.5)	
Site		.06
Baltimore	19.9 (0.6)	
Chicago	18.7 (0.5)	
Los Angeles	17.3 (0.5)	
New Orleans	16.4 (0.6)	
New York: Harlem	17.8 (0.6)	
New York: Lower East Side	17.5 (0.5)	
c ²	12.29 (0.38)	
c ² site	1.52 (1.02)	
-2 Log likelihood	11456.2	

References

1. Centers for Disease Control and Prevention. Youth risk behavior surveillance -- United States, 2001. *MMWR Morb Mortal Wkly Rep.* 2002;51(SS-4):1-64.
2. Kendler KS, Gardner CO, Prescott CA. Toward a comprehensive developmental model for major depression in women. *Am J Psychiatry.* 2002;159:1133-1145.
3. Meyerson LA, Long PJ, Miranda R Jr, Marx BP. The influence of childhood sexual abuse, physical abuse, family environment, and gender on the psychological adjustment of adolescents. *Child Abuse Negl.* 2002;26:387-405.
4. Molnar BE, Buka SL, Kessler RC. Child sexual abuse and subsequent psychopathology: results from the National Comorbidity Survey. *Am J Public Health.* 2001;91:753-760.
5. Wilsnack SC, Vogeltanz ND, Klassen AD, Harris TR. Childhood sexual abuse and women's substance abuse: national survey findings. *J Stud Alcohol.* 1997;58(3):264-271.

6. Bensley LS, Spieker SJ, Van Eenwyk J, Schoder J. Self-reported abuse history and adolescent problem behaviors. II. Alcohol and drug use. *J Adolesc Health*. 1999;24(3):173-180.
7. Bartholow BN, Doll LS, Joy D, et al. Emotional, behavioral and HIV risks associated with sexual abuse among adult homosexual and bisexual men. *Child Abuse Negl*. 1994;18:747-761.
8. Cohen M, Deamant C, Barkan S, et al. Domestic violence and childhood sexual abuse in HIV-infected women and women at risk for HIV. *Am J Public Health*. 2000;90:560-565.
9. Holmes WC. Association between a history of childhood sexual abuse and subsequent, adolescent psychoactive substance use disorder in a sample of HIV seropositive men. *J Adolesc Health*. 1997;20(6):414-419.
10. Strathdee SA, Hogg RS, Martindale SL, et al. Determinants of sexual risk-taking among young HIV-negative gay and bisexual men. *J Acquir Immune Defic Syndr Hum Retrovirol*. 1998;19(1):61-66.
11. Roy E, Haley N, Leclerc P, Cedras L, Blais L, Boivin JF. Drug injection among street youths in Montreal: predictors of initiation. *J Urban Health*. 2003;80:92-105.
12. Gruskin L, Gange SJ, Celentano D, et al. Incidence of violence against HIV-infected and uninfected women: findings from the HIV Epidemiology Research (HER) Study. *J Urban Health*. 2002;79:512-524.
13. Miller CL, Spittal PM, LaLiberte N, et al. Females experiencing sexual and drug vulnerabilities are at elevated risk for HIV infection among youth who use injection drugs. *J Acquir Immune Defic Syndr*. 2002;30(3):335-341.
14. Vlahov D, Wientde D, Moore J, et al. Violence among women with or at risk for HIV infection. *AIDS Behav*. 1998;2(1):53-60.
15. Wyatt GE, Myers HF, Williams JK, et al. Does a history of trauma contribute to HIV risk for women of color? Implications for prevention and policy. *Am J Public Health*. 2002;92:660-665.
16. Chilcoat HD, Breslau N. Posttraumatic stress disorder and drug disorders: testing causal pathways. *Arch Gen Psychiatry*. 1998;55:913-917.
17. Chilcoat HD, Breslau N. Investigations of causal pathways between PTSD and drug use disorders. *Addict Behav*. 1998;23:827-840.
18. Rounsaville BJ, Weissman MM, Wilber CH, Kleber HD. Pathways to opiate addiction: an evaluation of differing antecedents. *Br J Psychiatry*. 1982;141:437-446.
19. Haugaard JJ. The challenge of defining child sexual abuse. *Am Psychol*. 2000;55:1036-1039.
20. Babiker G, Herbert M. Critical issues in the assessment of child sexual abuse. *Clin Child Fam Psychol Rev*. 1998;1(4):231-252.
21. Fleming J, Mullen PE, Sibthorpe B, Attewell R, Bammer G. The relationship between childhood sexual abuse and alcohol abuse in women -- a case-control study. *Addiction*. 1998;93:1787-1798.
22. Jasinski JL, Williams LM, Siegel J. Childhood physical and sexual abuse as risk factors for heavy drinking among African-American women: a prospective study. *Child Abuse Negl*. 2000;24:1061-1071.
23. Falck RS, Wang J, Carlson RG, Siegal HA. The epidemiology of physical attack and rape among crack-using women. *Violence Vict*. 2001;16(1):79-89.
24. Kendler KS, Bulik CM, Silberg J, Hetttema JM, Myers J, Prescott CA. Childhood sexual abuse and adult psychiatric and substance abuse disorders in women. *Arch Gen Psychiatry*. 2001;57:953-959.

25. Bohn DK. Lifetime physical and sexual abuse, substance abuse, depression, and suicide attempts among Native American women. *Issues Ment Health Nurs*. 2003;24(3):333-352.
26. Simpson TL. Childhood sexual abuse, PTSD, and the functional roles of alcohol use among women drinkers. *Subst Use Misuse*. 2003;38(2):249-270.
27. Irwin KL, Edlin BR, Wong L, et al. and the Multicenter Crack Cocaine and HIV Infection Study Team. Urban rape survivors: characteristics and prevalence of human immunodeficiency virus and other sexually transmitted infections. *Obstet Gynecol*. 1995;85:330-336.
28. Lodico MA, DiClemente RJ. The association between childhood sexual abuse and prevalence of HIV- related risk behaviors. *Clin Pediatr(Phila)*. 1994;33:498-502.
29. Strathdee SA, Patrick DM, Archibald CP, et al. Social determinants predict needle-sharing behaviour among injection drug users in Vancouver, Canada. *Addiction*. 1997;92:1339-1347.
30. Garfein RS, Vlahov D, Galai N, Doherty MC, Nelson KE. Viral infections in short-term injection drug users: the prevalence of the hepatitis C, hepatitis B, human immunodeficiency, and human T-lymphotropic viruses. *Am J Public Health*. 1996;86:655-661.
31. Garfein RS, Doherty MC, Monterroso ER, Thomas DL, Nelson KE, Vlahov D. Prevalence and incidence of hepatitis C virus infection among young adult injection drug users. *J Acquir Immune Defic Syndr Hum Retrovirol*. 1998;18 (suppl 1):S11-S19.
32. Latka M, Ahern J, Garfein RS, et al. Prevalence, incidence, and correlates of chlamydia and gonorrhoea among young adult injection drug users. *J Subst Abuse*. 2001;13(1-2):73-88.
33. Kapadia F, Vlahov D, Des J, et al. Does bleach disinfection of syringes protect against hepatitis C infection among young adult injection drug users? *Epidemiology*. 2002;13:738-741.
34. Diaz T, Des Jarlais DC, Vlahov D, et al. Factors associated with prevalence hepatitis C: differences among young adult injection drug users in lower and upper Manhattan, New York City. *Am J Public Health*. 2001;91:23-30.
35. Spak L, Spak F, Allebeck P. Sexual abuse and alcoholism in a female population. *Addiction*. 1998;93:1365-1373.
36. Braitstein P, Li K, Tyndall M, Spittal et al. Sexual violence among a cohort of injection drug users. *Soc Sci Med*. 2003;57:561-569.
37. Walrath C, Ybarra M, Holden EW, Liao Q, Santiago R, Leaf P. Children with reported histories of sexual abuse: utilizing multiple perspectives to understand clinical and psychosocial profiles. *Child Abuse Negl*. 2003;27:509-524.
38. Frothingham TE, Hobbs CJ, Wynne JM, Yee L, Goyal A, Wadsworth DJ. Follow up study eight years after diagnosis of sexual abuse. *Arch Dis Child*. 2000;83(2):132-134.
39. Slesnick N, Meade M. System youth: a subgroup of substance-abusing homeless adolescents. *J Subst Abuse*. 2001;13:367-384.
40. Elze DE, Auslander W, McMillen C, Edmond T, Thompson R. Untangling the impact of sexual abuse on HIV risk behaviors among youths in foster care. *AIDS Educ Prev*. 2001;13:377-389.
41. Hobbs GF, Hobbs CJ, Wynne JM. Abuse of children in foster and residential care. *Child Abuse Negl*. 1999;23:1239-1252.
42. Tomeo ME, Templer DI, Anderson S, Kotler D. Comparative data of childhood and adolescence molestation in heterosexual and homosexual persons. *Arch Sex Behav*. 2001;30:535-541.
43. MacMillan HL, Fleming JE, Streiner DL, et al. Childhood abuse and lifetime psychopathology in a community sample. *Am J Psychiatry*. 2001;158:1878-1883.
44. Swanston HY, Plunkett AM, O'Toole BI, Shrimpton S, Parkinson PN, Oates RK. Nine years after child sexual abuse. *Child Abuse Negl*. 2003;27:967-984.

45. Dube SR, Anda RF, Felitti VJ, Edwards VJ, Williamson DF. Exposure to abuse, neglect, and household dysfunction among adults who witnessed intimate partner violence as children: implications for health and social services. *Violence Vict.* 2002;17(1):3-17.
46. Dube SR, Anda RF, Felitti VJ, Croft JB, Edwards VJ, Giles WH. Growing up with parental alcohol abuse: exposure to childhood abuse, neglect, and household dysfunction. *Child AbuseNegl* 2001;25:1627-1640.
47. Hillis SD, Anda RF, Felitti VJ, Marchbanks PA. Adverse childhood experiences and sexual risk behaviors in women: a retrospective cohort study. *Fam Plann Perspect.* 2001;33(5):206-211.
48. Hillis SD, Anda RF, Felitti VJ, Nordenberg D, Marchbanks PA. Adverse childhood experiences and sexually transmitted diseases in men and women: a retrospective study. *Pediatrics.* 2000;106(1):E11.
49. Potter K, Martin J, Romans S. Early developmental experiences of female sex workers: a comparative study. *Aust N Z J Psychiatry.* 1999;33:935-940.
50. Widom CS, Kuhns JB. Childhood victimization and subsequent risk for promiscuity, prostitution, and teenage pregnancy: a prospective study. *Am J Public Health.* 1996;86:1607-1612.

Acknowledgements

D.C. Ompad and S.A. Strathdee conducted the study, supervised the analyses, and wrote the article. N. Shah and Y. Wu conducted the analyses. S. Bailey, C.M. Fuller, R.M. Ikeda, E. Morse, P. Kerndt, and D. Vlahov developed the questionnaire. S. Bailey, C.M. Fuller, R. Garfein, R.M. Ikeda, C. Maslow, E. Morse, P. Kerndt, and D. Vlahov contributed to writing. S. Bailey, C.M. Fuller, E. Morse, P. Kerndt, and D. Vlahov supervised the studies at their respective sites. R.M. Ikeda and S. Bailey helped conceptualize the analysis.

Reprint Address

Danielle C. Ompad, New York Academy of Medicine, Center for Urban Epidemiologic Studies, 1216 Fifth Avenue, New York, NY 10029; E-mail: dompad@nyam.org .

At the time of this study, **Danielle C. Ompad** , **Nina Shah** , **Steffanie Strathdee** , and **David Vlahov** were with the Department of Epidemiology, Johns Hopkins School of Hygiene and Public Health, Baltimore, Md. **Danielle C. Ompad** and **David Vlahov** were also with Center for Urban Epidemiologic Studies at the New York Academy of Medicine, New York, NY. **Crystal M. Fuller** and **Yingfeng Wu** are with Center for Urban Epidemiologic Studies at the New York Academy of Medicine. **C.M. Fuller** is also with the Department of Epidemiology, Mailman School of Public Health, Columbia University, New York. **Robin M. Ikeda** is with the National Center for Injury Prevention and Control, Centers for Disease Control and Prevention, Atlanta, Ga. **Susan Bailey** is with the Community Outreach Intervention Projects, University of Illinois School of Public Health, Chicago. **Edward Morse** is with the Department of Sociology, Tulane University, New Orleans, La. **Peter Kerndt** is with the HIV Epidemiology Program, Department of Health Services, County of Los Angeles, Los Angeles, Calif. **Carey Maslow** is with National Research and Development Institute, New York. **Richard Garfein** is with the Division of HIV/AIDS Prevention, Centers for Disease Control

and Prevention.
