Physical Victimization and High-Risk Sexual Partners among Illicit Drug-Using Heterosexual Men in New York City

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ABSTRACT *Physical victimization has been linked to high-risk sexual partnerships in women. Although illicit drug-using heterosexual men are at high-risk of physical victimization, the association between violence and high-risk partners in heterosexual men has received little attention in the published literature. We examined the association between experience of severe physical victimization and acquisition of a high-risk sexual partner (i.e., a partner who injected drugs or participated in transactional sex) 1 year later among illicit drug-using men in New York City (2006–2009) using secondary cross-sectional data. Injection and non-injection drug-using men (n=280) provided a retrospectively recalled history of risk behavior and violence for each year over the past 4 years. Our primary outcome was acquisition of a high-risk sexual partner in any year following the baseline year. Our primary exposure was severe physical victimization (i.e., threatened with a knife or gun, beaten up, shot, or stabbed) in the prior year. Frequency of cocaine, heroin, and crack use and sexual victimization were also assessed. Log-binomial logistic regression with generalized estimating equation (GEE) methods was used to account for repeated measures for up to four time points. After adjustment for important covariates, participants that experienced physical victimization were significantly more likely to have acquired a high-risk sexual partner 1 year later (relative risk (RR), 3.73; 95 % confidence interval (CI), 1.55–8.97). Our study challenges gender-based stereotypes surrounding physical victimization and provides support for multidisciplinary programs that address both violence and HIV risk among illicit drug-using heterosexual men.*

KEYWORDS *Physical victimization, Sexual risk behavior, Illicit drug users, Male victims*

Injection drug users (IDUs) and non-injection drug users (non-IDUs) are at increased risk of being victims of physical violence compared to the general population.^{1,2} In a substance abuse treatment sample, 61 % of men and 65 % of women reported being the victim of physical partner violence, and 75 % of men and 45 % of women reported physical victimization from a person other than an intimate partner in the past 12 months.³ The HIV risk behaviors of an individual's sexual partners, in addition to condom use, have significant epidemiological implications for the

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likelihood of HIV infection.⁴ Physical victimization has been linked to high-risk sexual partnerships in women like having an HIV-positive sexual partner and other risk factors for HIV including having unprotected sex and having an STI.^{5,6} Although men are more likely to be victims of any kind of violence,^{3,7} the few studies examining physical victimization and sexual risk behavior among men have mostly focused on intimate partner violence (IPV) among men who have sex with men (MSM).^{8–11} Fewer studies have examined the association between physical victimization and sexual risk behavior in heterosexual men or illicit drug users.¹²

Drug users are more likely to have high-risk sexual partners (e.g., IDUs¹³ or those who engage in transactional sex,^{14–16}) which confers increased HIV risk.^{17–20} However, to our knowledge, no prior studies have examined if violent victimization in adulthood is associated with having a high-risk sexual partner or precedes acquisition of high-risk partner in illicit drug-using men. The examination of acquisition of high-risk partners could provide insight on the temporal ordering of adult victimization and high-risk sexual behavior in men—an important yet understudied area. This area of inquiry could also inform the development of interventions aimed at sexual risk reduction among men.

Our study aims to examine if severe physical victimization is associated with acquiring a high-risk sexual partner among heterosexual illicit drug-using men using a retrospectively recalled risk behavior and violence history. Given the temporal ordering supported by the link between childhood physical victimization and later sexual risk behavior,^{21,22} we hypothesize that previous history of victimization will be associated with acquiring a high-risk sexual partner.

METHODS

Participants

This secondary analysis uses baseline data from Social Ties Associated with Risk of Transition into Injection Drug Use (START), a longitudinal study that aimed to identify social risk factors for transition from non-injection drug use to injection drug use. All participants were recruited between July 2006 and June 2009 through targeted street outreach and respondent-driven sampling (RDS) from neighborhoods with high drug use in Brooklyn, Bronx, Manhattan, and Queens and has been described in detail elsewhere.^{23,24} In brief, participants were eligible for START if they were between 18 and 40 years old and were non-IDUs reporting frequent use of heroin, crack, or cocaine or newly initiated IDUs ($n=652$). Eligible IDUs reported injecting heroin, crack, or cocaine for 4 years or less and injecting at least once in the past 6 months. Injection drug use was verified by the presence of track marks. Eligible non-IDUs reported non-injection use of heroin, crack, or cocaine for at least 1 year and used heroin, crack, or cocaine two to three times per week in the last 3 months. Self-reported drug use for non-IDUs was verified with a rapid drug urine test that could detect the use of opiates and cocaine within 2 to 3 days prior to the screening interview. This study was approved by the Institutional Review Boards of Columbia University and the New York Academy of Medicine.

Data Collection

Written informed consent was obtained from all participants prior to data collection. Using interviewer-administered surveys, participants were asked to

provide socio-demographic characteristics and a year-by-year socio-behavioral risk history which ascertained drug use, sexual partner characteristics, and physical and sexual victimization in each of the 4 years prior to study enrollment. Year-by-year histories of sexual and drug use behavior have been shown to be a valid means of approximating the timing of events in previous studies of IDUs.²⁵ In order to improve participant recall, participants were reminded of their age and biographical landmarks (e.g., childbirth, residence change, and arrest/jail time) for each year of the prior 4 years that drug use, sexual risk behavior, and physical and sexual victimization were assessed. Upon completing the questionnaire, all participants received \$30 and a \$4 Metrocard.

Measures

Variables used in this analysis are comprised of time-varying measures that were retrospectively recalled by participants for each year in the past 4 years (i.e., physical and sexual victimization and drug use) and fixed measures (i.e., social and demographic characteristics and injection status). For the purpose of this analysis, time-varying measures reported 4 years ago were considered baseline measures (T_1) moving forward in time for three time points (i.e., past year was considered T_4). For all participants, baseline measures were from the first year for which sexual partner data was available. Participants without sexual partner data for at least 2 consecutive years were excluded.

Social, Demographic, and Psychological Characteristics. Demographic variables included in the analysis were age, race/ethnicity (Black, Hispanic, or White/Asian/Native American/Other), high school graduate or GED (yes or no), yearly taxable income (no income, less than or equal to \$10,000, or greater than \$10,000), untaxable income (no income, less than or equal to \$10,000, or greater than \$10,000), self-reported HIV status (positive or negative), lifetime history of homelessness (yes or no), and lifetime incarceration history (yes or no). White, Asian, Native American, and Other race categories were grouped together because of small sample sizes in each category. Dummy variables were created for the three race categories and the three taxable and untaxable income categories. Experience of depressive symptoms was based on affirmative responses to all of the following questions: (1) In your lifetime, have you ever had a period of at least 2 weeks when nearly every day you felt sad, depressed, or empty most of the time? (2) Have you ever had a period of at least 2 weeks when you lost interest in most things or got no pleasure from things which would usually have made you happy? and, (3) Has there ever been a period when you thought about committing suicide or did you ever try to end your own life (whether or not you had thought about it ahead)?

Primary Outcome. Acquisition of a high-risk sexual partner in any year following the first year measured was the primary outcome. Participants were considered to have acquired a high-risk sexual partner if they reported a high-risk sexual partner for 1 year but did not report a high-risk sexual partner in the previous year. Participants were asked to provide a year-by-year history of individuals they had sex with each year over the past 4 years. Participants reported on the gender, age, and race of each sexual partner and whether each partner injected drugs or participated in transactional sex in the year that they were the participant's sex partner. Based on the HIV prevalence in these risk populations, a high-risk sexual partner was an IDU

or had participated in transactional sex (i.e., gave or received sex for money or drugs).^{26–28}

Primary Exposure. Severe physical victimization (yes or no) was assessed for each year over the past 4 years. Being the victim of severe physical violence in the prior year was the primary exposure for this analysis and was defined as having been (1) threatened with a knife or gun (2) beaten up (e.g., punched, kicked, or hit until you were hurt so badly you had bruises, cuts, or broken bones) or (3) shot, stabbed, or wounded in any other way so badly that you went to a hospital. The participant's relationship to the perpetrator was not assessed for physical or sexual victimization.

Participant Drug Use and Sexual Victimization. Injection status was based on participant report of injecting any drug in the past 6 months. Sexual victimization, heroin use, cocaine use, and crack use were time-varying. Sexual victimization was based on a question that asked participants to recall for each year over the past 4 years if they were ever forced to have sex against their will (yes or no). For each year over the past 4 years, participants reported how often they sniffed heroin, sniffed cocaine, or smoked crack on a 7-point scale ranging from "never" to "everyday" in that year. Due to low response rates for some categories, response categories for drug use frequency were collapsed to measure weekly drug use with categories for "never," "less than once a week," and "at least once a week."

Analysis

We performed secondary data analysis on a sample of 280 males. Of the 376 males with complete data for at least 2 consecutive years over the past 4 years, 32 reported sex with another man (8.5 %) and were removed from the analysis. Because we wanted to examine if severe physical victimization is associated with subsequently acquiring a high-risk sexual partner, 64 individuals (17 %) who reported sex with a high-risk partner at baseline were removed from this analysis, and our outcome variable captured the first high-risk sexual partner reported after baseline in the year-by-year assessment.

In the univariate analysis, data from each year of the year-by-year data were combined and reflect the proportion of participants reporting behaviors or events over the past 4 years. For bivariate and multivariable analyses, log-binomial logistic regression with GEE method in STATA (v11.2)²⁹ was used to account for the correlation between repeated measurements on the same individual. An exchangeable correlation structure was used because time-varying measures were assessed over a relatively short time frame (i.e., past 4 years). Additionally, we used a robust estimator for the variance to account for possible misspecifications in the correlation structure.^{30,31} The exposures (i.e., physical victimization) and time-varying covariates (i.e., cocaine, heroin, and crack use; and sexual victimization) were lagged by 1 year in order to ensure that exposures (i.e., at time(t)-1) preceded acquiring a high-risk partner at time(t). All covariates were analyzed as possible confounders by examining independent associations with the outcome in bivariate analysis. Because of the small number of HIV-positive persons ($n=8$ or 3 %), HIV status was not included in the analysis. Covariates that were associated with a high-risk sexual

partner at $p \leq .05$ in bivariate analysis were included in the multivariable analysis. Variables significant at $p < 0.05$ were retained in the final multivariable model.

RESULTS

The social and demographic characteristics of our final sample ($n=280$) are presented in Table 1. The majority of the participants were Hispanic (42.9 %) or African-American (44.6 %), and more than half had graduated from high school or received a GED (51.4 %). Our sample had a mean age of 33 years (standard deviation=5.7, range=18–40). Approximately 66 % of participants reported less than or equal to \$10,000 in taxable income and 66.7 % reported less than or equal to \$10,000 in untaxable income. Most participants had a history of incarceration (82.1 %) and homelessness (85.7 %).

As shown in Table 2, 19.6 % of the sample had injected drugs in the past 6 months. The frequency of drug use reported by participants varied from year to year. Over the past 4 years, 25.7 % of the sample had never smoked crack, 29.6 %

TABLE 1 Social and demographic characteristics associated with acquiring a high-risk sexual partner among illicit drug-using men, New York City, 2006–2009 ($N=280$)

	N (%)	RR (95 % CI)
Mean age (range)	32.6 (18–40)	0.97 (0.91–1.04)
Racial/ethnic background		
White/Other ^a	35 (12.5)	1.00
Hispanic	120 (42.9)	0.30 (0.09–0.99)*
African-American	125 (44.6)	0.71 (0.26–1.89)
High school graduate/GED		
No	136 (48.6)	1.00
Yes	144 (51.4)	0.63 (0.28–1.40)
Taxable income		
No Income	67 (25.5)	1.00
≤\$10,000	173 (65.8)	0.69 (0.28–1.70)
>\$10,000	23 (8.8)	0.88 (0.19–3.97)
Untaxable income		
No Income	50 (19.8)	1.00
≤\$10,000	168 (66.7)	1.66 (0.50–5.49)
>\$10,000	34 (13.5)	0.94 (0.16–5.47)
Ever been homeless		
No	40 (14.3)	1.00
Yes	240 (85.7)	3.88 (0.54–27.9)
Ever gone to jail		
No	47 (17.9)	1.00
Yes	216 (82.1)	0.97 (0.34–2.79)
Ever had depressive symptoms		
No	217 (78.1)	1.00
Yes	61 (21.9)	0.56 (0.17–1.84)

RR- relative risk, 95 % CI- 95 % confidence interval

* $p \leq .05$

^aOther race included Asian or Pacific Islander and Native American

TABLE 2 Violence and risk behaviors associated with acquiring a high-risk sexual partner among illicit drug-using men, New York City, 2006–2009 (N=280)

	N (%)	RR (95 % CI)
Physical victimization		
No	157 (56.7)	1.00
Yes	120 (43.3)	3.66 (1.57–8.54)*
Sexual victimization		
No	256 (91.4)	1.00
Yes	24 (8.6)	3.57 (1.15–11.09)*
Injector (past 6 months)		
No	225 (80.4)	1.00
Yes	55 (19.6)	1.08 (0.41–2.79)
Smoked crack		
Never	72 (25.7)	1.00
Less than weekly	83 (29.6)	0.93 (0.26–3.35)
At least once a week	168 (60.0)	1.00 (0.42–2.37)
Sniffed cocaine		
Never	62 (22.3)	1.00
Less than weekly	106 (38.1)	1.54 (0.54–4.42)
At least once a week	152 (54.7)	0.94 (0.34–2.61)
Sniffed heroin		
Never	134 (48.6)	1.00
Less than weekly	54 (19.6)	1.01 (0.24–4.24)
At least once a week	115 (41.7)	0.72 (0.26–1.98)
>1 high-risk sexual partner ^a		
No	251 (91.6)	–
Yes	23 (8.4)	–

All covariates except injection status occur in the prior year

RR relative risk, 95 % CI 95 % confidence interval

* $p \leq .05$

^aHigh-risk partner was defined as a sex partner who was an injection drug user or gave or received sex for money or drugs

had reported using less than weekly for at least 1 year, and 60 % had reported weekly crack use during at least 1 year. In the past 4 years, 22.3 % reported never sniffing cocaine, 38.1 % reported sniffing cocaine less than once a week for at least 1 year, and 54.7 % reported sniffing cocaine weekly for at least 1 year. In the past 4 years, 48.6 % reported never sniffing heroin, 19.6 % reported sniffing heroin less than once a week for at least 1 year, and 41.7 % reported sniffing heroin weekly for at least 1 year. In the past 4 years, 43.3 % had experienced severe physical victimization, 8.6 % had been the victim of sexual violence, and 8.4 % had sex with at least one high-risk sexual partner.

In the unadjusted analysis (Table 1), Hispanics were significantly less likely than Whites to acquire a high-risk sexual partner over the 4-year period (relative risk (RR), 0.30; 95% confidence interval (CI), 0.09–0.99). As shown in Table 2, severe physical victimization (RR, 3.66; 95 % CI, 1.57–8.54) and sexual victimization (RR, 3.57; 95 % CI, 1.15–11.09) were significantly associated with acquiring a high-risk sexual partner 1 year later. Frequency of drug use and injection status were not associated with acquiring a high-risk sexual partner (Table 2).

In the multivariable analysis (Table 3), after controlling for race, severe physical victimization (RR, 3.73; 95 % CI, 1.55–8.97) remained significantly associated with acquiring a high-risk sexual partner 1 year later.

DISCUSSION

There are two major findings of this study: Our study sample had a high prevalence of severe physical victimization which is consistent with the growing literature on the prevalence of violence among illicit drug-using men.³ Additionally, and most noteworthy, we identified severe physical victimization as a significant predictor of acquiring a high-risk sexual partner in the following year, even after adjusting for race. Our findings replicate those of similar studies of IPV among illicit drug-using women,⁶ but is among the first to suggest that adult severe physical victimization may be associated with acquisition of a high-risk sexual partner among heterosexual men.

Our findings do not provide conclusive evidence of the temporal ordering of violent victimization due to the use of cross-sectional, retrospectively recalled data. The lack of association between some predictor variables, namely injection status, depressive symptoms, lifetime homelessness, income, and incarceration with high-risk sexual partners, could be due to use of fixed or lifetime measures instead of time-varying measures. Our findings point to the need for additional studies on the relationship between violent victimization and high-risk sexual partnerships among men and potential confounders of this relationship, especially studies that utilize a longitudinal design.

Theories explaining the link between violent victimization in adulthood and sexual risk behavior, including high-risk sexual partners, vary based on the type of violence. In the context of intimate partner relationships, IPV has been thought to confer increased sexual risk due to imbalances of power in the relationship which can lead to fear of requesting condom use, negative consequences of condom request, and forced unprotected sex.^{32,33} However, since heterosexual men are less likely to experience IPV compared to women and MSM,^{34,35} theories that have been used to explain IPV among women and MSM may be inadequate to explain the potential link between violent victimization and high-risk sexual partners in heterosexual men.

A more plausible explanation of the association between violent victimization and sexual risk partners among illicit drug users could be provided by a risk environment

TABLE 3 Adjusted relative risk of acquiring a high-risk sexual partner among illicit drug-using men, New York City, 2006–2009 (N=280)

	RR (95 % CI)
Physical victimization ^a	3.73 (1.55–8.97)*
Sexual victimization ^a	2.03 (0.52–7.84)
Hispanic ^b	0.53 (0.12–2.29)
Black ^b	1.19 (0.33–4.33)

RR relative risk, 95 % CI 95 % confidence interval

**p*<.05

^aIn the prior year

^bReference: White, Asian/Pacific Islander, and Native American

framework.^{36,37} The “risk environment” of drug users includes the complex interaction between micro (e.g., violence and drug use) and macro (e.g., neighborhood drug activity, drug use and distribution laws, and local law enforcement policies) environmental levels³⁸ which can lead to both violent victimization and high-risk sexual partnerships in drug users. Drug users may be more likely to be victims of violence due to participation in the illegal drug economy or in other illegal activities in order to buy drugs or get money to buy drugs.³⁹ Drug users who are more likely to be victims of violence may also be more likely to have high-risk sexual partners because they live or spend a lot of time in disadvantaged communities where violent crime and high-risk individuals are more prevalent.⁴⁰ Illicit drug-using men who are victims of violence may also have more high-risk sexual partners in their social networks. Our study highlights the need for additional research to examine how the risk environment may lead to violent victimization and high-risk partner selection including how drug use networks, risk behavior, and neighborhood context may influence this relationship.

Our findings point to the need for research on the social and behavioral factors comprising the risk environment, as well as psychological vulnerabilities (e.g., mental health symptoms), that may moderate how an individual responds to their risk environment. Future longitudinal research is needed to examine the role of post-traumatic stress disorder (PTSD), depression, and substance use in the relationship between violent victimization and high-risk sexual partners. Longitudinal research is also needed to examine if having a high-risk sexual partner may precede violent victimization, since high-risk partners may be more likely to be perpetrators of violence. Another important area for future research would be to examine the association of childhood violent victimization (unexplored in this analysis) with violent victimization, drug use, and sexual risk behaviors, including high-risk partners, in adulthood.

This study has limitations that warrant mention. Due to the cross-sectional nature of the data and use of a 4-year recall of high-risk partners, our outcome does not measure incidence based on a prospective cohort but, more precisely, the first report of a high-risk partner over the past 4 years. However, our study provides a close approximation of risk since we removed those with a baseline history of a high-risk partnership from the analysis. Given the use of secondary data, there are limitations on the confounders we were able to include in the analysis. We did not assess lifetime history of violent victimization, namely childhood victimization. Participants who reported violent victimization may be more likely to have experienced violence earlier in life⁴¹, and childhood victimization may be an important unmeasured confounder. Future research needs to measure the onset and frequency of violent victimization over the life course among men, especially related to the purchase, use, or sale of drugs, not only to better understand the social context of violence and HIV risk among drug users but also to potentially identify an even earlier point of intervention.

Our time-varying measures may be subject to recall bias due to the length of time of recall and due to the population having compromised recall ability related to drug use. However, several studies provide evidence for the reliability and validity of drug users’ self-report.^{42,43} Additionally, other studies have shown that yearly behavioral recall allows for a valid approximation of temporality using year-by-year self-reported risk behavior among a mostly male sample of drug users.^{25,44} Also, the average number of sexual partners in a year was 1.4 (data not shown), which may have allowed for more accurate recall.⁴⁵ Since traumatic events such as victimization

may serve as a memory anchor, participants who were victimized may have been more likely to recall events or behaviors that happened in close proximity or within the year of victimization. In this study, the use of biographical landmarks⁴⁶ were used which has been shown to reduce recall bias by anchoring events in time. This interviewing method was employed non-differentially easing potential for differences in recall by outcome status. As a result, misclassification of our outcome (i.e., due to recall bias) is likely to be non-differential, independent of exposure, and bias results toward the null.⁴⁷

Another possible drawback in this study is that participants may not have accurately reported the sexual risk behaviors of their sexual partners, yet there is evidence suggesting high concordance between participant report of network risk behavior and network self-report of risk behavior.⁴⁸ Finally, we cannot establish whether sexual partners were perpetrators of violence during the 4-year period. This is an area deserving further study among illicit drug-using men since IPV perpetrated by female sexual partners has been documented in a similar sample.³

In spite of these drawbacks, our study has noteworthy strengths with important implications for future HIV prevention research. This study suggests that the relationship between physical victimization and HIV risk is not only relevant among women and MSM. Heterosexual men and, in particular, drug-using men are at heightened risk for physical victimization. Our study challenges gender-based stereotypes surrounding violent victimization and provides support for multidisciplinary programs that address both violence and HIV risk among illicit drug-using men. Our findings emphasize the need for prospective research to explore the potential pathway between violent victimization and high-risk sexual partners in heterosexual drug-using men, including the role of environmental, psychosocial, and social network factors.

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