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Sexual HIV/HSV-2 Risk among Drug Users in New York City: An HIV Testing and Counseling Intervention

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INTRODUCTION

Sexual HIV transmission persists among drug users even as injection-related HIV transmission has declined in many regions of the US (Gyarmathy, Neaigus, Miller, Friedman, & Des Jarlais, 2002; Logan, Cole, & Leukefeld, 2002). Data from 2005–2006 showed HIV prevalence rates in New York City (NYC) among never-injected heroin and cocaine users approached 12% to 17%, roughly equivalent to HIV prevalence rates among injection drug users (IDUs) in the city and exceeding HIV rates among IDUs in many metropolitan statistical areas in the US (Des Jarlais et al., 2007; Friedman et al., 2005). Recent declines in hepatitis C virus prevalence among HIV-positive new injectors, and observations of strong associations between HIV and herpes simplex virus type 2 (HSV-2) infection in non-injection drug users (NIDUs), point to evidence that a number of new infections in New York City drug users are sexually transmitted (Des Jarlais et al, 2011; Hagan et al., 2010; Plitt, Sherman, Strathdee & Taha, 2005).

Background

Studies have found that IDU and NIDUs are at an increased risk for STI acquisition and transmission because of their participation in high risk sexual behaviors, association with high risk sexual partners (Strathdee et al, 2001), and because they share similar drug use, sexual and social networks (Abdul-Quader et al., 2006; Colon et al., 2001; Neaigus, Miller, Friedman & Des Jarlais, 2001). Female drug users in particular are at substantially higher risk for STI infection because of biological factors and the nature of transactional sex. Ross and his colleagues (1999) reported that female crack users were more likely than male users to exchange oral sex for drugs or money. A number of studies have also found that female drug users involved in sex trade work are more likely than males to use condoms inconsistently and to have an STI (Ford, Wirawan, Reed, Miliawan & Wolfe, 2002; Ompad et al, 2011, Tyndall et al, 2002; Plitt, Sherman, Strathdee & Taha, 2005). High rates of STI infection among drug users and especially female drug users are of concern because of the asymptomatic nature of some STI diseases such as Chlamydia, gonorrhea, and HSV-2. Undetected and untreated sexually transmitted infections such as gonorrhea and HSV-2 can result in adverse health outcomes for all individuals and reproductive and birth defects for women. Additionally, the risk for HIV acquisition increases in the presence of STI infection (Dickerson et al., 1996; Fleming & Wasserheit, 1999; Rottingen, Cameron & Garnett, 2001).

Undiagnosed and untreated STIs are common among users of heroin, cocaine, crack, and amphetamines, (Perlman, Kottiri, Salomon & Friedman, 2009; Logan, Cole, & Leukefeld, 2002) and thus are viewed as a persistent problem in drug using populations (Dembo, Belenko, Childs & Wareham, 2009; Bjekic, Vlajinca & Marinkovic, 1999; Thomas et al., 1996). In particular, HSV-2 is typically asymptomatic and as a result between 85% and 90% of HSV-2 seropositive individuals are unaware of their infection (Gottlieb et al., 2002; Leone, 2005; Xu et al., 2006). There is strong biological and epidemiological evidence linking HSV-2 infection to increased risk for HIV acquisition (Freeman et al., 2006) and transmission (Corey, Wald, Celum, & Thomas, 2004; Wawer et al., 2005). Early studies reported high rates of HSV-2 and HIV infection among crack users (Ross, Hwang, Leonard, Teng & Duncan, 1999; Jones et al., 1998). Data from the New York City Health and Nutrition Examination Survey (NHANES) showed that HSV-2 was found to be more prevalent in NYC than nationally, particularly among black and Hispanic populations. Results also showed that HSV-2 was also more prevalent among New York City adult residents than Chlamydia or gonorrhea (Schillinger et al., 2008). Furthermore, evidence from the National HIV Behavioral Surveillance study showed that HSV-2 infection among high risk heterosexuals in New York City exceeded 80% and was significantly associated with HIV (Hagan et al., 2010).

A meta-analysis conducted by Semaan and colleagues (Semaan, Des Jarlais, Sogolow, Johnson & Hedges, 2002), found that between 1988 and 1999 several HIV prevention interventions resulted in sexual risk behavior changes among drug users (. More recent intervention studies with a variety of drug using populations have shown reductions in HIV risk behaviors such as condom use, condom use attitudes, and beliefs (Rotheram-Borus & Desmond, 2010; Hops et al., 2011; Williams et al., 2012; Tross et al., 2008). A number of intervention studies that targeted cognitive in addition to behavioral changes also reported efficacious outcomes (Malow, West, Corrigan, Pena & Cunningham, 1994; Boyer, Barrett, Peterman & Bolan, 1997; Elwy, Hart, Hawkes & Petticrew, 2002).

Knowledge of HIV in the general population has increased over the past number of years but few studies have focused on STI knowledge and its impact on the relationship between STIs and HIV. More importantly, knowledge of STIs has not been well studied in drug users but it may be inadequate based on low knowledge regarding hepatitis, tuberculosis and HIV among drug users nationally and in NYC (Salomon, Perlman, Friedmann et al, 1999; McCoy et al, 2005; Hagan et al, 2006, Feist-Price, Logan, Leukefeld, Moore & Ebreo; 2003). Van de Hoek (1997) found that drug users are unaware that STIs increase the risk of HIV infection and generally do not seek STI testing unless symptoms are relatively severe. Insufficient STI knowledge highlights the need for innovative programs to increase knowledge among drug using populations as a means of improving their sexual health.

Evidence linking STIs, particularly HSV-2, and HIV transmission among injection and non-injection drug users and the linkage of drug, social and sexual networks among this group led us to develop a brief intervention—The Love Life Intervention. Brief interventions targeting drug users have been found in systematic reviews to be effective in reducing risk behaviors such as sexual risk behaviors and increasing knowledge of risk (van Empelen, 2003). The purpose of this pilot study was to evaluate the efficacy of a brief, multi-session

intervention to increase knowledge, motivation, and behavioral skills related to sexual health, to practice safe sex, and seek STI screening and medical follow-up in a sample of hard-to-reach injecting and non-injecting heroin, cocaine, and crack users in New York City. The intervention was drawn from Project Respect (Kamb, Dillon, Fishbein & Willis, 1996; Kamb et al., 1998), a client-centered, efficacious HIV testing and counseling intervention. Building on Project Respect the Love Life intervention was specifically tailored for drug users and enhanced to emphasize STI risk and prevention. The Love Life intervention also includes Motivational Interviewing (Miller & Rollnick, 2002) to assist those with HIV or an STI to follow through with medical appointments and care. The present analysis examined post-intervention changes in condom use and drug use behaviors, STI/HIV knowledge, HIV and safer-sex risk attitudes, and number of sexual partners in a sample of IDU and NIDU heroin, cocaine and crack users who completed the pilot test of the behavioral intervention.

METHODS

This study was conducted in 2008-2009 in Harlem, New York City, a predominantly Black and Hispanic community, severely impacted by HIV/AIDS and STIs (NYCDP, 2011; NYC Department of Health and Mental Hygiene (NYCDOHMH, 2006). For more than a decade HIV prevalence rates in Harlem have exceeded that of any other neighborhood in New York City (NYCDOH, 2010). In Central Harlem males 15-24 years old have the highest gonorrhea rates (457/100,000), and the second highest Chlamydia rates (887/100,000). Females in Central Harlem also account for a substantial number of Chlamydia and gonorrhea cases in the city (NYCDOHMH, 2008).

Study activities were conducted at an established community-based organization in Central Harlem. Eligible participants were current injection and non-injection users of heroin, cocaine and crack who reported unprotected vaginal and anal sex with more than one partner in the past 30 days by self-reports. One hundred and two individuals were recruited and screened for eligibility, 64 of whom were eligible for the intervention based on their reports of unprotected sex; 60 consented to participate in the intervention and 58 completed both the follow-up interviews and urine and blood samples.

Firstly, current users of heroin, cocaine and crack were identified by ethnographic observation and key informant interviews conducted by research staff. Confirmatory test to determine recent drug use eligibility was determined by rapid urine testing for drug metabolite using the OnTrak test. In the study's second recruitment stage initial recruits then referred 3 of their peers who were also tested for current drug use. This chain-referral recruitment procedure was repeated until a sample of 102 drug-positive users were obtained.

A computer-assisted behavioral questionnaire was administered to participants in the first stage of data collection. The questionnaire included topics on demographics, current drug use and drug use history, STI/HIV knowledge, presence of symptoms indicating STIs, risk attitudes and sexual behavior for a four-week referent period. Questionnaire items related to STI/HIV knowledge and HIV risk attitude were adapted from the HIV and hepatitis knowledge test used in the CDC Collaborative Injection Drug User Study III (CIDUS III) which was found to have high reliability (Cronbach's alpha, 0.7), (Hagan, Campbell,

Thiede, Strathdee, Ouellet, Latka et al., 2007). Provider trust questions were obtained from the Trust in Physician Scale (Anderson & Dedrick, 1990) that has an alpha of .91. An incentive was paid for completion of the survey.

Participants who reported unprotected sexual intercourse with more than one partner in the previous 30 days (n=64) were eligible for the pilot intervention. As mentioned earlier 60 agreed to participate. Participants urine specimens were screened for chlamydia and gonorrhea (COBAS AMPLICOR, Roche Diagnostic Systems, Branchburg, NJ) and blood was tested for HIV (HIV 1/2 EIA with Western blot confirmation, Bio-Rad Laboratories, Waltham, MA), herpes simplex virus type 2 (HerpeSelect immunoblot, Focus Technologies, Cypress, CA), and syphilis (Rapid Plasma Reagin and Treponema Pallidum Particle Agglutination tests).

Those with positive agglutination results were classified as confirmed syphilis of unspecified status, as these tests do not distinguish between past and current infection. HIV positive persons not already in care were referred to HIV care. All persons were given written documentation of their STI test results. Study protocols were reviewed and approved by the IRB at the National Development Research Institutes, Inc. Written consent was obtained from all study participants.

The intervention occurred in two sessions each lasting 1½ hours. Over the two structured sessions, participants were given pre-and post-test counseling to emphasize STI-and HIV-related knowledge, behavior, and skills; motivational interviewing to increase medical follow-up among STI-or HIV-positive drug users; modest incentives; and for those who tested positive for any infection referrals to STI/HIV medical providers (Hagan, Perlman, Des Jarlais, 2011) for care and treatment. STI and HIV results were provided at the second intervention session to those with positive tests.

The sample size of 102 had limited statistical power but was expected to yield preliminary data upon which to base sample size estimations for a larger study. A number of proportions of interest were examined to determine whether the 95% confidence intervals would be sufficiently narrow to calculate expected outcomes based on the study sample. Estimates were determined for prevalence of HSV-2 in the drug using population, those likely to be screened, and behavior changes, keeping in mind that the literature is less informative about an intervention of this kind with field-recruited drug populations as compared to those engaged in medical or harm reduction services.

Data Analysis

This current analysis focuses on 58 of the eligible IDUs and NIDUs who completed a follow-up visit. Our primary outcome variable was sexual risk during the four weeks post-intervention which was categorized as 1) no condom use, 2) inconsistent (<100%), and 3) consistent use or abstinent if they had no sex or condoms were used at every sexual occurrence four weeks post intervention. Our analysis examined whether factors such as knowledge, risk attitude, number of partner relationships, and drug use predicted changes in self-reported sexual risk behavior at post-test. HIV risk attitudes were measured by three variables: personal efficacy to practice safe sex (risk efficacy), burnout with practicing safer-

sex (risk fatigue) and self-assessment for HIV risk. Chi-square tests and Spearman rank correlations were used to assess the relationship between condom use and risk attitudes, STI/HIV knowledge and drug use practices. Wilcoxon Signed Rank test of STI/HIV knowledge, risk attitudes, drug injection and partner relationships were analyzed using SPSS 19.0.

RESULTS

Most participants were male (65%), 60% were African American and 33% Latino. Half were heterosexual, one-fifth were homosexual, and a quarter bisexual. The median age was 48. Approximately a third reported they were currently homeless. Most study participants lived in either their own apartments (62%) or a family or friend's apartment (26%). A small proportion had completed high school (14%) but more than half had a high school equivalency diploma.

Approximately 60% snorted or sniffed heroin or cocaine, 21% injected these drugs alone or together, and 66% smoked heroin or crack in the past 30 days. Drug injectors typically injected heroin or cocaine 2-3 times per day. Seventy-four percent of the participants tested positive for antibodies to HSV-2, 44% were HIV positive and more than one-third were both HIV and HSV-2 positive (Table 2). Almost two-thirds of STI positives visited a health care provider for treatment or medical advice at post intervention.

During the 4 weeks post-intervention, 50% of participants were either sexually abstinent or reported consistent condom use, 17% reported inconsistent use, and one-third did not use condoms at all. Thus, there was a substantial overall increase in condom use from baseline when all the participants reported unprotected sex with more than one partner. There was an increase in STI/HIV knowledge scores following participation in the intervention: $z = -3.25$, $p < .002$. There was a significant increase in scores for risk efficacy ($z = -3.16$, $p < .005$) and reductions in number of opposite sex partners ($z = -3.74$, $p < .001$), safer-sex risk fatigue ($z = -3.89$, $p < .001$) and in the number of days injected drugs ($z = -3.13$, $p < .005$). There was no change in scores for self-assessment of HIV risk.

Additional analysis examined factors associated with condom use. Spearman Rank correlations showed (Table 3) that the fewer days participants injected ($r = -.34$) or the fewer opposite sexual partners ($r = -.42$) they had the more likely they were to increase their condom use. However, those who reported greater levels of safer sex risk fatigue ($r = -.40$) or assessed their personal HIV risk as higher ($r = -.27$) were less likely to adopt safer sexual behaviors. There was no association between STI/HIV knowledge, same sex partners, risk efficacy, recent STI visit to a provider, HSV-2 or HIV status, and condom use using either Spearman Rank correlations or Chi-square for categorical variables.

DISCUSSION

The sample for the Love Life intervention study was drawn from a high sero-prevalence neighborhood in New York City. Recruitment occurred in an area that is defined by the National HIV Behavioral Surveillance (NHBS) as having high rates of heterosexual transmission of HIV (Jenness et al., 2009).

Participants in the Love Life intervention experienced substantial reductions in safer-sex risk fatigue, the number of same sex and opposite sex partners, and the number of days when drugs were injected over the course of four weeks. STI/knowledge also increased after the intervention. Consistent condom use or sexual abstinence increased almost two-fold. Of note, the majority tested positive for antibodies to HSV-2 and a large proportion was co-infected with HIV and HSV-2. Further analysis showed significant associations between increased condom use and reductions in injecting per day, fewer opposite sexual partners, safer-sex risk fatigue and assessment of one's personal HIV risk as high. A number of other variables such as STI knowledge, risk efficacy and number of same sex partners were not correlated with participants' condom use even when there were changes in pre- and post-intervention scores. The lack of an association between condom use and the predictors may be a function of the small study sample and the use of non-parametric tests which are less sensitive in detecting differences between groups. However, evidence that condom use practices increased even with this small sample has research implications for future studies with larger sample sizes and more robust statistical techniques.

Knowledge was viewed as a means to effect behavior change in condom use and other behavioral indicators. In this study STI knowledge scores increased over time although the association with condom use was not as strong. Nonetheless, the significant change in scores is of great consequence as it suggests an important uptake in STI knowledge among a population with high rates of sexually transmitted diseases. The absence of a statistically significant relationship with condom use, but one that was trending toward significance, suggest that a longer intervention study with a larger sample might yield more substantial sexual health outcomes among drug users.

Safer-sex risk fatigue has been a major focus of HIV prevention research, particularly among men who have sex with men (MSM) (Golub, Rosenthal, Cohen & Mayer, 2008; McKirnan, Houston & Tolou-Shams, 2007; Ostrow et al, 2008). Our results were consistent with previous research showing that safer-sex risk fatigue is associated with risky sexual behaviors although we did observe a decline in the risk attitude post intervention.

A major goal of the intervention was to motivate drug users who were HSV-2 positives to seek possible treatment and follow-up advice from medical providers (Dunne et al., 2008; Whitley & Roizman, 2001). Approximately one-third of those diagnosed with an STI did visit a provider, and brought a copy of their test results to the visit. However, many of our HSV-2 antibody positive participants reported that public health department providers indicated that they 'don't have herpes,' because they did not report having herpes outbreaks. These participants also reported that they did not receive HIV-related counseling from providers. This raises questions as to whether usual practice routinely includes counseling regarding the risk of HIV in patients with HSV-2 infection. Recent research indicates that HSV-2 viral shedding is equally likely during symptomatic and asymptomatic periods, so the absence of symptoms should not preclude counseling (Tronstein et al., 2011), particularly in such a high-risk population. Although recent RCTs of acyclovir treatment of HSV-2 have not shown an effect on HIV transmission (Celum et al., 2008; Celum et al., 2010), for patients presenting to an STI clinic with a positive HSV-2 antibody test,

education and counseling regarding the risk of HIV acquisition and transmission should be given.

Findings of our study were limited by the study's sample size which reduced our ability to assess the effect of the pilot Love Life Project. Additionally, the brief-follow up period of the intervention study precluded observation of behavioral changes after 30 days. The pilot did have high participation and retention rates, with 97% returning for a follow-up visit, suggesting that the intervention was acceptable and feasible to very high-risk individuals. In our sample there was a high convergence of sexual and drug-related risk, which makes this population an important target for this type of brief but intense counseling intervention. We showed that drug users could be motivated to increase condom use and seek STI screening and follow-up in treatment. As part of seek, test, and treat, it may be important for seronegative individuals to be provided with a sexual health checkup which includes motivational interviewing and STI screening. In addition, reminders of the relationship between STIs including HSV-2 and HIV could be emphasized as a means of reducing HIV risk in this type of high-risk population.

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Table 1

Baseline Characteristics, n=58 drug users, Harlem, NY, 2008

Demographics	Ns	%
Gender		
Male	38	65
Female	20	35
Ethnicity		
Black	35	60
Hispanic	19	33
White/Mixed	4	7
Mean Age (s.d)	47.85 (10.96)	
High School Diploma		
Yes	33	57
No	25	43
Homeless		
Yes	20	35
No	38	65

Table 2

Risk Behaviors, n=58 drug users, Harlem, NY, 2008

Drug Use, past 30 days	Ns	%
Injected heroin & cocaine alone/together	12	21
Sniffed/Snorted heroin, cocaine	34	59
Smoked heroin, crack	38	66
Number of times injected/day		
< once	2	18
2-3 times	6	55
4-9 times	3	27
Sexual Behavior, past 30 days		
<i>Condom Use</i>		
Consistent/Abstinent	29	50
Inconsistent	10	17
No Condom use	19	33
<i>STI/HIV test results</i>		
HIV positive	32	44
HSV-2 positive	42	74
HIV & HSV-2 positive	21	36
Chlamydia	2	4
Gonorrhea	0	0
Syphilis	1	1.7
<i>STI Positive- Visit to provider post-intervention</i>		
Yes	33	64
No	19	37
<i>Reported History of STIs and HIV</i>		
Ever told had genital herpes	0	0
Ever told had other STI	30	52
Ever tested positive for HIV	55	95
<i>Exchange sex for money, goods or drugs</i>		
Yes	2	50
No	2	50

Table 3

Changes in HIV/STI Knowledge, Attitudes and Behaviors: Pre & Post Intervention, N=58

	Pre-Intervention Means (SD)/Median	Post-Intervention Means (SD)/Median	Change in Means Pre- Post Intervention	* Associations with Condom use at follow-up (R)	P-values
STI/HIV knowledge	15.24 (1.82)/16	16.08 (1.47)/17	.84	.236	0.074
Safer sex risk fatigue	7.24 (3.84)/ 8	4.20 (4.11)/3	-3.04	-.403	0.002
Self-assessment of HIV risk	8.00 (3.50)/8	7.43 (3.57)/8	-.57	-.265	0.045
Number of Opposite sex partners	3.02 (4.78)/2	1.05 (.77)/1	-2.97	-.415	0.007
Drug injection/days	6.95 (12.22)/0	3.66 (8.87)/0	-3.29	-.338	0.009

* Spearman Rank Correlations