

Contextual Determinants of Condom Use Among Female Sex Exchangers in East Harlem, NYC: An Event Analysis

James M. McMahon · Stephanie Tortu ·
Enrique R. Pouget · Rahul Hamid · Alan Neaigus

Published online: 16 June 2006
© Springer Science+Business Media, Inc. 2006

Abstract Recent studies have revealed a variety of contexts involving HIV risk behaviors among women who exchange sex for money or drugs. Event analysis was used to identify the individual, relationship, and contextual factors that contribute to these high-risk sex exchange practices. Analyses were conducted on data obtained from 155 drug-using women who reported details of their most recent sex exchange event with male clients. The majority of sex exchange encounters (78%) involved consistent condom use. In multivariable analysis, protective behavior was associated primarily with situational and relationship variables, such as exchange location, substance use, sexual practices, and respondent/client discussion and control. In order to inform HIV prevention programs targeted to women sex exchangers, further research is needed on the contextual determinants of risk, especially with regard to condom-use negotiation and factors involving substance use that adversely affect women's ability to manage protective behavior in the context of sex exchange.

Keywords Commercial sex work · Prostitution · HIV risk · HIV prevention · Women and HIV · Event analysis

J. M. McMahon (✉) · E. R. Pouget · R. Hamid · A. Neaigus
National Development and Research Institutes,
71 West 23rd Street, 8th Floor, New York, 10010 New York.
e-mail: mcmahon@ndri.org

S. Tortu
School of Public Health, Louisiana State University,
New Orleans, Louisiana

E. R. Pouget
School of Epidemiology and Public Health, Yale University,
New Haven, Connecticut

Introduction

As the HIV/AIDS epidemic spread rapidly in the United States throughout the 1980s, first among gay men and then injection drug users (IDUs), it was not long until another marginalized group—female sex workers—was perceived as being a “vector” for transmission of the disease (Lyons and Fahmer, 1990). In fact, while the sex trade industry played a major role in the spread of HIV in Africa and Asia—the first cases of HIV in India were detected among street prostitutes—this was not generally the case in Europe and North America. With few exceptions, female commercial sex workers in the United States were not afflicted with the high rates of HIV observed among men who have sex with men (MSM) and IDUs (Centers for Disease Control and Prevention, 1987; Rosenberg and Weiner, 1988; Vanwesenbeeck, 2001). This finding was consistent with reports from several early studies indicating relatively high rates of condom use among female sex exchangers (Dorfman, Derish, and Cohen, 1992; McKeganey, 1994).

Yet, by the early 1990s, while most surveillance studies were reporting that the majority of HIV-infected prostitutes in the United States and Europe had acquired the virus through injection drug use (Centers for Disease Control and Prevention, 1987; Des Jarlais, Friedman, Goldsmith, and Hopkins, 1990), HIV prevention research was beginning to document extensive heterogeneity in the contexts surrounding sex exchange practices and HIV risk among marginalized urban women (Jackson, Highcrest, and Coates, 1992). Crack–cocaine use, in particular, was identified as a major risk factor for HIV among female sex exchangers, independent of injection drug use (Edlin *et al.*, 1994; Sterk, 1988). Subsequent ethnographic work revealed that sex-for-crack exchanges tended to involve frequent intercourse, numerous sex partners, and low condom use (Inciardi, 1995). Reports

of other forms of high-risk sex trading in U.S. cities were soon to follow, including sex-for-heroin exchanges (“bag brides”) (Goldstein, Ouellet, and Fendrich, 1992) and “survival sex”—the exchange of sex for immediate survival needs such as food and shelter in response to an economic crisis (Bailey, Camlin, and Ennett, 1998; Mallory and Stern, 2000; Surratt and Inciardi, 2004).

Over the last decade, ecological, contextual, and relationship factors have emerged as crucial determinants of high-risk sex exchange practices. In a comparison of HIV risk involving sex exchange in high- and low-seroprevalence cities, Tortu *et al.* (2000a) found that background seroprevalence moderated the association between sex exchange and risk for HIV transmission. Other ecological and contextual determinants of high-risk sex exchange have been identified in recent years: Street sex exchange has been shown to be more risky than exchange in brothels (Deren *et al.*, 1996; Pyett and Warr, 1997; Rissel, Richters, Grulich, de Visser, and Smith, 2003); sex for drugs reportedly entails greater risk than sex for money (Kwiatkowski and Booth, 2000); and sex exchange with regular clients appears to involve greater risk than exchange with less regular clients (de Graaf, Vanwesenbeeck, Van Zessen, Straver, and Visser, 1992; Kerrigan *et al.*, 2003; Leonard, Freund, and Platt, 1989; Parrado, Flippen, and McQuiston, 2004). Despite recognition of these risk factors, our understanding of the variety of contexts within which sex trading occurs, and the effects that this heterogeneity has on HIV risk, remains incomplete (Weeks, Grier, Romero-Daza, Puglis-Vasquez, and Singer, 1998).

This lack of clarity is often reflected in the lexicon of sex exchange research—terms such as prostitution, commercial sex work, survival sex, transactional sex, and sex trading are often ascribed overlapping and ill-defined meanings. Throughout this article we employ the term “sex exchange” to refer to the behavior of directly exchanging sex for money or drugs.

One approach to learning about contextual determinants of high-risk sex exchange practices is to analyze detailed information regarding women’s most recent sex exchange events. This approach minimizes recall bias if events are of recent origin, eliminates generalizations across a given time period (e.g., 30 days or 6 months), and permits a detailed description of the social context of disease risk. This article is the third in a series of articles in which event analysis was employed to examine the social context of women’s HIV risk. The first two papers focused on women’s most recent sex encounters with non-exchange male partners (Tortu *et al.*, 2000b) and risks associated with drug injection events (Tortu, McMahon, Hamid, and Neaigus, 2003), respectively. The current study extends this body of work by applying event analysis methodology to sex exchange practices among female crack, cocaine, or heroin users in East Harlem,

New York City. This study will: (1) Determine the prevalence of HIV, hepatitis B, and hepatitis C infections among a sample of drug-involved female sex exchangers recruited in East Harlem, NYC; (2) describe the most recent sex exchange events reported by these women; and (3) identify individual, relationship, and situation-specific determinants of exchange-related risk during the events.

Methods

Participants

Drug-using women were recruited from the streets of East Harlem from 1997 to 1999 as part of a larger cross-sectional study on the social context of sex- and injection-related HIV risk behavior. A total of 601 participants were recruited by experienced outreach workers using targeted sampling (Watters and Biernacki, 1989), and by participant referrals. A brief screening form was administered at the time of initial contact to determine study eligibility. In order to participate, women had to be at least 18 years of age, heterosexually active in the previous 6 months, and report the use of injected or non-injected heroin, cocaine, or crack in the previous 30 days.

Women who qualified and agreed to participate in the project were either escorted directly to the field site for screening and assessment, or were given an appointment card and invited to participate at a later time. Once at the field site, participants were asked to review and sign an informed consent. Urine was analyzed to validate recent self-reported drug use. A face-to-face structured interview, lasting approximately 2 hr, was administered in a private room by trained and experienced female interviewers. After the interview, women were paid \$25 for their participation. Study participants were offered counseling and testing for HIV and hepatitis B and C infections. About 85% of participants consented to HIV testing, and 70% consented to screening for hepatitis B and C; all tests were conducted on the same day as the interview and took place at private field site offices. At post-test counseling sessions, participants were given medical and social service referrals as needed.

Of the 601 women enrolled in the study, 246 (41%) reported *ever* exchanging sex for money or drugs. The events examined in this study were obtained from 155 women who reported exchanging vaginal or anal sex for money or drugs in the prior 6 months. Each respondent reported on her most recent sex exchange event. The sample of women was composed of 57% Black non-Hispanic, 35% Latina (mainly Puerto Rican), and 8% White non-Hispanic. Median age was 37 years; 47% graduated high school; 28% were married or

living with a primary heterosexual partner; 47% were self-reported homeless; and all but two of the women reported no current legal employment. One in four women reported experiencing childhood sexual abuse and 34% reported childhood physical abuse. In the 30 days prior to the interview, 24% of the women reported injecting drugs; of those, nearly all injected heroin, either exclusively or in addition to cocaine. All 155 women reported using illegal non-injected drugs in the last 30 days: 79% used crack, 47% heroin, 45% marijuana, and 24% cocaine. Additionally, 94% reported using tobacco and 71% consumed alcohol in the previous 30 days.

The sub-sample of women included in the present analysis differed from other participants in the larger sample in that the former were slightly younger, and were more likely to be homeless, to use crack-cocaine, and to report having an STD. A more detailed comparison of sex exchangers versus non-exchangers is in preparation under a separate analysis.

Measures

The interview included questions on respondent's demographics, substance use, and disease risk factors. In addition, detailed information was collected concerning each respondent's most recent sex exchange event. Respondents were asked about their own HIV serostatus at the time of the event, as well as the context surrounding the sex exchange event. Contextual and situation-specific factors included the setting of the event, the use of drugs or alcohol, the sexual activities that were engaged in, the commodity and value exchanged, discussion of condom use, and respondent's perceived control over condom use. Characteristics of the male client (i.e., "date") and of the relationship between respondent and client were also obtained, including previous exchange history, estimated age difference, and client's level of influence over sex exchange practices. A complete list of variables is presented in Tables I and II. In addition, using an open-ended format, respondents were asked why they did or did not use a condom during their most recent sex exchange event. Subject responses were recorded by the interviewers and later reviewed and coded by research staff.

Events were categorized as either "protected" or "unprotected" as follows. A protected sex exchange event was defined as an episode of coitus in which a condom was used consistently (i.e., at every instance of penetration) throughout vaginal or anal intercourse. An unprotected event was defined as an episode of coitus in which either a condom was not used at all or not used consistently throughout vaginal or anal intercourse. The terms "protected" and "unprotected" were not disclosed to respondents prior to or during the interview. Women reported only on their most recent vaginal or anal sex exchange event. Classification of each reported event as either protected or unprotected was based solely

Table I Bivariate logistic regression tests for significant predictors of protected sex exchange events

Individual-level variables	MLE logistic regression		
	%	OR	95% CI
Respondent-specific variables			
Age at event (years)			
18–29	13.5	1.49	0.63, 3.51
30–39	46.5	0.94	0.52, 1.70
40 and over	40.0	Reference	
Race/ethnicity			
Black non-Hispanic	56.8	1.07	0.56, 2.04
Hispanic	34.8	0.67	0.34, 1.29
White/Asian/other	8.4	Reference	
Completed high school education	47.1	1.40	0.63, 2.94
Self-reported homeless	46.5	1.32	0.61, 2.84
HIV positive seroaware ^d	11.3	1.29	0.35, 4.79
Age at first intercourse under 15	43.9	0.85	0.40, 1.82
Experienced childhood sexual abuse	25.2	0.63	0.27, 1.45
Experienced childhood physical abuse	34.2	0.80	0.36, 1.76
Ever sexually assaulted by client	6.5	1.13	0.23, 5.60
Ever physically assaulted by client	5.2	0.83	0.16, 4.34
Number of times exchanged sex in last 30 days	15.2 ^c	1.00	0.99, 1.01
Had primary heterosexual partner*	60.7	0.57	0.25, 1.30
Current crack-cocaine user**	78.7	2.60	1.11, 6.05
Current injection drug user	23.9	1.27	0.50, 3.22
Exchange partner ("client")-specific variables			
Client's race/ethnicity			
Black non-Hispanic*	63.2	0.18	0.02, 1.44
Hispanic	25.2	0.20	0.02, 1.68
White/Asian/other	11.6	Reference	
Client's age (years) ^b			
18–29	12.4	0.79	0.37, 1.65
30–39*	36.0	1.65	0.87, 3.08
40 and over	51.6	Reference	
Client was HIV positive	1.9	Indeterminate	
Client sold drugs	12.9	0.82	0.28, 2.45
Client ever injected drugs*	7.1	0.30	0.90, 1.06
Respondent perceived client "very much" wanted to reduce his risk for HIV/AIDS*	67.7	6.09	2.68, 13.83

Note. $N = 155$ unless otherwise indicated.

^a $n = 151$.

^b $n = 153$.

^cMean reported.

* $p \leq .20$. ** $p \leq .05$.

Table II Bivariate logistic regression tests for significant predictors of protected sex exchange events

Dyadic and situational variables	MLE logistic regression		
	%	OR	95% CI
Relationship-specific variables			
Length of time knew client			
Just met	19.4	1.16	0.60, 2.25
Less than a year	25.2	0.73	0.41, 1.32
A year or longer	55.5	Reference	
Respondent's relationship with client ^a			
Stranger	18.8	1.16	0.58, 2.31
Regular client	53.9	1.09	0.64, 1.87
Friend*	14.9	2.00	0.94, 4.28
Acquaintance	12.3	Reference	
Had sex previously with client ^a	74.7	0.88	0.36, 2.16
Respondent 10 or more years younger than client	24.5	0.72	0.31, 1.69
Respondent-client same race/ethnicity	71.6	1.07	0.46, 2.46
Respondent felt "very close" to client	33.6	1.53	0.66, 3.58
Respondent felt "very much" in control of using a condom**	91.6	4.97	1.54, 15.9
Situation-specific variables			
Time of event			
Event occurred on weekend (Friday–Sunday)	38.0	0.99	0.45, 2.17
Event occurred between 7 p.m.–4 a.m.	56.8	0.93	0.46, 1.87
Location of event			
At respondent's place	13.6	0.78	0.22, 2.93
At client's place**	34.8	0.35	0.14, 0.85
At another person's place*	36.8	1.96	0.39, 9.90
Hotel, car, or public place		Reference	
Drugs injected by respondent at event (yes/no)			
Heroin ^a	9.7	1.94	0.42, 9.07
Cocaine ^b	2.0	Indeterminate	
Any non-alcoholic drugs used by respondent at event	85.8	0.76	0.24, 2.43
Any non-injected drug (excluding alcohol) used at event*	79.4	0.44	0.14, 1.37
Any injected drugs used by respondent at event	12.3	2.62	0.57, 11.93
Non-injection drugs/alcohol used by respondent at event			
Alcohol ^{a,**}	28.6	0.40	0.18, 0.89
Marijuana ^{a,*}	10.4	0.42	0.14, 1.27
Cocaine ^{a,*}	5.8	0.33	0.08, 1.29
Crack ^a	61.0	1.54	0.71, 3.31
Heroin ^a	25.3	0.64	0.28, 1.47
Sexual practices at event			
Kissing ^{a,**}	45.5	0.43	0.20, 0.93
Cunnilingus**	22.6	0.36	0.16, 0.83
Fellatio ^a	39.6	0.79	0.36, 1.70
Anal sex	0.7	Indeterminate	
Client fondled respondent's vagina	72.9	0.63	0.25, 1.60
Respondent fondled client's penis	65.2	0.61	0.26, 1.42
Client initiated the date	80.7	1.11	0.43, 2.85
Discussed using a condom with client**	67.1	10.15	4.22, 24.39
Respondent exchanged sex for money only	60.7	1.50	0.70, 3.24
Respondent exchanged sex for crack	23.9	1.27	0.50, 3.22
Respondent exchanged sex for heroin*	16.1	0.53	0.21, 1.37
Value of drugs/money more than \$50	50.3	0.87	0.41, 1.87

Note. $N = 155$ unless otherwise indicated.

^a $n = 154$.

^b $n = 153$.

* $p \leq .20$. ** $p \leq .05$.

on women's reported sexual behavior, not on respondent's perception of risk.

For participants who consented to HIV testing, oral fluids were collected using the OraSure procedure. HIV antibodies were identified using the standard ELISA screening, confirmed by Western Blot. For hepatitis, blood was collected through venipuncture. Core antibody assays were performed using CORZYME enzyme immunoassay to screen for hepatitis B, and Abbott HCV EIA 2.0 for hepatitis C.

Data analyses

Prevalence data were calculated from biological test results for HIV, hepatitis B, and hepatitis C. Standard univariate statistics were used to describe the women who participated in the study, as well as the sample of sex exchange events reported by these women. Respondents' most recent sex exchange events, whether condom-protected or unprotected, comprised the unit of analysis in all subsequent inferential statistical procedures. A total of 246 women reported on their last sex exchange event. However, in order to minimize recall bias, 91 events that occurred more than 6 months prior to the interview were excluded from the analysis, yielding a final sample of 155 events. Of the 91 events that were excluded, 78 occurred more than 1 year prior to the interview.

In event analysis, consistent condom use during the event (i.e., condom-protected event) was the dependent variable. Bivariate logistic regression using maximum likelihood estimation (MLE) was applied to each of the predictor variables listed in Tables I and II. Predictors of condom use with an alpha of .20 or less were retained for further multivariate analyses. Principal components analysis (PCA) with oblique (promax) rotation was employed as an exploratory tool to clarify the correlational structure among selected predictors of condom use (Table III). Oblique rotation of the principal axes permitted the components to be correlated in the analysis. Multicollinearity diagnostics (variance inflation factor [VIF] and tolerance) were performed on the independent variables in order to identify ill-conditioned data that could cause inflated standard errors and unstable coefficients in regression analysis (Table III). The PCA and multicollinearity diagnostic results were used to aid model specification.

MLE multiple logistic regression was performed using several model selection techniques to identify variables that independently predicted consistent condom use during sex exchange events. Because of the exploratory nature of the analysis, we chose not to apply a correction for multiple tests (such as the Bonferroni adjustment). In each analysis, events missing relevant information (due to non-response) were excluded (i.e., listwise deletion).

Results

Prevalence of blood-borne infections

Twenty-two percent of women exchangers who consented to voluntary HIV testing ($n = 147$) were seropositive. Of the women who were screened for hepatitis B and C ($n = 125$), 40% were anti-HBV reactive, and 38% were anti-HCV reactive.

Description of most recent sex exchange events

Of the 155 sex exchange events included in the analysis, 121 (78%) were categorized as protected and 34 (22%) were categorized as unprotected. Tables I and II provide descriptive data for other characteristics of respondent-reported recent exchange events. Nearly 60% of events occurred in the evening or early morning hours (between 7 p.m. and 4 a.m.). The majority of sex exchange events took place either in a hotel, car, or public place (37%) or at the client's residence (35%). Fewer than 14% of events occurred at the women's residence. Non-injection drugs (mostly crack) were used by respondents before or during sex exchange in about 80% of events; and about 12% of events involved the use of injected drugs. Nearly 40% of sex exchange events included fellatio (in addition to vaginal sex), but less than 1% involved anal sex. Money was the primary commodity of exchange: 97% of events involved money exchange, either exclusively (61%) or in addition to drugs (36%). The median value of the drugs/money exchanged for sex was \$55 USD (mean = \$79.23, $SD = \$72.16$).

According to women's estimates (or knowledge), the median age of the male client was 40 years (mean = 41.2, $SD = 11.7$). Nearly two-thirds of the male clients were Black non-Hispanic and about 25% were Hispanic. Women exchangers reported that about 13% of their clients sold drugs. Less than 20% of the women had only just met their client before exchanging sex (i.e., client was a stranger), and more than half knew their client for more than 1 year. Nearly 75% had exchanged sex previously with the client. One in four women perceived themselves to be 10 or more years younger than their client. Nearly three in four were the same race/ethnicity as their client, indicating non-random mixing.

Approximately 59% of the exchange events occurred within 1 week of the interview and 79% occurred within 1 month. The mean number of days that had elapsed between the date of respondent's most recent sex exchange event and the date of the interview was not significantly different between condom-protected and unprotected sex exchange events, as determined by the Wilcoxon rank-sum test ($z = 0.40, p > .05$).

Table III Principal components analysis eigenvalues, percent variance accounted for, and component loadings expressed as standard regression coefficients after oblique (promax) rotation

	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8	PC 9	Collinearity diagnostics	
										Tol ^a	VIF ^b
Eigenvalues of correlation matrix	2.17	1.62	1.47	1.32	1.26	1.13	1.08	1.07	1.01		
Percent variance accounted for by component	12.1	9.0	8.2	7.3	7.0	6.3	6.0	6.0	5.6		
Predictor variables by component											
Resp. felt in control of condom use	90 ^c									.76	1.31
Cocaine used at event	− 59 ^c		42 ^c							.66	1.51
Client ever injected drugs	− 56 ^c							− 49 ^c		.74	1.34
Event occurred at client's home		− 71 ^c								.84	1.20
Event occurred at other's home		80 ^c								.80	1.25
Resp. current crack user			79 ^c							.81	1.23
Marijuana used at event			− 51 ^c			− 42 ^c				.81	1.23
Kissing at event				71 ^c						.89	1.13
Cunnilingus at event				60 ^c						.88	1.13
Any non-injected drug used				64 ^c						.83	1.21
Client wanted to reduce risk					78 ^c					.73	1.36
Sex exchanged for heroin					− 66 ^c					.86	1.16
Condom use was discussed						79 ^c				.84	1.19
Resp. had current main partner						41 ^c			42 ^c	.93	1.07
Alcohol used at event							74 ^c			.81	1.23
Client 30 to 39 years of age							− 74 ^c			.85	1.17
Client was Black non-Hispanic								86 ^c		.87	1.14
Client was a friend									83 ^c	.83	1.19

Note. Tolerance (Tol) and variance inflation factor (VIF) collinearity diagnostics. $N = 155$.

^aTolerance value of near one indicates independence; if the value is close to zero, multicollinearity is indicated.

^bChatterjee, Hadi, and Price. (2000) suggest that multicollinearity is present if the mean variance inflation factor, which has a range from 1 to infinity, is considerably larger than 1, and the largest VIF is greater than 10.

^cValue of coefficient exceeds the root mean square of all values in the matrix.

Predictors of condom-protected sex exchange events

Bivariate analyses

Condom protected/unprotected sex exchange (dichotomous dependent variable) was regressed separately on respondent and client characteristics, as well as situation-specific and relationship-specific variables. Using an initial alpha level of .20, 18 candidate predictors of condom-protected sex exchange events were identified (see Tables I and II). Six individual-level predictors were identified, including two respondent-specific predictors (respondent had a primary sexual partner and respondent was a crack-cocaine user)

and four client-specific predictors (client was Black non-Hispanic, between 30 and 39 years old, had a history of injection drug use, and “very much” wanted to reduce his risk for HIV). Two relationship-specific predictors were identified in the bivariate analyses (respondent and client were “friends,” and respondent felt “very much” in control of using condoms with client). The majority of candidate predictors of condom use in the bivariate analyses were situation-specific variables (event occurred at client's place or another person's place; non-injected drugs were used at the event—specifically alcohol, marijuana, or cocaine; sex exchange involved kissing or cunnilingus; respondent and client talked about using condoms prior to exchanging sex; and respondent exchanged sex for heroin).

Table IV Multiple logistic regression: predictors of condom-protected sex exchange events using various model selection methods ($N = 155$)

Significant predictors	Model A Forward and stepwise selection w/ complete model		Model B Backward selection w/ complete model or forward and stepwise selection w/ reduced model ^a	
	AOR	95% CI	AOR	95% CI
1. Event occurred at client's place ^b	0.25*	0.07, 0.85		
2. Cocaine used at event	0.05**	0.01, 0.40		
3. Kissing occurred at event	0.21**	0.07, 0.66	0.23**	0.08, 0.66
4. Respondent had primary sex partner	0.31*	0.10, 0.99	0.36	0.12, 1.12
5. Client "very much" wanting to reduce HIV risk	8.34**	2.70, 25.80	5.07**	1.78, 14.45
6. Condom use was discussed	15.69**	4.79, 51.43	17.68**	5.57, 56.12
7. Respondent felt in control of condom use			6.46*	1.26, 32.99
8. Respondent current crack user			3.15	0.98, 10.21

^aReduced model excludes "cocaine used at event."

^bAll three effect-coded vectors representing the "place of event" variable were entered into the model. For clarity, only the significant vector is shown.

* $p \leq .05$. ** $p \leq .01$.

Multivariate analyses

Principal components analysis was performed on the 18 candidate predictor variables identified in the bivariate analyses. PCA was used as a heuristic exploratory tool to summarize the correlational structure among the independent variables, and to aid in model specification. Consequently, the PCA scores are not reported, nor were they used in subsequent data analyses. The first nine principal components accounted for 68% of the total variance among the independent variables, and divided the predictors of protected sex exchange events into distinct components (see Table III). Diagnostic statistics (VIF and Tolerance) revealed no underlying collinearity among the 18 independent variables (Table III).

As shown in Table IV, the use of forward, backward, or stepwise model selection techniques resulted in two overlapping, but distinct, final models. Forward and stepwise selection produced a final model (Model A) that included (1) event occurred at client's place, (2) respondent used cocaine at event, (3) kissing occurred at event, (4) respondent had primary sex partner at time of event, (5) client "very much" wanted to reduce his risk for HIV, and (6) condom use was discussed at event. By contrast, backward selection generated a final model (Model B) that included the last four variables (3–6) from Model A, as well as (7) respondent felt "very much" in control of condom use at event, and (8) respondent was a crack user. Moreover, when the variable *cocaine was used at event* was removed from the initial model, forward and stepwise selection techniques produced Model B.

The occurrence of the two overlapping models can be explained, in part, by the relationship among several of the variables. It can be seen with reference to Table III that *respondent's use of cocaine at event* and *control of condom use by respondent* both load heavily on the first principal component due to a negative correlation between these variables—respondents report less control of condom use when using cocaine during sex exchange. Similarly, *cocaine use at event* and *respondent was a crack-cocaine user* both load heavily on the third principal component due to a positive correlation between these variables—respondents who were crack users were more likely to use cocaine during the sex exchange event. When *cocaine use at event* is added to the model first, as in forward or stepwise model selection, this variable accounts for a portion of the variance of the dependent variable also accounted for by the *control* and *crack user* variables, and the association of these variables with the dependent variable is weakened. By contrast, when *cocaine use at the event* is removed from the model, *respondent's control of condom use* retains its significant relationship with the dependent variable.

This pattern suggests that the relationship between respondent's cocaine use and the use of condoms during sex exchange events is mediated by the respondent's control over condom use (i.e., cocaine use affects control which influences condom use). To confirm this mediation hypothesis, the variables must meet three conditions (Baron and Kenny, 1986). First, the independent variable (*respondent's cocaine use at event*) must significantly account for variation in the presumed mediator (*respondent's level of control*), a condition that is met according to the log likelihood test

(OR = .083, $p < .01$). Second, the presumed mediator (*respondent's level of control*) must significantly account for variation in the outcome variable (*condom use at event*), a condition that is also met: (OR = 4.97, $p < .01$). And third, when the preceding associations are controlled for, there must be a significant decrease in the proportion of variance in the outcome (*condom use at event*) accounted for by the independent variable (*respondent's cocaine use at event*); and this final condition is also met in accordance with the log likelihood ratio test ($D = 75.3$, $p < .01$). Thus, empirical evidence indicates that women's cocaine use can influence condom-use practices during sex exchange by altering their level of control.

Respondent's self-reported motives for condom use

Respondents who engaged in unprotected sex during their most recent sex exchange event were asked why they did not use a condom. The most frequently given reasons for not using a condom with exchange partners involved women's reports of client attitudes or characteristics: "client didn't feel like using a condom" (50%), "using a condom would decrease client's sexual pleasure" (44%), and "client was not infected with HIV/STI" (38%). This supports previous research indicating that male clients, rather than women exchangers, have more influence over condom use during exchange (Leonard, 1990). Responses involving women's affect were also common, including: "got caught up in the moment" (35%), "didn't feel like it/too much trouble" (32%), "decreases my sexual pleasure" (27%), and "I was too drunk or high to care" (18%). Unavailability of condoms was a further barrier to protected sex during exchange for some women (29%). Women also reported client's refusal to wear a condom (24%) and client's anger at the request for condom use (21%) as reasons for not having protected sex. About one in five women stated that one reason for not using a condom was that they had "known the client for a long time" (21%).

Discussion

The "last event" methodology was used in this study because it minimizes recall bias and eliminates generalizations over time. Information on the context of sex exchange practices is rarely obtained in traditional risk behavior surveys. In contrast, our respondents were asked to provide a detailed description of the setting and social context in which the behavior occurred. However, there are limitations to the method that must be noted. First, it is not possible to obtain a random sample of street recruited women who exchange sex for money or drugs. Moreover, data regarding recent sex exchange events are self-reported; and, while we feel the

use of the "most recent event" reporting strategy minimized recall and generalizations, the data may be subject to other reporting biases. For example, socially desirable response bias is always a concern when dealing with stigmatized behavior. The median age of the women in this sample was 37 years, and the results may not generalize to younger women sex exchangers. It should also be noted that our sample of female sex exchangers was very heterogeneous, and included a variety "subgroups" such as street prostitutes, women who exchange sex for crack or heroin, and women who exchange sex infrequently for needed resources. Our limited sample size prohibited analyses to identify these subcategories and their potential association with protective behavior. Finally, the size of our sample provided sufficient power (80% or greater) to detect only relatively large effect sizes (Cohen, 1988); thus, variables with small to medium effects on sex exchange practices may not have been detected in the present study. We therefore only address significant predictors in the discussion section, and we do not assume that non-significance indicates no effect. Conversely, given the large number of inferential tests in the analyses, one must consider predictors with borderline p -values with some degree of caution. Our small sample size and limited power further preclude tests of significant interaction terms in the final model. Nonetheless, we believe these data have some important implications for research and prevention efforts targeting marginalized urban women who exchange sex.

Our analyses revealed that client-centered factors such as client motivation and client–respondent discussions regarding condom use are key determinants of protective behavior in the context of sex exchange. Sex exchange events in which clients "very much" wanted to reduce their risk for HIV (as perceived by respondents) were five to eight times more likely to involve condom use compared to events in which clients were perceived as less motivated to reduce risk. In addition, the most common reason given by respondents for not using a condom at their last sex exchange event was that the client did not want to (or refused to) use a condom. These findings suggest a particularly strong influence on condom-use practices by the client, a finding documented in several previous studies (e.g., Aral and St. Lawrence, 2002; Elifson, Boles, Darrow, and Sterk, 1999; Vanwesenbeeck, de Graaf, van Zessen, Straver, and Visser, 1993). One implication for HIV/STI prevention is the development of client-focused interventions, but serious challenges remain with regard to the implementation of such programs (Leonard *et al.*, 2000).

It is of interest to note that women's perceived control over condom use predicted safe sex practices independently of client's motivation for protective behavior (see Model B, Table IV). Control and self-efficacy for condom use has most often been conceptualized as a static characteristic of individuals, rather than a

capacity that changes in accordance with partnership dynamics and context (Albarracin, Kumkale, and Johnson, 2004; Tortu *et al.*, 2000b). Women's control over condom use during any given sexual exchange encounter can be influenced by myriad factors (Fernandez-Esquer, Atkinson, Diamond, Useche, and Mendiola, 2004; Sanders-Phillips, 2002), including social contextual factors such as the threat or act of physical violence (El-Bassel, Witte, Wada, Gilbert, and Wallace, 2001; Romero-Daza, Weeks, and Singer, 2003). In the sample of sex exchange events examined here, our analysis indicate that cocaine consumption during exchange events influenced condom-use practices by affecting women's level of control. Thus, we provide evidence in support of a direct contextual link between women's cocaine use, lack of perceived control over condom use, and risk behavior during sex exchange.

The relative influence and control exerted over condom use by women sex exchangers and their clients is at the center of several other significant determinants of risk behavior identified in this study—location of exchange event and client–respondent discussion of condom use. Sex exchange events that occurred at the client's residence were less likely to involve condom use compared to events that occurred in other settings. Previous research has shown that sex exchange in brothels tends to involve lower risk compared to other locations (Pyett and Warr, 1997). Both findings might suggest that women wield less control over condom use in unfamiliar or unregulated settings. Alternatively, location of event might be correlated with some important client or relationship attribute influencing condom use. Cusick (1998), for example, found that sex exchange encounters at prostitutes' homes were less likely to involve condom use, but that clients with whom these encounters were enacted had special relationships or arrangements with the women. A similar finding was reported by Hansen, Lopez-Iftikhar, and Alegria, (2002) in a qualitative study of Puerto Rican sex workers. This might also help explain the observed association between kissing and unprotected intercourse at women's most recent exchange events. Kissing was associated with closeness to client, although closeness was not a significant predictor of condom use in bivariate analysis.

Client–respondent discussion of safe sex was also a strong predictor of condom use at last sex exchange event. Discussion and negotiation of condom use has also been identified as an important predictor of protective behavior with *non-exchange* male partners (Carter, McNair, Corbin, and Williams, 1999; Catania *et al.*, 1992; Choi, Wojcicki, and Valencia-Garcia, 2004; de Visser and Smith, 2001; Kordoutis, Loumakou, and Sarafidou, 2000; Moore, Harrison, Kay, Deren, and Doll, 1995; Tortu *et al.*, 2000b; Williams, Gardos, Ortiz-Torres, Tross, and Ehrhardt, 2001; Wingood and DiClemente, 1997). So much so, that con-

dom negotiation skills training is now routinely included in most HIV/STI prevention programs for women. However, these skills-building sessions typically address issues surrounding condom negotiation with intimate partners, which are very different from those involving exchange partners. Rather than centering on issues of love, trust, and intimacy, so important to discussions of condom use in primary relationships, condom negotiation during sex exchange encounters typically involve economic and survival considerations (Oladosu, 2005). Prior research has shown that non-use of condoms can be a critical bargaining tool used by women to procure additional drugs or money from exchange partners (Hansen *et al.*, 2002; Wojcicki and Malala, 2001). Despite the importance of condom-use negotiations on the sexual risk behaviors of female exchangers and their clients, and more than a decade after McKeganey's (1994) call for "... better information on the specifics of prostitute/client negotiations" (p. 1222), we still know very little about the content and context of these critical discussions. In order for HIV/STI prevention programs targeting female sex exchangers to be successful, a greater understanding of women's control or lack of control over sexual practices in various social contexts will be required.

The finding that having a primary heterosexual partner at the time of the event was associated with women's non-use of condoms during sex exchange was somewhat unexpected. Numerous studies have shown that condom use among intimate partners is generally much lower than among exchange partners (Macaluso, Demand, Artz, and Hook, 2000). Some researchers have posited that condom use has come to symbolize and demarcate commercial from private sex in the lives of female prostitutes (e.g., van den Hoek, Coutinho, van den Haastrecht, van Zandehoff, and Goudsmit, 1988; Waddell, 1996; Warr and Pyett, 1999). Others view differential condom use as a practical consequence of women's perceived risk from different types of partners, rather than a symbol that, by itself, confers meaning (Cusick, 1998). Our results do not support either of these hypotheses. One possible explanation is that women who provide monetary support for their primary partners may resort to non-use of condoms during sex exchange as a way of eliciting more money from clients. Currently, the influence of primary partnerships and other social relationships on women's sex exchange practices is not well understood.

In summary, the majority of sex exchange events reported by women drug-users in East Harlem involved consistent condom use. Our findings indicate, however, that social and contextual factors place some women sex exchangers at increased risk for HIV and other pathogens. Multivariate analyses revealed eight relationship-specific and situation-specific variables that independently predicted sexual risk behavior during women's most recent exchange events (see Table IV). Four of these predicted *non-use* of condoms

during sex exchange, including: (1) event occurred at client's place, (2) respondent used cocaine at event, (3) kissing occurred at event, and (4) respondent had primary heterosexual partner at time of event. The other four variables predicted consistent use of condoms during sex exchange; they were: (5) client "very much" wanted to reduce his risk for HIV, (6) condom use was discussed at event, (7) respondent felt "very much" in control of condom use at event, and (8) respondent was a crack-cocaine user.

These findings suggest that the key determinants of sexual risk among women exchangers in East Harlem center around social and contextual factors. In order to inform HIV prevention programs targeted to women sex exchangers, further research is needed on the social and contextual determinants of risk, especially with regard to client influences, issues of power and control, condom-use negotiation, and factors involving drug use and dependence that adversely affect women's ability to manage protective behavior in the context of sex exchange. More research is also needed to distinguish among contextual subtypes of sex exchange practices and elucidate the variety and nature of exchange relationships that influence women's risk behavior.

Acknowledgements This research was funded by NIDA grant # R01 DA10864 (S. Tortu, P.I.). Data from an earlier version of this study were presented at the AIDS Impact Conference, Ottawa, July 1999. The authors thank our capable project staff: Sherelle Bonaparte, Hanifah Burns, Jeanne Campbell, Audrey Grandy-Lampkin, Christine Ramos, Leilani Torres, and Leonora Wengraf. Jeanine Botta provided technical assistance. We especially thank the women of East Harlem who participated in this study.

References

- Albarracin, D., Kumkale, G. T., and Johnson, B. T. (2004). Influences of social power and normative support on condom use decisions: A research synthesis. *AIDS Care*, *16*, 700–723.
- Aral, S. O., and St. Lawrence, J. S. (2002). The ecology of sex work and drug use in Saratov Oblast, Russia. *Sexually Transmitted Diseases*, *29*, 798–805.
- Bailey, S. L., Camlin, C. S., and Ennett, S. T. (1998). Substance use and risky sexual behavior among homeless and runaway youth. *Journal of Adolescent Health*, *23*, 378–388.
- Baron, R. M., and Kenny, D. A. (1986). The moderators-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182.
- Carter, J. A., McNair, L. D., Corbin, W. R., and Williams, M. (1999). Gender differences related to heterosexual condom use: The influence of negotiation styles. *Journal of Sex and Marital Therapy*, *25*, 217–225.
- Catania, J. A., Coates, T. J., Kegeles, S., Thompson-Fullilove, M., Peterson, J., Marin, B., et al. (1992). Condom use in multi-ethnic neighborhoods of San Francisco: The population-based AMEN (AIDS in multi-ethnic neighborhoods) study. *American Journal of Public Health*, *82*, 284–287.
- Centers for Disease Control and Prevention. (1987). *Antibody to human immunodeficiency virus in female prostitutes* (Morbidity and Mortality Weekly Report, No. 11).
- Chatterjee, S., Hadi, A. S., and Price, B. (2000). *Regression analysis by example*. New York: Wiley.
- Choi, K. H., Wojcicki, J., and Valencia-Garcia, D. (2004). Introducing and negotiating the use of female condoms in sexual relationships: Qualitative interviews with women attending a family planning clinic. *AIDS and Behavior*, *8*, 251–261.
- Cohen, J. (1988). In J. Cohen (Ed.), *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cusick, L. (1998). Non-use of condoms by prostitute women. *AIDS Care*, *10*, 133–146.
- de Graaf, R., Vanwesenbeeck, I., Van Zessen, G., Straver, C. J., and Visser, J. H. (1992). Condom use and sexual behaviour in heterosexual prostitution in the Netherlands. *AIDS*, *6*, 1223–1226.
- de Visser, R., and Smith, A. (2001). Relationship between sexual partners influences rates and correlates of condom use. *AIDS Education and Prevention*, *13*, 413–427.
- Deren, S., Sanchez, J., Shedlin, M., Davis, W. R., Beardsley, M., Des Jarlais, D., et al. (1996). HIV risk behaviors among Dominican brothel and street prostitutes in New York City. *AIDS Education and Prevention*, *8*, 444–456.
- Des Jarlais, D., Friedman, S. R., Goldsmith, D., and Hopkins, W. (1990). In B. R. Voeller and J. M. Reinisch (Eds.), *Heterosexual transmission of human immunodeficiency virus from intravenous drug users: Regular partnerships and prostitution* (pp. 245–256). New York: Oxford University Press.
- Dorfman, L. E., Derish, P. A., and Cohen, J. B. (1992). Hey girlfriend: An evaluation of AIDS prevention among women in the sex industry. *Health Education Quarterly*, *19*, 25–40.
- Edlin, B. R., Irwin, K. L., Faruque, S., McCoy, C. B., Word, C., Serrano, Y., et al. (1994). Intersecting epidemics: Crack cocaine use and HIV infection among inner-city young adults. *New England Journal of Medicine*, *331*, 1422–1427.
- El-Bassel, N., Witte, S. S., Wada, T., Gilbert, L., and Wallace, J. (2001). Correlates of partner violence among female street-based sex workers: Substance abuse, history of childhood abuse, and HIV risks. *AIDS Patient Care and STDS*, *15*, 41–51.
- Elifson, K. W., Boles, J., Darrow, W. W., and Sterk, C. E. (1999). HIV seroprevalence and risk factors among clients of female and male prostitutes. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology*, *20*, 195–200.
- Fernandez-Esquer, M. E., Atkinson, J., Diamond, P., Useche, B., and Mendiola, R. (2004). Condom use self-efficacy among U.S. and foreign-born Latinos in Texas. *Journal of Sex Research*, *41*, 390–399.
- Goldstein, P., Ouellet, L., and Fendrich, M. (1992). From bag brides to skeezers: A historical perspective on sex-for-drugs behavior. *Journal of Psychoactive Drugs*, *23*, 349–361.
- Hansen, H., Lopez-Iftikhar, M. M., and Alegria, M. (2002). The economy of risk and respect: Accounts by Puerto Rican sex worker of HIV risk taking. *The Journal of Sex Research*, *39*, 292–301.
- Inciardi, J. (1995). Crack, crack house sex, and HIV risk. *Archives of Sexual Behavior*, *24*, 249–269.
- Jackson, L., Highcrest, A., and Coates, R. A. (1992). Varied potential risks of HIV infection among prostitutes. *Social Science and Medicine*, *35*, 281–286.
- Kerrigan, D., Ellen, J. M., Moreno, L., Rosario, S., Katza, J., Celentano, D. D., et al. (2003). Environmental-structural factors significantly associated with consistent condom use among

- female sex workers in the Dominican Republic. *AIDS*, 17, 415–423.
- Kordoutis, P. S., Loumakou, M., and Sarafidou, J. O. (2000). Heterosexual relationship characteristics, condom use and safe sex practices. *AIDS Care*, 12, 767–782.
- Kwiatkowski, C. F., and Booth, R. E. (2000). Differences in HIV risk behaviors among women who exchange sex for drugs, money, or both drugs and money. *AIDS and Behavior*, 4, 233–240.
- Leonard, L., Ndiaye, I., Kapadia, A., Eisen, G., Diop, O., Mboup, S., et al. (2000). HIV prevention among male clients of female sex workers in Kaolack, Senegal: Results of a peer education program. *AIDS Education and Prevention*, 12, 21–37.
- Leonard, T. L., Freund, M., and Platt, J. J. (1989). Behavior of clients of prostitutes. *American Journal of Public Health*, 79, 903.
- Leonard, T. L. (1990). Male clients of female street prostitutes: Unseen partners in sexual disease transmission. *Medical Anthropology Quarterly*, 4, 41–55.
- Lyons, C., and Fahmer, R. (1990). HIV in women in the sex industry and/or injection drug users. *NAACOG Clinical Issues in Perinatal and Women's Health Nursing*, 1, 33–40.
- Macaluso, M., Demand, M. J., Artz, L. M., and Hook, E. W. III. (2000). Partner type and condom use. *AIDS*, 14, 537–546.
- Mallory, C., and Stern, P. N. (2000). Awakening as a change process among women at risk for HIV who engage in survival sex. *Quality Health Research*, 10, 581–594.
- McKeganey, N. P. (1994). Prostitution and HIV: What do we know and where might research be targeted in the future? *AIDS*, 8, 1215–1226.
- Moore, J., Harrison, J. S., Kay, K. L., Deren, S., and Doll, L. S. (1995). Factors associated with Hispanic women's HIV-related communication and condom use with male partners. *AIDS Care*, 7, 415–427.
- Oladosu, M. (2005). Consistent condom use dynamics among sex workers in Central America: 1997–2000. *Journal of Biosocial Science*, 37, 435–457.
- Parrado, E. A., Flippen, C. A., and McQuiston, C. (2004). Use of commercial sex workers among Hispanic migrants in North Carolina: Implications for the spread of HIV. *Perspectives in Sexual Reproduction and Health*, 36, 150–156.
- Pyett, P. M., and Warr, D. J. (1997). Vulnerability on the streets: Female sex workers and HIV risk. *AIDS Care*, 9, 539–547.
- Rissel, C. E., Richters, J., Grulich, A. E., de Visser, R. O., and Smith, A. M. (2003). Sex in Australia: Experiences of commercial sex in a representative sample of adults. *Australian and New Zealand Journal of Public Health*, 27, 191–197.
- Romero-Daza, N., Weeks, M., and Singer, M. (2003). "Nobody gives a damn if I live or die": Violence, drugs, and street-level prostitution in inner-city Hartford, Connecticut. *Medical Anthropology*, 22, 233–259.
- Rosenberg, M. J., and Weiner, J. M. (1988). Prostitutes and AIDS: A health department priority? *American Journal of Public Health*, 78, 418–423.
- Sanders-Phillips, K. (2002). Factors influencing HIV/AIDS in women of color. *Public Health Reports*, 117(Suppl. 1), S151–S156.
- Sterk, C. (1988). Cocaine and HIV seropositivity. *Lancet*, 1, 1052–1053.
- Surratt, H. L., and Inciardi, J. A. (2004). HIV risk, seropositivity and predictors of infection among homeless and non-homeless women sex workers in Miami, Florida, USA. *AIDS Care*, 16, 594–604.
- Tortu, S., Beardsley, M., Deren, S., Williams, M., McCoy, H. V., Stark, M., et al. (2000a). HIV infection and patterns of risk among women drug injectors and crack users in low and high sero-prevalence sites. *AIDS Care*, 12, 65–76.
- Tortu, S., McMahan, J., Hamid, R., and Neaigus, A. (2000b). Drug-using women's sexual risk: An event analysis. *AIDS and Behavior*, 4, 329–340.
- Tortu, S., McMahan, J. M., Hamid, R., and Neaigus, A. (2003). Women's drug injection practices in East Harlem: An event analysis in a high-risk community. *AIDS and Behavior*, 7, 317–328.
- van den Hoek, J., Coutinho, R. A., van den Haastrecht, H. J. A., van Zandehoff, A. W., and Goudsmit, J. (1988). Prevalence and risk factors of HIV infections among drug users and drug using prostitutes in Amsterdam. *AIDS*, 2, 55–60.
- Vanwesenbeeck, I., de Graaf, R., van Zessen, G., Straver, C. J., and Visser, J. H. (1993). Protection styles of prostitutes' clients: intention, behavior, and considerations in relation to AIDS. *Journal of Sex Education and Therapy*, 19, 79–92.
- Vanwesenbeeck, I. (2001). Another decade of social scientific work on sex work: A review of research 1990–2000. *Annual Review of Sexual Research*, 12, 242–289.
- Waddell, C. (1996). HIV and the social world of female commercial sex workers. *Medical Anthropology Quarterly*, 10, 75–82.
- Warr, D. J., and Pyett, P. M. (1999). Difficult relations: Sex work, love and intimacy. *Sociology of Health and Illness*, 21, 290–309.
- Watters, J., and Biernacki, P. (1989). Targeted sampling: Options for the study of hidden populations. *Social Problems*, 6, 416–430.
- Weeks, M. R., Grier, M., Romero-Daza, N., Puglis-Vasquez, M. J., and Singer, M. (1998). In S. Stevens, S. Tortu, and S. Coyle (Eds.), *Streets, drugs and the economy of sex in the age of AIDS* (pp. 205–229). New York: Hayworth Press.
- Williams, S. P., Gardos, P. S., Ortiz-Torres, B., Tross, S., and Ehrhardt, A. A. (2001). Urban women's negotiation strategies for safer sex with their male partners. *Women and Health*, 33, 133–148.
- Wingood, G. M., and DiClemente, R. J. (1997). The effects of an abusive primary partner on the condom use and sexual negotiation practices of African-American women. *American Journal of Public Health*, 87, 1016–1018.
- Wojcicki, J. M., and Malala, J. (2001). Condom use, power and HIV/AIDS risk: Sex-workers bargain for survival in Hillbrow/Joubert Park/Berea, Johannesburg. *Social Science and Medicine*, 53, 99–121.