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Consistency of Condom Use during Receptive Anal Intercourse Among Women and Men Who Have Sex with Men (MSM): Findings from the Safe in the City Behavioral Study

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Safe in the City Study Group

Abstract

Background.—Unprotected receptive anal intercourse poses HIV risk for men who have sex with men (MSM) and heterosexual women. Little is known about differences in consistent condom use during anal intercourse among these populations.

Methods.—Data were analyzed from a nested study conducted from 2004-2005 within a behavioral intervention trial of approximately 40,000 urban U.S. STD clinic patients. Analyses were restricted to women and MSM who reported receptive anal intercourse with ≥1 partner in the prior 3 months at baseline or 3-month follow-up surveys. Condom use was categorized as consistent (100% of receptive acts) or inconsistent/nonuse (0-99% of receptive acts). Multivariable regression with general estimating equations was used to identify factors associated with consistent condom use within each population.

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Results.—Approximately 31% of women and 70% of MSM reported receptive anal intercourse at least once in the past 3 months. MSM were significantly more likely to report consistent condom use compared to women. For women, intention to use condoms, partner support for condom use, the belief they could stop having sex when condoms were unavailable, and believing their partner had not given them a sexually transmitted infection (STI) were associated with using condoms consistently. For MSM, intention to use condoms, condom use self-efficacy, perceived partner support for condom use, having a non-main partner, believing their partner had not given them an STI, and fewer sex acts were associated with consistent condom use.

Conclusions.—Findings confirm the importance of considering anal intercourse when assessing STI/HIV risk in MSM and heterosexual women.

SHORT SUMMARY:

A study of urban U.S. STD clinic clients found that condom use during receptive anal intercourse was relatively uncommon and should be considered when assessing STI/HIV risk factors among both MSM and women.

Keywords

condom use; anal intercourse; STI/HIV prevention; heterosexual women; MSM

INTRODUCTION

Considerable research has focused on addressing unprotected anal intercourse among men who have sex with men (MSM) as a significant risk factor for HIV and sexually transmitted infections (STIs), given that MSM bear the overwhelming burden of the U.S. HIV epidemic.[1–4] Research on heterosexual behaviors associated with acquisition of STIs, including HIV, however, has almost exclusively focused on vaginal intercourse.[5, 6] Nonetheless, given that most women living with HIV in the U.S. were infected due to sexual contact with a high-risk male heterosexual, anal intercourse has increasingly been recognized as an area of relevant research inquiry.[7–10]

National estimates from NSFG indicate 36% of women aged 25-44 report ever having had anal intercourse,[11] and studies have found up to 10% of heterosexual men and women did so in the previous year.[12] In one study, 38% of heterosexual women from high-risk areas in New York reported unprotected anal intercourse in the past year (n=436).[3] Additionally, increasing evidence suggests that anal intercourse may be part of a repertoire of normative sexual behavior among adolescents and young adults.[13]

Unprotected receptive anal intercourse is a particularly efficient method for HIV (and other STI) transmission when compared to vaginal intercourse for women[3, 6, 13–17] due to increased likelihood of mucosal disruption and trauma within the rectum compared to the vaginal lining.[3, 18] The estimated probability for HIV infection per act of unprotected receptive anal intercourse is 5 times that per act of unprotected vaginal intercourse.[3, 19, 20]

The risk associated with anal intercourse is compounded by infrequent condom use by heterosexual adults and adolescents for anal intercourse when compared to vaginal

intercourse, and when compared to anal intercourse among MSM. Studies have also highlighted the absence of pregnancy risk and poor understanding of the STI/HIV risks associated with anal intercourse as factors contributing to infrequent condom use.[5, 7, 9, 13, 21]

Recent research also has focused on developing a better understanding of the factors associated with inconsistent condom use and problems during use (i.e., breakage, slippage, or partial use [delayed application or early removal]) among U.S. men who have sex with men.[4, 22–25] In our previous examination of condom use for receptive and insertive anal intercourse within a sample of MSM STD clinic patients, in nearly half (43%) of partnerships condoms were not used, and another 11% involved only inconsistent use.[26] Inconsistent condom use for anal intercourse among MSM has been associated with beliefs that pre-ejaculatory fluid poses no or minimal risk for HIV/STI transmission or that only rectal trauma poses HIV risk resulting in the false sense of security that brief penetration without protection is a safe behavior.[22, 23] Further, MSM report heightened perceived risk for HIV/STIs and more consistent condom use within non-main partnerships.[26, 27]

In the present analysis, we examined individual respondent, partner, and partnership-related factors among women and MSM that influence the decision to use condoms during receptive anal intercourse. Specifically we: 1) determined the prevalence of receptive anal intercourse in a sample of urban U.S. STD clinic patients; 2) assessed differences in condom use consistency for receptive anal intercourse only among heterosexual women and MSM; and 3) examined characteristics and cognitive factors associated with condom use consistency for receptive anal intercourse and how these factors differ for women and MSM.

MATERIALS AND METHODS

Data were analyzed from the *Safe in the City* behavioral study, a nested component of a larger trial evaluating the effects of a video-based waiting room intervention modeling couples overcoming barriers to safer sexual behaviors on STI incidence among patients (N=38,635) attending participating clinics.[28]

Recruitment:

Participants in the behavioral study (n=1609) were clinic attendees recruited from STD clinics in 3 cities (Denver, Long Beach, and San Francisco) between June 2004 and May 2005. Participants were eligible patients who were at least 18 years of age, not diagnosed with a condition that required multiple follow-up visits (e.g., genital herpes, HIV/AIDS), not previously exposed to the intervention, in the clinic waiting room for at least 20 minutes, and sexually active in the previous three months. Audio computer-assisted self-interview (ACASI) surveys were administered immediately following the initial clinical exam ("index visit") and at 3-months follow-up. Both assessments measured behaviors during the previous 3 months and were included in analyses. Women and MSM who reported *receptive* anal intercourse with at least one partner at baseline or at the 3-month follow-up survey were assigned to "any anal intercourse," and men who reported no male sexual partners were excluded from these analyses. The institutional review boards at each site and the Centers for Disease Control and Prevention reviewed and approved the study protocol.

Measures:

Condom use behavior during receptive anal intercourse was defined as consistent (100% of acts) or inconsistent/nonuse (0-99%) in the past 3 months. The following individual-level and partner- and partnership-specific variables were examined to assess their relationships with condom use consistency: *Individual-level variables*: Demographic variables (respondent age, race/ethnicity, education level, marital status), respondent STI history (past 3 months), perceived risk for STI/HIV, STI knowledge, number of sex partners (past 3 months), and other cognitive variables (condom application knowledge, condom use beliefs, intention to use condoms with all partners, intention for safer-sex behaviors with all partners, comfort with obtaining condoms, and perceived ability to stop sex without condoms). *Partner-specific variables*: Whether respondent's partner had other sex partners, was perceived to have given the respondent an STI, and was supportive of using condoms. *Partnership-specific variables*: Number of anal intercourse acts within the partnership (past 3 months), condom use self-efficacy, whether respondent was drunk or high on drugs during any anal intercourse act, and type of partnership (main/non-main). (For each of the three most recent sex partners in the past three months, respondents were asked if the partner was a main or another type of partner. Respondents were able to name both main and non-main partners during the same period. Partnership status could have changed during the course of the study, and the same partnerships could have been reported during multiple time periods.)

All continuous variables, except respondent age and number of sex partners, were composite variables. These variables were computed as averages of several measures using five-point Likert scoring (strongly agree to strongly disagree) or 0/1 (yes/no) responses. For instance, partner support for condom use was determined as the mean of seven items (ranging from 0 {strongly disagree} to 4 {strongly agree} including, partner would: (i) be mad at me if I asked to use condoms, (ii) be proud of me if I asked to use condoms. Where appropriate, some item responses were reverse-coded prior to computing the average. (Table 1)

Analyses:

The consistency of condom use during receptive anal intercourse was compared between women and MSM using Pearson's chi-squared test. Consistent condom use was also examined separately for women and receptive MSM for all categorical variables, using Pearson's chi-squared test or Fisher's exact test. For partner- and partnership-specific analyses, generalized estimating equations (GEE) approach was used to account for potential correlation among partnerships for the same respondent. For continuous variables, means and standard deviations were calculated for women and MSM using the two-sided Wilcoxon rank test.

Multivariable models were developed using GEE to account for possible correlations among multiple partnerships of each study participant, multiple condom uses among individuals, and the two study visits. Covariates that were significantly associated with consistent condom use during receptive anal intercourse for either group in bivariate analyses were included in multivariable modeling. Models were adjusted for age, marital status (women only), race/ethnicity, and study site. Proc *genmod* in SAS® version 9.3, Cary, NC, was employed for fitting the models. Two models (one each for women and MSM) predicting

consistent condom use during receptive anal intercourse included characteristics and cognitive factors at the *individual, partner and partnership levels.*

RESULTS

Of 1609 STD clinic patients participating in the behavioral study of the *Safe in the City* trial, there were 555 women and 263 MSM who were included for current analysis. Among female respondents, most had at least a high school education, had never been married, and were Hispanic or black (Tables 2 & 3). Most MSM respondents similarly had a high school education, though the majority was white. Women reported a total of 1436 sexual partnerships, and MSM reported 765 sexual partnerships. Approximately 31% of women and 70% of MSM reported receptive anal intercourse at least once in the past 3 months. Overall, women reported receptive anal intercourse within 254 (17.7%) partnerships, and MSM within 425 (55.6%) partnerships. Of female partnerships where receptive anal intercourse occurred, 195 partnerships (76.8%) involved inconsistent/nonuse of condoms for receptive anal intercourse, whereas condoms were used consistently in 59 (23.2%) partnerships. Of MSM partnerships where anal intercourse was reported, inconsistent/nonuse of condoms for receptive anal intercourse occurred in 233 (54.8%) partnerships whereas consistent use was reported in 192 (45.2%) partnerships. The percentage of partnerships with consistent condom use during receptive anal intercourse was significantly higher in MSM compared to women (chi-square=32.87, $p<0.0001$). (Table 3)

Bivariate analyses identified a number of individual, partner- and partnership-specific variables that were associated with consistent condom use during receptive anal intercourse separately for women and MSM, and female and MSM partnerships. (Tables 2 & 4)

Multivariable results:

Multivariable analysis revealed several characteristics associated with consistent condom use during receptive anal intercourse. For women, the intention to use condoms with all partners (adjusted OR=2.8; CI:1.3-6.3), belief that respondents could stop having sex in situations when condoms were unavailable (adjusted OR=1.8;CI:1.0-3.2), belief that their partner had not given them an STI (adjusted OR=3.0;1.0-9.0), and partner support for condom use (adjusted OR=1.7; CI:1.0-3.0) were associated with consistent condom use for receptive anal intercourse. For MSM, higher intention to use condoms with all partners (adjusted OR=5.1;CI:2.8-9.5), perceived partner support for condom use (adjusted OR=2.2; CI:1.4-3.5), having a partner who was not a main partner (adjusted OR=4.3;CI:2.2-8.6) or who was not believed to have given the respondent an STI (adjusted OR=2.3;CI:1.3-4.0) were associated with consistent condom use for receptive anal intercourse. Additionally, fewer number of anal intercourse acts (adjusted OR=3.7; CI:1.6-8.7), and condom use self-efficacy in the partnership (adjusted OR=1.5; CI:1.0-2.5) were also associated with increased odds of consistent condom use during receptive anal intercourse among MSM (Table 5).

DISCUSSION

Almost one-third of female and nearly three-quarters of MSM participants in the *Safe in the City* trial reported engaging in receptive anal intercourse during the preceding 3-months. Consistent condom use during receptive anal intercourse was significantly lower for female respondents than MSM respondents. However, even among MSM, consistent condom use for receptive anal intercourse was less than optimal. We have previously reported inconsistent condom use among MSM who participated in the *Safe in the City* evaluation for all anal intercourse (insertive and receptive), highlighting HIV/AIDS-related morbidity and mortality and the prevention efforts targeted to this group.[26] Overall, these results suggest that innovative efforts to increase consistent condom use by MSM are needed.

Our findings provide additional information about cognitive factors that influence decisions to use condoms during receptive anal intercourse. Factors associated with consistent condom use during receptive anal intercourse differed markedly between women and men who have sex with men, with three exceptions: intention to use condoms with all partners, partner support for condom use, and the belief that the partner did not give the respondent an STI. Thus, intervention efforts focused on increasing condom use intention with all partners and strategies for developing partner support for condom use may be beneficial for both groups. The fact that condom use was associated with believing one's partner had not given the respondent an STI is possibly attributable to the fact that data were collected retrospectively. In the cases where respondents used condoms consistently with a particular partner, they likely believed they were not at risk for contracting an STI from that partner due to the perceived effectiveness of the condom.

Unique to women was the ability to discontinue sex when a condom was not available, which was significantly associated with consistent use for anal intercourse. Thus, emphasizing skills-based condom use counseling that focuses on delayed gratification techniques may be beneficial, as condoms may not always be available. For MSM, condom use self-efficacy in the partnership was significantly predictive of consistent use during receptive anal intercourse, which underscores the importance of context of sexual partnerships when promoting condom use strategies. The finding that condoms were used more consistently with non-main partners by MSM has been previously reported in the literature.[27]

There are some limitations to our findings. First, the present analysis relied on self-reports of receptive anal intercourse from the prior 3-months. Although this time frame has been employed for evaluating anal intercourse in other studies,[28–30] it may be subject to error particularly among individuals who engage in anal intercourse repeatedly with multiple partners. Further, there are limitations inherent within studies that rely on self-reported behavioral data for recall of sensitive behaviors, particularly during studies of HIV/STI behavioral interventions. Another potential limitation is that the *Safe in the City* trial was conducted approximately 10 years ago. However, more recent studies continue to affirm that consistent use for anal intercourse remains a public health priority as women and MSM continue to use condoms infrequently for receptive anal intercourse, even with high risk partners.[10] Finally, our results may not be generalizable to all women or MSM outside of the

STD clinic setting or, including HIV-positive patients who were excluded from the *Safe in the City* trial.

Anal intercourse has rarely been discussed openly in health care or research settings as an HIV risk factor for heterosexual women likely due to cultural taboos and stigma resulting from its association with homosexuality and the perception that it represents unhygienic behavior.[6, 21] Several public health practice recommendations emerge from this work. First, given that a high proportion of persons attending STD clinics reported recent anal intercourse, clinicians should screen patients for exposure in the past 3 months, and consider screening patients for infection. The U.S. Center for Disease Control and Prevention recommends screening persons at risk for rectal chlamydial or gonococcal infection. Second, sexual health education and disease prevention programs should include a discussion of anal intercourse, its role in health and disease transmission, and opportunities to reduce the risk of HIV and STI transmission during anal intercourse with interventions such as routine screening for infection, condom use, use of lubricants and pre-exposure prophylaxis (PrEP). Condom use counseling should consider barriers and facilitators unique to receptive anal intercourse and tailored to aspects of particular sexual partnerships such as those shown to be associated with consistent condom use in our study for each population. For example, our findings suggest that improving self-efficacy for condom use and the ability to effectively discuss the need for condom use during anal intercourse with a partner may help facilitate condom use for both women and MSM. Finally, more research is needed to better understand motivations for anal intercourse among heterosexual men, women, and MSM, as those findings might inform prevention interventions.

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Table 1:

Measures used for bivariate and multivariable analyses (Standardized Cronbach's alpha is given for each ordinal composite variable measured on the five-point Likert scale)

PARTNER SUPPORT FOR CONDOM USE	**Scored as: average of the following responses to the 7 items listed** 0 Strongly Disagree; 1 Disagree; 2 Neither Agree nor Disagree; 3 Agree; 4 Strongly Agree Most recent sex partner would be mad at me if I asked to use condoms. *(reverse coded)* Most recent sex partner would be proud of me if I asked to use condoms. Most recent sex partner would break up with me if I asked to use condoms. *(reverse coded)* Most recent partner would be supportive if I asked to use condoms. Most recent partner would think I have other partners if I asked to use condoms. *(reverse coded)* Most recent partner would appreciate it if I asked to use condoms. Most recent partner would be jealous if I asked to use condoms. *(reverse coded)*
Cronbach's alpha = 0.88	
PERCEIVED STI/HIV RISK	**Scored as: average of the following responses to the 5 items listed** 0 Strongly Disagree; 1 Disagree; 2 Neither Agree nor Disagree; 3 Agree; 4 Strongly Agree If I don't use condoms, I could get infected with an STD or HIV in the next 3 months. Unless I change my behavior, I am likely to get an STD or HIV. If I don't reduce the number of people I have unprotected sex with, I could get infected with a STD or HIV. If I keep having unprotected sex with my partner(s), I could get infected with a STD or HIV. Sometimes I think that it's only a matter of time before I get a STD or HIV.
Cronbach's alpha = 0.79	
CONDOM USE SELF-EFFICACY IN PARTNERSHIP	**Scored as: average of the following responses to the 5 items listed** 0 Strongly Disagree; 1 Disagree; 2 Neither Agree nor Disagree; 3 Agree; 4 Strongly Agree Can use a condom even if most recent sex partner does not want to. Can use a condom every time you have sex with most recent sex partner. Can use a condom even if you want to feel close with most recent sex partner. Can use condom even if you are making up with most recent sex partner after a fight. Can use condom even high or drunk with most recent sex partner.
Cronbach's alpha = 0.92	
CONDOM USE BELIEFS	**Scored as: average of the following responses to the 4 items listed** 0 Strongly Disagree; 1 Disagree; 2 Neither Agree nor Disagree; 3 Agree; 4 Strongly Agree Condoms ruin the mood. Sex doesn't feel as good when you use a condom. Sex with condoms doesn't feel natural. Using condoms breaks up the rhythm of sex.
Cronbach's alpha = 0.85	
ABILITY TO STOP SEX WITHOUT CONDOMS	**Scored as: average of the following responses to the 6 items listed** 0 Strongly Disagree; 1 Disagree; 2 Neither Agree nor Disagree; 3 Agree; 4 Strongly Agree I could stop having sex to get a condom even if I'm really turned on. I could cool off and stop having sex if no condom was available. I could stop having sex to get a condom even if it meant getting dressed and going to the store. I could stop having sex to get a condom even with a really hot new partner. I could stop having sex to get a condom even with someone I want to have a relationship with. I could stop having sex to get a condom even with someone I am in love with.
Cronbach's alpha = 0.89	
CONDOM USE INTENTIONS	**Scored as: average of the following responses to the 7 items listed** 0=I am already (using condoms every time I have vaginal sex or anal sex with a MAIN partner, etc. from each question) and plan to continue 1=I want to … every time 2=I'm not sure I want to … every time

	3=I do not want to … every time 4=I do not plan to have any sex partners in the next 3 months Do you intend to use condoms every time you have vaginal or anal sex with a MAIN partner? Do you intend to use condoms every time you have vaginal or anal sex with partners OTHER THAN a main partner? Do you intend to use condoms until your partner has been tested for HIV, and is HIV negative? Are you sure that you can use condoms until your partner has had a check-up for STDs, and doesn't have any? Do you intend to use condoms more often than in the past 3 months? Do you intend to keep condoms nearby so they will be close when you need them? Do you intend to discuss using condoms with partners?
CONDOM USE KNOWLEDGE	**Scored on following scale: 0=no, 1=yes** Space should be left at the tip of a condom. Time to put on a condom is right before a man comes or ejaculates. *(reverse coded)* When a man uses a condom, he should unroll it first and then slip it on. When women have anal sex with men, they don't need to use condoms. (reverse coded)
STI KNOWLEDGE	**Scored on following scale: 0=no, 1=yes** Some STDs can make women sterile (not able to have a baby). You can't tell if a man or woman has a STD by looking at him or her. A woman who has an STD will usually have symptoms. *(reverse coded)* A man who has an STD will usually have symptoms. *(reverse coded)* It doesn't matter what kind of lubricant you use with your condom. *(reverse coded)*
COMFORT IN OBTAINING CONDOMS	**Scored on following scale: 0=no, 1=yes** I can get condoms whenever I want without difficulty. I wouldn't mind buying condoms. I would feel uncomfortable carrying condoms with me. *(reverse coded)* I can get condoms out of a condom machine in a club or bar.
INTENTIONS FOR SAFER-SEX BEHAVIORS	**Scored as: average of the following responses to the 2 items listed** 0=I want to 1=I'm not sure I want to 2=I do not want to 3=I do not plan to have sex in the next 3 months Do you intend to have fewer sex partners in the next 3 months, than you had in the past 3 months? Do you intend to get to know new partners better before you have sex with them? **Scored as: average of the following responses to the 3 items listed** 0=I have (avoided having sex while drinking or using drugs, etc.) and I plan to continue 1=I want to… 2=I'm not sure I want to… 3=I do not want to… 4=I do not plan to … in the next 3 months Do you intend to avoid having sex when drinking or using drugs too much? Do you intend to break-up with a partner who puts you at risk of getting STDs? Do you intend to go without having sex with your partner until you have been treated and cleared?
CONSISTENT CONDOM USE	**For each partner, respondents were asked:** *"In the past 3 months, how many times in total did you have anal sex with (partner's name)?"* *"During the (# times) that you had anal sex with (partner's name), how many times did you use a condom?"* $$\frac{\text{Total number of anal sex acts with a condom}}{\text{Total number of anal sex acts}} = \%\,\text{Condom use}$$ Consistent condom use was defined as 100% condom use. Inconsistent/nonuse condom use was defined as less than 0-99% condom use.

Table 2:

Comparison of individual, partner and partnership characteristics predictive of consistency of condom use during receptive anal intercourse as reported by women and men who have sex with men (MSM) in partnerships, *Safe in the City* Trial, 2003-5.[a]

INDIVIDUAL CHARACTERISTICS: POPULATION REPORTING RECEPTIVE AI				
Covariate	**Women (N=171)**		**MSM (N=184)**	
	0%-99% #(%)	**100% #(%)**	**0%-99% #(%)**	**100% #(%)**
Education	p=0.6523		0.0102	
<HS	61(76.3)	19(23.7)	22(84.6)	4(15.4)
HS+	72(79.1)	19(20.9)	92(58.2)	66(41.8)
Marital status	0.1470[b]		0.0469[b]	
Never married	102(74.5)	35(25.5)	105(61.0)	67(39.0)
Married	13(92.9)	1(7.1)	0(0.0)	2(100.0)
Divorces/Separated/Widowed	18(90.0)	2(10.0)	8(88.9)	1(11.1)
Race/Ethnicity	0.9824		0.4575[b]	
White	46(78.0)	13(22.0)	58(58.0)	42(42.0)
Black	32(78.0)	9(22.0)	4(80.0)	1(20.0)
Hispanic	34(79.0)	9(21.0)	29(70.7)	12(29.3)
Other	21(75.0)	7(25.0)	21(58.3)	15(41.7)
STI in past 3 months	0.7660[b]		0.4859[b]	
Yes	15(83.3)	3(16.7)	7(77.8)	2(22.2)
No/don't know	117(77.5)	34(22.5)	106(60.9)	68(39.1)
PARTNER CHARACTERISTICS				
Covariate	**Women (N=254)**		**Receptive MSM (N=425)**	
	0%-99% #(%)	**100% #(%)**	**0%-99% #(%)**	**100% #(%)**
Partner has other sex partners **OR[95%CI]**	1.38 [0.76, 2.51]		1.95 [1.28, 2.97]	
Yes	74(73.3)	27(26.7)	125(48.5)	133(51.6)
No/don't know(ref)	121(79.1)	32(20.9)	108(64.7)	59(35.3)
Believe partner gave respondent STI **OR[95%CI]**	2.20 [1.02, 4.72]		1.81 [1.20, 2.75]	
Yes(ref)	65(85.5)	11(14.5)	87(63.5)	50(36.5)
No/don't know	129(72.9)	48(27.1)	145(50.5)	142(49.5)
PARTNERSHIP CHARACTERISTICS[c]				
Covariate	**Women (N=254)**		**Receptive MSM (N=425)**	
	0%-99% #(%)	**100% #(%)**	**0%-99% #(%)**	**100% #(%)**

INDIVIDUAL CHARACTERISTICS: POPULATION REPORTING RECEPTIVE AI				
Covariate	**Women (N=171)**		**MSM (N=184)**	
	0%-99% #(%)	**100% #(%)**	**0%-99% #(%)**	**100% #(%)**
Interview interval **OR[95%CI]**	1.77 [0.97, 3.25]		1.30 [0.87, 1.96]	
Baseline	120(81.1)	28(18.9)	39(57.7)	102(42.3)
Follow-up(ref)	75(70.8)	31(29.2)	94(51.1)	90(48.9)
Type of partnership **OR[95%CI]**	0.52 [0.26, 1.03]		0.26 [0.17, 0.40]	
Main	159(79.5)	41(20.5)	128(73.6)	6(26.4)
Non-main(ref)	36(66.7)	18(33.3)	105(41.8)	146(58.2)
Drunk or high during anal sex **OR[95%CI]**	0.92 [0.49, 1.73]		0.63 [0.42, 0.95]	
Yes	80(77.7)	23(22.3)	104(61.5)	65(38.5)
No(ref)	115(76.2)	36(23.8)	129(50.4)	127(49.6)
Number of anal sex acts **OR[95%CI]**	3.33 [1.13, 9.83]		7.21 [3.74, 13.92]	
1-5 acts	157(74.1)	55(25.9)	162(47.2)	181(52.8)
6 or more acts(ref)	38(90.5)	4(9.5)	71(86.6)	11(13.4)

[a] P-values are given for Pearson's chi-squared test

[b] P-values for Fisher's exact test for low cell counts

[c] Generalized estimating equations (GEE) approach was used for bivariate analysis to account for potential correlation among partnerships for the same respondent

Table 3:

Respondents, partnerships, and consistency of condom use for women and men who have sex with men (MSM) reporting receptive anal intercourse, *Safe in the City* Trial, 2003-5.

	Total # of respondents	Total # of partnerships	Total #(%) of respondents who reported AI	Total #(%) of partnerships with AI	Condom Use Consistency		chi-squared statistic df=1	P
					0%-99% use #(%)	100% use #(%)		
Women	555	1,436	171(30.8%)	254(17.7%)	195(76.8%)	59(23.2%)	32.87	<0.0001
Receptive MSM	263	765	184(70.0%)	425(55.6%)	233(54.8%)	192(45.2%)		

Table 4:

Individual, partner and partnership characteristics and cognitive factors predictive of consistency of condom use during receptive anal intercourse for women and men who have sex with men (MSM), *Safe in the City* Trial, 2003-5.[a,b]

Covariate	Women (N=171)			MSM (N=184)		
	0%-99% (N=133)	100% (N=38)		0%-99% (N=114)	100% (N=70)	
INDIVIDUAL CHARACTERISTICS	**Mean SD**	**Mean SD**	**p**	**Mean SD**	**Mean SD**	**p**
Respondent's age	27.6 ± 7.7	29.9 ± 10.5	0.3404	31.3 ± 8.7	30.9 ± 8.5	0.7047
Total number of sex partners	2.5 ± 3.3	2.8 ± 4.8	0.8774	4.9 ± 5.3	5.2 ± 7.7	0.5437
Respondent's risk for STI/HIV	2.5 ± 1.0	2.6 ± 1.1	0.3585	2.8 ± 0.9	2.6 ± 0.8	0.0549
COGNITIVE FACTORS						
Intention to use condoms with all partners	2.2 ± 0.5	2.5 ± 0.4	0.0030	2.1 ± 0.5	2.6 ± 0.5	<.0001
Intention for safer-sex behaviors with all partners	2.0 ± 0.5	2.0 ± 0.5	0.7270	1.9 ± 0.5	1.9 ± 0.6	0.7491
Condom use knowledge	0.9 ± 0.2	0.8 ± 0.2	0.5168	0.9 ± 0.1	0.9 ± 0.1	0.3035
STI knowledge	0.7 ± 0.2	0.7 ± 0.2	0.8057	0.8 ± 0.2	0.8 ± 0.2	0.8665
Comfort level in obtaining condoms	0.8 ± 0.2	0.8 ± 0.2	0.9374	0.9 ± 0.2	0.9 ± 0.2	0.7208
Condom use beliefs	2.2 ± 1.0	2.5 ± 1.0	0.0734	2.0 ± 0.9	2.5 ± 1.0	0.0010
Ability to stop having sex without condoms	2.6 ± 0.9	3.1 ± 0.8	0.0031	2.5 ± 0.9	3.1 ± 0.6	<.0001
Partner support for condom use	2.6 ± 0.9	3.0 ± 0.7	0.0131	2.6 ± 0.8	3.2 ± 0.7	<.0001
Condom use self-efficacy in the partnership	2.5 ± 1.1	3.1 ± 1.0	0.0037	2.6 ± 1.0	3.5 ± 0.7	<.0001

[a] P-values are given for two-sided Wilcoxon rank-sum test with t-approximation

[b] For some covariates, valid N is smaller than indicated due to missing values

Table 5:

Adjusted odds ratios in favor of consistent condom use during receptive anal intercourse for partnerships among women and men who have sex with men (MSM), *Safe in the City* Trial, 2003-5.[a]

Covariate	Women (N=236) Adjusted OR[95%CI]	Receptive MSM (N=412) Adjusted OR[95%CI]
RESPONDENT CHARACTERISTICS		
Education		
< HS	1.1 [0.5, 2.7]	0.8 [0.3, 1.8]
HS+	ref	ref
Total number of sex partners	1.04 [0.96,1.13]	0.98 [0.96, 1.01]
Intention to use condoms with all partners	2.8 [1.3, 6.3] [b]	5.1 [2.8, 9.5] [d]
Condom use beliefs	0.8 [0.5, 1.3]	1.3 [0.9, 1.8]
Ability to stop having sex without condoms	1.8 [1.0, 3.2] [b]	0.9 [0.5, 1.4]
PARTNER CHARACTERISTICS		
Partner has other sex partners		
Yes	2.0 [0.9,4.5]	1.4 [0.8, 2.7]
No	ref	ref
Believe partner gave respondent STI		
Yes	ref	ref
No	3.0 [1.0, 9.0] [b]	2.3 [1.3, 4.0] [c]
Partner support for condom use	1.7 [1.0, 3.0][b]	2.2 [1.4, 3.5] [d]
PARTNERSHIP CHARACTERISTICS		
Type of partnership		
Main	ref	ref
Non-main	2.0 [0.8,4.9]	4.3 [2.2, 8.6] [d]
Condom use self-efficacy in the partnership	1.4 [0.9, 2.1]	1.5 [1.0, 2.5][b]
Number of anal sex acts		
1-5 acts	2.7 [0.7, 10.9]	3.7 [1.6, 8.7] [c]
6 or more	ref	ref

[a]Odds ratios are also adjusted for age, marital status (for women but not for MSM due to no observations of married couples who used condoms inconsistently), race/ethnicity, and study site.

[b]p<0.05,

[c]p<0.01,

$d_{p<0.001}$