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Risky Sexual Behavior and Correlates of STD Prevalence Among African American HIV Serodiscordant Couples

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Abstract

This paper reports baseline behavioral and biological data collected from a cohort of 535 African American HIV serodiscordant couples enrolled in the Eban study across four urban metro areas. Data were collected on (1) the prevalence of risky sexual behaviors that occur within a couple and with concurrent sexual partners, (2) the STD prevalence for each member of the couple and (3) the correlates of STDs in the male partner as well as in the female partner. Presentation of the sociodemographic characterization and HIV risk behavior profiles of African American HIV serodiscordant couples represents an important initial description of a hidden, vulnerable population. Future research should be conducted with diverse samples of African American couples (i.e., younger couples, non-stable couples) to explore other potential correlates of STD prevalence.

Keywords

HIV; Serodiscordant; African-American couples

Introduction

Although the HIV/AIDS epidemic in the African American community continues to be a public health crisis, perhaps one subgroup that deserves special attention is African American HIV serodiscordant couples. In the US, HIV transmission risk reduction efforts for this population have been minimal. Although data indicate that condoms reduce the annual HIV transmission among HIV serodiscordant couples by 95% when used consistently [1], studies report 20–25% of serodiscordant couples engage in unprotected intercourse [2, 3]. Research also indicates that overall rates of unprotected intercourse are greater with regular partners than with non-regular partners. The rationale for these practices is unclear, but one study conducted by Wyatt et al. [4], with African American and Caucasian HIV serodiscordant couples reported that couples in this study perceived being at a low risk for HIV transmission and avoided discussing safer sex so as not to remind the infected partner of their HIV status [5]. The findings from these studies suggest significant risks for transmission of HIV in HIV serodiscordant couples. Furthermore, HIV acquisition and transmission in serodiscordant couples may be facilitated by sexually transmitted infections [6]. While several articles have examined the prevalence of STDs in HIV-infected women [7, 8] and men who have sex with men [9, 10], the prevalence of STDs and sexual risk behaviors is incompletely characterized among African American HIV serodiscordant couples. The present manuscript aims to address this gap by describing: (1) the prevalence

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of risky sexual behaviors that occur within a couple and that occur with concurrent sexual partners, (2) the STD prevalence for each member of the couple and (3) the correlates of STDs in the male partner as well as in the female partner. The provision of couples-based data, the opportunity to examine sexual behaviors from both the male and female partners' perspective is a unique scientific contribution of this manuscript.

Methods

Study Recruitment

A total of 4,389 individuals were pre-screened for possible inclusion into the study. The following are the top five reasons individuals were ineligible: 1,006 (23%) reported no incidents of unprotected intercourse in the past 90 days; 623 (14%) were seroconcordant couples; 543 (12%) could not be contacted for further screening; 328 (8%) did not have a partner; and 296 (7%) reported violence in their relationship in the past year. Of the 4,389 that were pre-screened, 1,472 individuals were further screened and provided consent for study participation, and 93% (1,374) met the study eligibility criteria. Baseline ACASI data, including demographic characteristics, were collected for 1,178 participants (85% of all eligible individuals); 1,070 (78% of those who were eligible) of these participants were subsequently randomized and 108 were not.

Study Design

The Eban study is a two-arm, couples-based randomized controlled trial of high-risk HIV serodiscordant African American couples currently underway in four cities in the US. The present article examines the baseline behavioral and biological data collected from this cohort of eligible couples. Study enrollment opened in November2003 and closed in June 2007. Participants were 535 couples enrolled across four urban metro areas, where high-risk serodiscordant African American couples could be recruited (Atlanta = 117 couples; Los Angeles = 100 couples; New York = 221 couples; Philadelphia = 97 couples). Bellamy [11] contains a complete description of the randomization procedure implemented in this trial.

Data Collection

At baseline, data were obtained from three sources. First, participants completed a 90-min Audio Computer-Assisted Survey Interview (ACASI), which assessed sociodemographic characteristics, HIV/STD-associated sexual behaviors, and psychosocial mediators that had sound psychometric properties and had previously been implemented with adult African American populations. Although both male and female partner participants completed the same ACASI assessments, the sexual behavior items were written to be appropriate for each gender. Subsequently, a trained African American interviewer administered validated and reliable assessments on sexual and physical abuse and a brief index assessing study participants' commitment to the African American community. Finally, males provided a urine specimen and women provided two self-obtained vaginal swab specimens that were assayed for three STDs.

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Assessment of STDs

STD prevalence was defined as a laboratory-confirmed test for chlamydia, gonorrhea, or trichomonas infection at the baseline assessment. Participants were considered STD positive if they tested positive for any one of these three STDs. One swab was evaluated for *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) using the Becton–Dickinson ProbeTec ET *Chlamydia trachomatis* and *Neisseria gonorrhoeae* Amplified DNA Assay (Sparks, MD). A second vaginal swab was tested for *Trichomonas vaginalis* (TV) using Taq-Man PCR [12]. All assays were conducted at the Emory University Department of Pathology Research Laboratory. Participants testing positive for an STD were provided directly observable single-dose treatment and received appropriate counseling per CDC recommendations.

Assessment of Self-Report Measures

Sociodemographic Characteristics—Sociodemographic characteristics assessed included participant's age, education, employment status, income, health insurance, marital status and number of years with study partner.

Medical History—Participants reported their last CD4 count, last viral load, length of time since their HIV diagnosis (months), whether they had a history of hepatitis C, and whether they had ever received drug treatment.

Sexual Behaviors—Participants provided data on types of sexual behaviors engaged in (vaginal, anal and oral), frequency of male or female condom use during sex, whether behaviors were practiced with their study partners, with partners outside this primary relationship or with both, and data were reported across three different time periods (at last sex, past 30 days and past 90 days). Shorter time frames were selected to facilitate the collection of more reliable reports of episodes of sexual behavior [13] while longer time frames allowed capturing a greater number of episodes of sexual behavior. The primary HIV sexual risk behaviors assessed have been used in prior multisite studies involving African Americans and individuals living with HIV, and this study used similar measures for consistency of assessment [14, 15].

The primary HIV sexual risk behavior assessed was the proportion of the participants' vaginal and anal intercourse episodes with their study partner in the past 90 days that were protected using a male or female condom. This variable was calculated by dividing the total number of episodes of vaginal and anal intercourse with the study partner in the past 90 days into the total number of times a male or female condom was used on those occasions. Similar variables were created to assess proportion of oral and anal sexual episodes protected by a condom in the past 90 days with the study partner. Additionally, similar variables were computed to assess proportion of protected vaginal, anal or oral episodes with partners other than the study partner in the past 90 days that were protected using a condom.

A second important HIV sexual risk behavior assessed was the number of unprotected vaginal intercourse episodes with the study partner in the past 90 days. This variable was

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calculated by subtracting the total number of vaginal intercourse episodes with the study partner with whom a condom was used in the past 90 days from the total number of episodes of vaginal intercourse with the study partner in the past 90 days. Similar variables were created to assess number of oral and anal sexual episodes not protected by a condom in the past 90 days with the study partner. Additionally, similar variables were computed to assess number of unprotected vaginal, anal or oral episodes with partners other than the study partner in the past 90 days.

Sexual behaviors with concurrent partners was assessed by asking each member of the couple if he or she had sex with someone other than his or her study partner in the past 90 days and whether condoms were used on those occasions. The assessment also measured history of trading sex for drugs, shelter, money or food in the past 90 days and reported condom use (male and female condoms) at last sexual episode (vaginal, anal, and oral sex) with study partners.

Psychosocial Variables—Psychological distress was measured using the Center for Epidemiologic Studies—Depression (CESD) Scale (Brief version) [16]. Adult sexual abuse (ASA) was assessed using the Wyatt Sex History Questionnaire (Adult Sexual Abuse section only) [17] and intimate partner violence (IPV) was assessed using the Revised Conflict Tactics Scale (CTS2), modified version [18] which measures the history of physical abuse by an intimate partner in adulthood. The Cutting down, Annoyance by criticism, Guilty feeling and Eye-openers (CAGE) brief screener was used to measure lifetime alcohol dependence [19] and history of heavy drug use and dependence was measured using the Texas Christian Drug Screen II (TCUDS) [20]. Alcohol and drug problems were characterized by CAGE scores greater than or equal to 2 and by TCUDS scores greater than or equal to 3, respectively. History of spending time in a drug treatment program was assessed by the following item: “Have you ever spent time in an impatient drug treatment program?” and douching (females only) was assessed by the following question: “In the past 90 days, have you douched?”

Statistical Analysis Methods

Descriptive summaries were calculated for sociodemographic characteristics and sexual behaviors, and appropriate independent two-sample methods were employed to compare couples in which the female partner was HIV positive with couples in which the male partner was HIV positive. Gender-specific comparisons for select variables were also computed (e.g., comparing females in couples where the HIV positive partner was female to males in couples where the HIV positive partner was male). Means and standard deviations were computed for continuous measures, and *t*-tests were calculated with corresponding *P*-values of the null hypothesis that population means were identical in the two groups (couples in which the female was the positive partner compared with couples in which the male was the positive partner). Similarly, frequency and percents were calculated for categorical measures, and corresponding chi-squared (χ^2) tests were computed to test the null hypothesis of no association in the distribution of those frequencies in couples in which the female was the positive partner compared with couples in which the male was the positive partner. All analyses were completed using SAS V9 [21]. Univariate analyses of

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categorical and continuous variables were performed using the FREQ, MEANS or UNIVARIATE procedures, as appropriate, and all hypotheses tests were two-sided and conducted at the alpha = 0.05 level.

Couple-Level Measures—A couple-level STD measure was created as the cross-classification (similarity of the partners' STD status versus dissimilarity of the partners' STD status) of each partner's dichotomous STD outcome noting whether both partners tested positive, one partner tested positive, or both partners tested negative for any one of the three STDs. Similarly, dichotomous couple-level sexual behavior measures (e.g., condom use at last sex, history of trading sex) were also cross-classified as similarity of partners' responses versus dissimilarity of partners' responses. Finally, continuous couple-level sexual behavior measures were also computed. For example, the proportion of vaginal intercourse episodes using a male condom in the past 90 days reported by the couple was calculated for each study partner as described above. Subsequently, the couple-level variable was derived by adding the individual-level data and averaging partner-specific individual-level data.

Results

Sociodemographic Characteristics of the Sample

Table 1 compares the sociodemographic characteristics of participants and those who were eligible but not randomized. Participants were more likely to be married (33 vs. 20%; χ^2 = 6.96 (df = 2), P = 0.0084), than eligible non-participants, however, there were no observed age, education, income, insurance status, or employment status differences between participants and those who were eligible but not randomized.

The CD4 counts and viral load of HIV positive individuals were also assessed. Thirty-six percent of HIV positive males (n = 74) and 28% of HIV positive females (n = 89) reported not knowing their CD4 count and 48% of HIV positive males (n = 98) and 44% of HIV positive females (n = 136) reported not knowing their viral loads. Of the reported values, there were no differences in the distribution of viral loads for HIV positive males and females (χ^2 = 1.60 (df = 3), P = 0.6601), however, the reported distribution of CD4 counts were significantly different. Specifically, the distribution of CD4 counts (copies/mL) for HIV positive women was 7% reported 0–200; 31% reported 201–500 and 33% reported >500 compared to HIV positive men: 12% reported 0–200; 24% reported 201–500 and 28% reported >500 (χ^2 = 8.15 (df = 3), P = 0.0430).

Prevalence of Sexual Risk Behaviors

Table 2 compares the baseline prevalence of the study couples' sexual risk behaviors. Couples in which the HIV positive partner is female were compared to couples in which the HIV positive partner is male with respect to each outcome and sexual risk behavior. However, couples with HIV positive male partners reported a significantly higher proportion of condom-protected sex than couples with HIV positive female partners (mean = 0.54, SD = 0.39 versus mean = 0.38, SD = 0.38; t = −4.60 (df = 530), P < 0.0001). All couples reported similar frequencies of unprotected sexual activity (vaginal, anal and oral) with their study partners in the past 90 days. Couples with HIV positive female partners reported a

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significantly higher (t = 4.68 (df = 478), P <0.0001) proportion of male condom-unprotected vaginal sex (mean = 0.64; SD = 0.36) compared with couples with HIV positive male partners (mean = 0.48; SD = 0.38). Few couples reported using the female condom during sex.

The prevalence of sexual risk behaviors with partners outside of the couple's relationship (e.g., concurrent partners) were similar among couples with HIV positive female and couples with HIV positive male partners. Specifically, significant differences were not reported in the prevalence of the couples' prior history of trading sex for drugs, money, shelter or food (χ^2 = 2.24 (df = 2), P = 0.3261); the number of concurrent opposite sexual partners (χ^2 = 0.14 (df = 2), P = 0.9329); the proportion of male-condom unprotected vaginal sex episodes in the past 90 days (t = 0.54 (df = 6), P = 0.6102); or the frequency of unprotected vaginal sex episodes with opposite sex partners in the past 90 days (t = −2.04 (df = 6), P = 0.1269).

STD Prevalence

The prevalence of STDs was also assessed at the couple level. Twenty-three percent (n = 74) of couples with HIV positive female partners and 26% (n = 56) of couples with HIV positive male partners (χ^2 = 0.33 (df = 1), P = 0.5680) tested positive for at least one STD at baseline (e.g., at least one partner tested positive for at least one STD). Further analyses assessed STD prevalence at the individual-level. Bivariate analyses by gender indicated that STDs, were significantly more prevalent in women than in men (χ^2 = 74.60 (df = 1), P <. 0001). This difference in STD prevalence by gender was accounted for by Trichomoniasis. The prevalence of gonorrhea, Trichomoniasis and chlamydia was similar for HIV positive and HIV negative females. However, when comparing the prevalence of each STD for the HIV positive and HIV negative males, HIV negative males had a higher STD prevalence (7.19 vs. 2.37%; χ^2 = 5.91 (df = 1), P = 0.0150) (Tables 3, 4).

Bivariate and Multivariate Associations for STD Prevalence in Women

Bivariate associations were assessed between sociodemographic characteristics, sexual behaviors, psychosocial factors, and the variable "any STD," defined as testing positive for at least one STD at baseline. In bivariate analyses conducted among women (n = 535) who were either HIV positive or HIV negative, being uninsured (χ^2 = 1.97 (df = 1), P = 0.1608), having a lengthier relationship with one's study partner (t = −1.48 (df = 527), P = 0.1396), and having a history of douching (χ^2 = 13.11 (df = 1), P = 0.0003), inpatient drug treatment (χ^2 = 1.89 (df = 1), P = 0.1692) or abuse (χ^2 = 1.65 (df = 1), P = 0.1996), were associated with testing positive for at least one STD at baseline. In multivariate analyses, women who douched were 2.28 times as likely to have a prevalent STD (odds ratio [OR] = 2.28; 95% confidence interval [CI], 1.40–3.74; χ^2 = 10.85 (df = 1), P = 0.0010). No other variables were significant in this multivariate model.

Bivariate and Multivariate Associations for STD Prevalence in Men

Bivariate associations were assessed between sociodemographic characteristics, sexual behaviors, psychosocial factors, and the variable "any STD," defined as testing positive for at least one STD at baseline. In bivariate analyses conducted among men (n = 535) who

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were either HIV positive or HIV negative, being uninsured (χ^2 = 6.33 (df = 1), P = 0.0119) and having a history of PTSD (χ^2 = 2.61 (df = 1), P = 0.1061) were associated with testing positive for at least one STD at baseline. In multivariate analyses, men who were uninsured were approximately 2.6 times as likely to have a prevalent STD (OR = 2.62; 95% CI, 1.22–5.65; χ^2 = 6.03 (df = 1), P = 0.0140). Insurance status was the only variable significant in this multivariate model.

Discussion

This study is among the first to examine HIV serodiscordant African American couples. Serodiscordant couples who engage in unprotected sexual activity are an important research focus because they are in relationships where the risk of transmission is very high. This study makes significant contributions to public health research because it highlights a population that has received scant empirical attention. HIV has permeated our society and remains a significant public health problem. It affects not only individuals, but also families.

Besides being affected by HIV, these couples are affected by other sexual risks. Overall, couples reported using condoms only about 44% of the time when they had anal or vaginal sex. Furthermore, the proportion of condom protected sexual episodes were significantly less frequent when the female partner was positive compared to when the male partner was HIV positive. This pattern was observed among females in sexual relationships with their study partner as well as with their nonstudy partners, suggesting that if the female partner is the positive partner in a serodiscordant couple negotiating safer sex may be a challenge. Strategies for reducing HIV transmission risk in HIV serodiscordant couples need to take into account the gender of the HIV positive partner, given greater potential for transmission when the female partner is positive. Additional HIV transmission behaviors, including high levels of non-condom use, were reported by at least one member of many study couples. Nearly 18% of couples reported that one partner had a concurrent sexual partner, and about 8% of couples reported that at least one partner had traded sex for money, drugs, or food. Clearly, given the breadth of HIV transmission risk behaviors reported by couples in this study, prevention efforts tailored to this subpopulation are warranted.

About 26% of the couples tested positive for an STD. The prevalence of STDs reported among this sample is comparable to the prevalence reported in other studies of HIV positive individuals [22]. By far the most prevalent STD in females and in males was Trichomonas. Prevalence rates for Trichomonas were comparable for HIV negative and for HIV positive females. The comparable prevalence of STDs in HIV negative and HIV positive women has been documented in prior research [7]. However, significantly more HIV negative males had a prevalent *Trichomonas* infection compared with HIV positive males.

Trichomonas is a protozoan parasite transmitted principally through vaginal intercourse and is highly prevalent in African Americans. Empirical research suggests that *Trichomonas* may play an important role in HIV transmission dynamics [23]. *Trichomonas* typically elicits an aggressive local cellular immune response with inflammation of the vaginal epithelium and exocervix in women and the urethra in men [24]. This inflammatory response induces a large infiltration of leukocytes, including HIV target cells such as CD4+

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bearing lymphocytes and macrophages to which HIV can bind and gain access [25]. In addition, *Trichomonas* can frequently punctuate mucosal hemorrhages [26]. Among persons living with HIV, the pathology induced by *Trichomonas* can increase HIV shedding. *Trichomonas* infection may also act to expand the portal of entry for HIV in an HIV negative person [27].

In multivariate analyses, the only significant correlate of having a prevalent STD in women was douching. Historically, vaginal douching has been used as a hygienic practice [28], and several studies have reported that douching is more common among African American women compared with women of other ethnic groups [29–31]. African American women may douche more frequently as a result of cultural beliefs reinforcing douching as a hygienic practice as well as possibly an effective contraceptive practice [32, 33]. Douching has been found to reduce the normal vaginal flora, specifically, the Lactobacilli bacteria that protect against genital pathogens. This may result in an overgrowth of pathogenic organisms in the lower genital tract [34]. A study conducted by McClelland et al. among Kenyan women demonstrated that vaginal washing with water or soap increased women's risk for acquiring HIV-1 [35]. This study concluded that intervention strategies aimed at modifying intravaginal practices should be evaluated as a possible female-controlled HIV-1 prevention strategy.

In multivariate analyses with males, being uninsured was the only significant correlate of having a prevalent STD. Socioeconomic forces such as having limited health insurance are well-known risk markers for HIV and other STIs [36, 37]. This finding contributes to the accumulating evidence which emphasizes the importance of social and economic context in promoting the spread and perpetuation of the HIV epidemic among African Americans. Changing the social context of life for African Americans may be effective in decreasing the burden of the HIV epidemic in this community [38].

Strengths and Limitations

This study has a number of limitations. The sample in this study may not be representative of all African American serodiscordant couples. To be eligible to participate, a couple had to have been together for 6 months, be planning to be together another year, and have no plans to have a child. The results may not generalize to couples that do not meet these criteria. Moreover, these eligibility criteria may have hampered our ability to identify other known correlates of STD prevalence in African Americans. Additionally, we did not recruit people who were unaware that they were in a serodiscordant relationship, which restricts the generalizability of the findings.

The data from this study represent a significant extension in the examination of couple-level HIV sexual risk behavior. The findings are original and contribute significantly to HIV/STD research with couples, particularly African American couples. Additionally, presentation of the sociodemographic characterization and HIV risk behavior profiles of African American HIV serodiscordant couples represents an important initial description of a hidden, vulnerable population.

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In conclusion, because of HIV infection, individuals in serodiscordant couples need to learn to have sex in a way that is safe and healthful for both themselves and their partners. Programs that provide information and skills to promote sexual health in the context of couples' lives and the fullness of their relationships have the potential to be successful in reducing the risks that HIV serodiscordant couples face. Future research should be conducted with diverse samples of African American couples (i.e., younger couples, non-stable couples) to explore other potential correlates of STD prevalence.

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The NIMH Multisite HIV/STD Prevention Trial for African American Couples Study Group

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Table 1

Demographic comparison of participants meeting eligibility requirements

	Eligible and randomized (*n* = 1070)	Eligible and not randomized (*n* = 108)	$\chi 2$ statistic
Age			
<30	60 (5.69)	4 (3.96)	2.23, df = 2
30–39	229 (21.71)	28 (27.72)	
40+	766 (72.61)	69 (68.32)	
Married to study partner[a]	344 (32. 54)	20 (19.80)	6.95, df = 1
Education			
<HS	325 (30.72)	33 (32.67)	0.47, df = 2
HS/GED	435 (41.12)	38 (37.62)	
Some college	298 (28.17)	30 (29.70)	
Employed[b]	300 (28.41)	37 (36.63)	3.02, df = 1
Income			
<$400 per month	307 (29.10)	32 (32.00)	1.02, df = 3
$400–850 per month	443 (41.99)	37 (37.00)	
$851–1650 per month	204 (19.34)	20 (20.00)	
>$1650 per month	101 (9.57)	11 (11.00)	
Insured	796 (75.38)	81 (80.20)	1.17, df = 1

All values represent *N* (%).

P-values were determined using χ^2 tests

df degrees of freedom

[a] *P*-value <0.01,

[b] *P*-value <0.10

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Table 2

Baseline prevalence of couple-level HIV transmission sexual risk behaviors, by gender of HIV sero-positive partner (within the relationship in the past 90 days)

	HIV + female couples (*n* = 323)	HIV + male couples (*n* = 212)	Statistic, df
Proportion condom protected sex[a]	0.38 ± 0.38	0.54 ± 0.39	−4.60, df = 530
MC at last vaginal sex[b]			
Both no	36 (11.25)	33 (15.79)	9.68, df = 2
One no	262 (81.88)	148 (70.81)	
Both yes	22 (6.88)	28 (13.40)	
MC at last anal sex			
Both no	17 (27.87)	8 (22.22)	0.38, df = 2
One no	38 (62.30)	24 (66.67)	
Both yes	6 (9.84)	4 (11.11)	
FC at last vaginal sex			
Both no	19 (5.94)	19 (9.05)	2.77, df = 2
One no	284 (88.75)	176 (83.81)	
Both yes	17 (5.31)	15(7.14)	
# Unprotected vaginal sex (w/study partner)			
MC unprotected	16.69 ± 22.68	14.69 ± 27.16	0.83, df = 329
FC unprotected	25.20 ± 29.28	25.41 ± 29.36	0.18, df = 504
Neither MC or FC	17.32 ± 23.14	14.89 ± 24.00	1.03, df = 425
# Unprotected anal sex (w/study partner)			
MC unprotected	3.09 ± 3.87	2.90 ± 4.36	0.17, df = 59
FC unprotected	5.21 ± 6.80	4.10 ± 5.05	−0.45, df = 504
Neither MC or FC	3.50 ± 4.32	2.50 ± 3.80	0.84, df = 46
# Unprotected oral sex (receptive, w/study partner)			
DD or MC unprotected	13.86 ± 30.37	13.39 ± 16.44	0.16, df = 240
# Unprotected oral sex (non-receptive, w/study partner)			
DD or MC unprotected	12.18 ± 18.63	12.03 ± 14.03	0.06, df = 204
Proportion unprotected vaginal sex (w/study partner)			
MC unprotected[a]	0.64 ± 0.36	0.48 ± 0.38	4.68, df = 478
FC unprotected[c]	0.96 ± 0.12	0.94 ± 0.16	1.74, df = 312
Neither MC or FC[d]	0.66 ± 0.36	0.51 ± 0.38	3.92, df = 425
Proportion unprotected anal sex (w/study partner)			
MC unprotected	0.57 ± 0.36	0.63 ± 0.36	−0.72, df = 59
FC unprotected	0.88 ± 0.19	0.95 ± 0.15	−1.36, df = 59
Neither MC or FC	0.63 ± 0.36	0.66 ± 0.39	−0.28, df = 46

Values shown are *N* (%) or mean ± standard deviation. *P*-values for continuous variables were determined using two-sample *t*-tests; *P*-values for categorical variables were determined using χ^2 tests

STD sexually transmitted disease, *MC* male condom, *FC* female condom, *DD* dental dam

[a] *P*-value <0.0001;

[b] *P*-value <0.01;

[c] *P*-value <0.10;

[d] *P*-value <0.001

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Table 3

STD prevalence by gender

	Males (*n* = 535)	**Females (*n* = 535)**	**All (*n* = 1070)**
Chlamydia	4 (0.75)	4 (0.75)	8 (0.75)
Gonorrhea	0 (0.00)	1 (0.19)	1 (0.09)
Trichomoniasis	24 (4.52)	116 (21.80)	140 (13.17)
Any STD[a]	28 (5.27)	120 (22.51)	148 (13.91)

Values shown are *N* (%)

[a]Generalized Cochran Mantel Haensel (CMH) test statistic; $\chi^2 = 74.60$, df = 1, $P < 0.0001$

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Table 4

STD prevalence among females and males by HIV serostatus

	Females			Males		
	HIV− (*n* = 212)	**HIV+ (*n* = 323)**	**All (*n* = 535)**	**HIV− (*n* = 323)**	**HIV+ (*n* = 212)**	**All (*n* = 535)**
Chlamydia	2 (0.94)	2 (0.62)	4 (0.75)	4 (1.25)	0 (0.00)	4 (0.75)
Gonorrhea	0 (0.00)	1 (0.31)	1 (0.19)	0 (0.00)	0 (0.00)	0 (0.00)
Trichomoniasis	53 (25.00)	63 (19.69)	116 (21.80)	19 (5.94)	5 (2.37)	24 (4.52)
Any STD	55 (25.94)	65 (20.25)	120 (22.51)	23 (7.19)	5 (2.37)	28 (5.27)

Values shown are *N* (%)