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Women at Risk for STDs: Correlates of Intercourse without Barrier Contraception

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Abstract

Objective—To evaluate correlates of vaginal intercourse without barrier contraception (unprotected intercourse).

Study Design—Baseline data from a randomized trial were analyzed to evaluate factors associated with intercourse without barrier method use among women under 35 years old. Logistic regression models provided estimates of the association of demographic, reproductive, and sexual history variables with unprotected intercourse.

Results—Intercourse without barrier contraception was common: 65% of participants had two or more episodes of intercourse without barrier contraception use in the past month. Factors associated with increased odds of unprotected intercourse included: number of coital episodes, partner's unwillingness to use condoms (Odds Ratio (OR)_{adj} 4.1, 95% Confidence Interval (CI) 2.3–6.9), and among women under 20 years, low condom use self-efficacy score (OR_{adj} 1.6, 95% CI 1.0–2.9).

Conclusion—Risk factors for unprotected intercourse included coital frequency and the male partner's unwillingness to use condoms. Self-efficacy for condom use was especially important for women under 20 years of age.

Keywords

Condom use; barrier contraceptive method; sexually transmitted disease; sexually transmitted infection; unintended pregnancy

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CONDENSATION

Vaginal intercourse without barrier contraception was common in this cohort of high-risk women, and factors associated with lack of barrier use varied by age group.

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INTRODUCTION

Unintended pregnancy, sexually transmitted diseases (STDs) and the adverse health consequences of STDs are widespread public health problems in the United States and worldwide. An estimated 18.9 million new STD infections, both curable and incurable, occur each year in the United States.¹ Women suffer the adverse effects of STDs to a greater degree than men.² Thus, it is important to identify methods of prevention to advance women's health in the U.S.

Barrier contraceptive methods (specifically male condoms), when used consistently and correctly, are effective in preventing numerous STDs, including the human immunodeficiency virus (HIV).³ In 2000, the NIH released a landmark report of the effectiveness of condoms for prevention. The report, *Scientific Evidence on Condom Effectiveness for Sexually Transmitted Disease (STD) Prevention*, summarized the published studies on condom effectiveness as of June 2000.⁴ The report stated that transmission of *Neisseria gonorrhoeae* and *Chlamydia trachomatis* are reduced by half with 100% condom use. A recent report demonstrated a marked reduction of incident HPV infection with consistent condom use.⁵

Despite this evidence, U.S. data indicate that individuals having heterosexual intercourse use condoms consistently only 19% of the time.⁶ Among sexually active adolescents, the highest risk age group for STDs, only 21% used condoms at last intercourse. One potentially important factor affecting condom use is that many men are unwilling to use them. Some women may be unable to negotiate use due to gender-related power imbalances.⁷⁻⁹

There are few studies in the medical literature that have evaluated patient-specific characteristics that are associated with vaginal intercourse without barrier method use in women at risk for STDs and unplanned pregnancy. We sought to address this issue in a baseline analysis of a randomized trial called Project PROTECT. Our hypothesis was that factors associated with the number of episodes of intercourse without barrier method use in the past month would vary by age group. We also hypothesized that specific behavioral and psychological measures would be associated with vaginal intercourse without barrier method use during the past month.

MATERIAL AND METHODS

Data for the current study were derived from the baseline data collection efforts of Project PROTECT - a randomized trial funded by the National Institute of Child Health and Human Development (NICHD) that evaluated the extent to which a computer-based individualized intervention could improve dual contraceptive method use. Trial protocols were approved by the Women and Infants' Hospital and the University of Rhode Island Institutional Review Boards.

Women eligible for Project PROTECT included English-speaking women between the ages of 13 to 35 who were competent to give informed consent. Parental consent and minor assent were obtained for all participants less than 18 years of age. To be eligible for the study, women had to report sexual activity with a male partner in the past 6 months; desire to avoid pregnancy for 24 months after randomization; and test negative for sexually transmitted disease outcomes of the study (i.e. *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, trichomoniasis, and pelvic inflammatory disease). High-risk women were defined as: 1) all sexually active women age 13 - 24; and 2) sexually active women age 25 - 35 years whose history included any of the following: unplanned pregnancy; history of an STD; inconsistent use of contraception; or other factors that placed a woman at above average risk for unplanned pregnancy or STD (e.g., more than one sexual partner in the past six months or drug or alcohol abuse).

Recruitment began in October 1999 and continued until October 2003. Potential participants were recruited from primary care, gynecology, and family planning clinics at the two hospitals involved in the study, as well as from Planned Parenthood of Rhode Island. Advertisement was done in local city and university newspapers, on local cable and radio stations, and nurse recruiters visited local high schools and colleges in the Providence area. Clinicians treating women tested in clinics or urgent care areas and diagnosed with sexually transmitted infections were also invited to participate after a negative test of cure. During the study, we also initiated a “refer-2-friends” program (a.k.a. snowballing) to encourage and improve recruitment. For this analysis, we were interested in women who were sexually active within the 30 days prior to their baseline visit. Thus, we limited our analytic sample to a subgroup of 469 women.

At the time of randomization, all participants completed a self-administered questionnaire and a computer-based survey. The self-administered questionnaire collected information regarding substance abuse, partner violence, and sexual abuse. The computer intervention inquired about sexually transmitted disease history, number of sexual partners, frequency of intercourse, contraceptive behavior including condom use, partner willingness to use condoms, and participant’s self-efficacy (described below).

The participant’s perception of her male partner’s willingness to use condoms (not at all/not very/sometimes/extremely willing) was assessed. The psychological construct, self-efficacy, or a participant’s confidence in her ability to successfully negotiate condom use with her partner across different challenging situations, was determined using a 10-item scale developed and validated in different samples by Redding.^{10, 11}

The two most common measures of condom use have been: proportional (percentage of times a condom was used) or absolute (the number of times a person reported vaginal intercourse with condoms over a specified time period). More recent publications support the absolute measure of condom use.^{12–15} As such, we selected as our primary outcome number of episodes of vaginal intercourse without barrier method use in the past month. We defined number of episodes vaginal intercourse without barrier method use in last 30 days as:

$$\#coital\ episodes - \#times\ condoms\ were\ used.$$

We dichotomized the outcome into 0–1 episodes of vaginal intercourse without barrier method use (zero/low risk) versus 2 or more episodes. This dichotomization was based on clinical relevance with respect to the presumed increased risk of infection with two or more episodes of vaginal intercourse without barrier method use in a month. Poisson regression analyses were performed using the number of episodes of vaginal intercourse without barrier method use as the outcome to support associations noted with the logistic regression.

Bivariate analyses (chi-square for categorical and t-test for continuous variables) evaluated the association between demographic, reproductive, and sexual history factors and 2 or more episodes of vaginal intercourse without barrier method use in the past month. Estimates of odds ratios (OR) and corresponding 95% confidence intervals (CI) were derived from logistic regression models where the dependent variable was at least 2 acts of vaginal intercourse without barrier method use in the past 30 days. We also performed logistic regression analyses stratified by age: women ≥ 19 years-old, women age 20–24, and women age 25 and older.¹⁶ Odds ratios were adjusted for demographic, reproductive, and sexual risk factors. Our final model included: race/ethnicity, use of hormonal contraception, partner’s willingness to use condoms, self-efficacy, number of coital acts in the past 30 days, more than one sexual partner in the past month (yes/no), and having sex after alcohol use. We evaluated model fit with the use of the C-statistic where values between 0.7 and 0.8 were considered acceptable and values between 0.8 and 1.0 were considered excellent fit. The C-statistic for the three age groups (\geq

19, 20–24, and ≥ 25) was 0.86, 0.82, and 0.77, respectively. SAS (version 8.2) was used to perform the statistical analyses.

RESULTS

The demographic, reproductive, and historical characteristics of the study sample are provided in Table I. The mean age of participants was 21.9 years. Fifty-four percent of the population was non-white, 25% had less than a high school education, 60% had a history of substance abuse, 46% had a past STD, and over 50% reported an unplanned pregnancy. Over 50% of the women in the cohort had six or more lifetime sexual partners and 17% had more than one sexual partner in the past 30 days.

The following factors differed by age group: education, substance abuse, history of STD or unplanned pregnancy, hormonal contraception, number of lifetime sexual partners, number of partners in the past 30 days, number of episodes of sex after alcohol use, and history of exchanging sex for drugs or money. Higher risk activities were far more common in the older age group due to the differential eligibility criteria of Project PROTECT for women over 25 years of age.

Sixty-five percent of participants had two or more episodes of vaginal intercourse without barrier method use in the past 30 days, 11% had one episode, and 24% had zero episodes of vaginal intercourse without barrier method use. The association between specific characteristics and having at least two episodes of vaginal intercourse without barrier method use in the past 30 days is described in Table II. In the unadjusted analysis, hormonal contraception was associated with an increased odds (OR = 1.8) of at least two episodes of vaginal intercourse without barrier method use in the past 30 days as was the number of coital episodes, having three or more occasions of coitus after alcohol use, male partner's unwillingness to use condoms, and lower self-efficacy. However, after adjustment for confounders only the number of coital episodes and the male partner's unwillingness to use condoms remained statistically significant in the multivariable model.

Table III provides the associations between reproductive, sexual, behavioral, and psychological factors and having at least two episodes of intercourse without a barrier in the past 30 days stratified by age. After adjustment for potential confounders, male partner's willingness to use condoms was inversely correlated with at least two episodes of vaginal intercourse without barrier method use in the past 30 days. The odds of vaginal intercourse without barrier method use were 6–8 times greater in women with partners not willing to use condoms than in those with partners willing to use condoms. If partners were "somewhat willing" to use condoms, there was still a 3 to 5-fold increased odds of having at least two episodes of vaginal intercourse without barrier method use compared to partners that were very willing to use condoms. Lower self-efficacy was associated with having at least two episodes of vaginal intercourse without barrier method use in the past month in women less than 20 years of age, but its effect diminished in women 20 years of age and older. Hormonal contraception was associated with increased odds of vaginal intercourse without barrier method use among 20–24 year olds (OR_{adj}=2.7, 95% CI 1.2–5.0). Regardless of age, race/ethnicity and multiple sexual partners in the past 30 days were not associated with having vaginal intercourse without barrier method use.

We performed additional multivariable analysis using Poisson regression as this method does not rely on an arbitrary dichotomized cutoff of two or more episodes of intercourse without barrier method use. Poisson regression uses the absolute count (i.e. number of vaginal intercourse without barrier method use episodes) as the outcome. The findings of these analyses supported the conclusions reached using logistic regression.

COMMENT

There were a number of important observations in this analysis of a group of high-risk, sexually-active women. Factors strongly associated with having at least two episodes of vaginal intercourse without barrier method use in the past month included number of coital episodes and partner's willingness to use condoms. Use of hormonal contraception was correlated with having at least two episodes of vaginal intercourse without barrier method use in the past 30 days in women age 20–24, and a women's confidence in her ability to use condoms (self-efficacy) was associated with having at least two episodes of vaginal intercourse without barrier method use in the past month in women age 19 and younger.

Vaginal intercourse without barrier method use in the past month was extremely common in this sample - 65% of participants reported two or more episodes. In a study of 522 African-American female adolescents, Crosby found that the mean number of reported acts of unprotected vaginal sex with a steady partner in the last 6 months was 4.5 (less than one per month), and the mean number of unprotected vaginal sex acts with a casual partner in the past 6 months was 0.74.¹⁴ There are several potential reasons for the inconsistency across studies. First, Crosby and colleagues studied a population of African-American female adolescents (mean age = 16.0 years); over 80% were full-time students. We studied a diverse group of high-risk women between 13 and 35 years of age. Second, our study focused on the past 30 days, while Crosby and colleagues asked about the previous 6 months. Third, it is possible that the use of computer-assisted data collection in our study increased the accuracy of reporting compared to the above study.¹⁷

Consistent with previous literature on the importance of relationship factors for women's STD protection,^{7–9} the two most important factors associated with having at least two episodes of vaginal intercourse without barrier method use in the past month in our study, regardless of a patient's age, were coital frequency and the male partner's willingness to use condoms. The greater the number of coital acts in the past 30 days, the greater the chance of exposure to pathogens. Coital frequency is an important, and often neglected, aspect of a patient's sexual history. Male partner's unwillingness to use condoms may reflect gender-based power imbalance. Pulerwitz and colleagues investigated a new measure called the Sexual Relationship Power Scale (SRPS) and found that women with high levels of relationship power were five times as likely as women with low levels to report consistent condom use.¹⁸ Other studies have supported the belief that relationship power is linked to control of contraceptive decision making.^{19–21}

Individual self-efficacy was found to be an important correlate of having at least two episodes of vaginal intercourse without barrier method use in participants less than 20 years old. Self-efficacy appeared to be most important in adolescents, who are at highest risk for sexually transmitted diseases. Condom use self-efficacy has also been found to be an important correlate of condom use in a number of other studies.^{22–24} Robertson and colleagues evaluated gender differences in the prediction of condom use among incarcerated juvenile offenders and noted that condom use by adolescent males was predicted by peer influence and by positive condom attitudes. Condom use among females was predicted by peer influence, condom attitudes, and self-efficacy.²⁵

In our study, factors associated with having at least two episodes of vaginal intercourse without barrier method use in the past month varied by age group. Use of hormonal contraception was associated with a two-fold increased odds of having at least two episodes of vaginal intercourse without barrier method use in the past month in women age 20–24. In a recent report, Yarnall and colleagues also noted that use of hormonal contraception was associated with increased unprotected intercourse.²⁶ In the U.S., the two most predominant forms of contraception,

sterilization and oral contraceptives, are highly effective at prevention pregnancy, yet provide no protection against STDs. Women who use hormonal contraception may be at increased risk if use is associated with intercourse without barrier method use.

There are a number of methodologic limitations of our baseline analysis that deserve mention. Condom use was based on self-report. While we attempted to assess consistency of use, we did not evaluate correct condom use, social norms, or a direct measure of the male's reported willingness to use condoms (versus the participant's assessment of male willingness). In addition, prospective predictors of intercourse without barrier method use should be evaluated as prospective predictors may differ from cross-sectional predictors.

Future interventions should focus on STD prevention in women under the age of 25 as this group is at highest risk for sexually transmitted infections and adverse reproductive outcomes.²⁷ Numerous studies have noted that interventions should be gender-tailored and culturally congruent.^{22, 28, 29} Interventions should also focus on improving adolescent women's condom use self-efficacy. Increased self-efficacy may increase condom use in a relationship, but only if the male partner is willing to use condoms. As the patient's partner's willingness to use condoms decreases, the likelihood of vaginal intercourse without barrier method use increases.

Given the power dynamic in many relationships, women often are unable to negotiate the use of male condoms to protect their health. More empirical exploration of sexual assertiveness³⁰ and effective strategies to persuade men at different levels of willingness to use condoms are warranted.

While some investigators and experts in the field have questioned the effectiveness of male condoms as an effective method of STD prevention, others have emphasized the importance of male condoms for STD prevention.³¹ Winer and colleagues studied 82 university students who reported their first episode of intercourse with a male partner either during the study period or within two weeks before enrollment. The incidence of genital HPV was 37.8 per 100 patient-years in women whose partners used condoms consistently, compared with 89.3 per 100 patient-years at risk in women whose partners used condoms less than 5 percent of the time ($HR_{adj} = 0.3$; 95% CI 0.1 to 0.6).⁵ Park noted that condom use was protective in women over the age of 25 years, but had no effect in younger women.¹⁶ It is possible that condom measurement issues can account for some of the inconsistency across studies. Some investigators create a binary variable: condom use yes or no. This is a crude measure at best, and does not assess consistency of use. Others have asked patients to quantify their condom use on an ordinal scale (e.g. always, almost always, sometimes, etc.) or as a percentage of coital episodes (e.g. 60 – 80% of coital episodes), but each measure ignores the absolute number of exposures.

Consistent condom use prevents the acquisition of most viral STDs, such as HIV, and offers reasonable protection against bacterial STDs.³² To get a more accurate assessment of the protective effect of condoms on STD acquisition, it is important that investigators accurately measure the number of episodes of vaginal intercourse without barrier method use in a time period. Future intervention studies should carefully assess an absolute measure of exposure to sexually transmitted pathogens, and evaluate interventions in women to increase their condom use self-efficacy, condom skills, and social negotiation. In addition, it will be important for these studies to control for important covariates and potential confounders that can introduce bias including demographic characteristics, sexual risk factors, contraceptive use, level of exposure to STD pathogens, and other risk factors that may be associated with STD outcomes.³³ Given the potentially large group of women whose partner(s) may not be willing to use a male condom, additional prospective studies are needed to assess the role of microbicides and

female-controlled barriers that could empower women to protect themselves against sexually transmitted infections.

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References

1. Public Health Service. Progress Review: Sexually Transmitted Diseases: US Department of Health and Human Services. 2005
2. Centers for Disease Control and Prevention. Atlanta, GA: US Department of Health and Human Services; 2003. Sexually Transmitted Disease Surveillance. September 2004, www.cdc.gov/std/stats. 2003
3. Centers for Disease Control and Prevention. Sexually Transmitted Disease Treatment Guidelines. *MMWR* 2006;55(RR11):58–63.
4. Scientific evidence on condom effectiveness for sexually transmitted disease (STD) Prevention. National Institute of Allergy and Infectious Diseases. National Institutes of Health, Dept. of Health and Human Services, 2001.
5. Winer RL, Hughes JP, Feng Q, et al. Condom use and the risk of genital human papillomavirus infection in young women. *New Engl J Med* 2006;354:2645–2654. [PubMed: 16790697]
6. Catania JA, Canchola J, Binson D, et al. National trends in condom use among at-risk heterosexuals in the united states. *J Acquir Immune Defic Syndr* 2001;27:176–82. [PubMed: 11404540]
7. Amaro H. Love, sex, and power. Considering women's realities in HIV prevention. *Am Psychol* 1995;50:437–47. [PubMed: 7598292]
8. Blanc AK. The effect of power in sexual relationships on sexual and reproductive health: an examination of the evidence. *Stud Fam Plann* 2001;32:189–213. [PubMed: 11677692]
9. Wingood GM, Scd DiClemente RJ. Application of the theory of gender and power to examine HIV-related exposures, risk factors, and effective interventions for women. *Health Educ Behav* 2000;27:539–65. [PubMed: 11009126]
10. Redding C, Rossi JS. Testing a model of situational self-efficacy for safer sex among college students: Stage and gender-based differences. *Psychol Health* 1999;14:467–86.
11. Redding CA, Morokoff PJ, Noar SN, et al. Evaluating transtheoretical model-based predictors of condom use in at-risk men and women. *Ann Behav Med* 2002;24:S021.
12. Crosby R, DiClemente RJ, Holtgrave DR, Wingood GM. Design, measurement, and analytical considerations for testing hypotheses relative to condom effectiveness against non-viral STIs. *Sex Transm Infect* 2002;78:228–31. [PubMed: 12181456]
13. Crosby RA. Condom use as a dependent variable: measurement issues relevant to HIV prevention programs. *AIDS Educ Prev* 1998;10:548–57. [PubMed: 9883289]
14. Crosby RA, DiClemente RJ, Wingood GM, Sionean C, Cobb BK, Harrington K. Correlates of unprotected vaginal sex among African American female adolescents: importance of relationship dynamics. *Arch Pediatr Adolesc Med* 2000;154:893–9. [PubMed: 10980792]
15. Fishbein M, Pogue-Wright W. Evaluating AIDS prevention interventions using behavioral and biological outcome measures. *Sex Transm Dis* 2000;27:101–10. [PubMed: 10676977]
16. Park BJ, Stergachis A, Scholes D, Heidrich FE, Holmes KK, Stamm WE. Contraceptive methods and the risk of Chlamydia trachomatis infection in young women. *Am J Epidemiol* 1995;142:771–8. [PubMed: 7572949]
17. Turner CF, Ku L, Rogers SM, Lindberg LD, Pleck JH, Sonenstein FL. Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology. *Science* 1998;280:867–73. [PubMed: 9572724]
18. Pulerwitz J, Amaro H, De Jong W, Gortmaker SL, Rudd R. Relationship power, condom use and HIV risk among women in the USA. *AIDS Care* 2002;14:789–800. [PubMed: 12511212]

19. Harvey SM, Bird ST, Galavotti C, Duncan EA, Greenberg D. Relationship power, sexual decision making and condom use among women at risk for HIV/STDS. *Women Health* 2002;36:69–84. [PubMed: 12555803]
20. Harvey SM, Henderson JT, Branch MR. Protecting against both pregnancy and disease: predictors of dual method use among a sample of women. *Women Health* 2004;39:25–43. [PubMed: 15002881]
21. Soet JE, Dudley WN, Dilorio C. The effects of ethnicity and perceived power on women's sexual behavior. *Psychol Women Q* 1999;23:707–23. [PubMed: 12322399]
22. DiClemente RJ, Wingood GM, Harrington KF, et al. Efficacy of an HIV prevention intervention for African American adolescent girls: a randomized controlled trial. *Jama* 2004;292:171–9. [PubMed: 15249566]
23. Marin BV, Tschann JM, Gomez CA, Gregorich S. Self-efficacy to use condoms in unmarried Latino adults. *Am J Community Psychol* 1998;26:53–71. [PubMed: 9574498]
24. O'Leary AO, DiClemente RJ, Aral SO. Reflections on the design and reporting of STD/HIV behavioral intervention research. *AIDS Educ Prev* 1997;9:1–14.
25. Robertson AA, Stein JA, Baird-Thomas C. Gender differences in the prediction of condom use among incarcerated juvenile offenders: testing the Information-Motivation-Behavior Skills (IMB) model. *J Adolesc Health* 2006;38:18–25. [PubMed: 16387244]
26. Yarnall KS, McBride CM, Lyna P, et al. Factors associated with condom use among at-risk women students and nonstudents seen in managed care. *Prev Med* 2003;37:163–70. [PubMed: 12855216]
27. Peipert JF. Clinical practice. Genital chlamydial infections. *N Engl J Med* 2003;349:2424–30. [PubMed: 14681509]
28. Kamb ML, Fishbein M, Douglas JM Jr, et al. Efficacy of risk-reduction counseling to prevent human immunodeficiency virus and sexually transmitted diseases: a randomized controlled trial. Project RESPECT Study Group. *Jama* 1998;280:1161–7. [PubMed: 9777816]
29. Shain RN, Piper JM, Newton ER, et al. A randomized, controlled trial of a behavioral intervention to prevent sexually transmitted disease among minority women. *N Engl J Med* 1999;340:93–100. [PubMed: 9887160]
30. Morokoff PJ, Quina K, Harlow LL, et al. Sexual Assertiveness Scale (SAS) for women: development and validation. *J Pers Soc Psychol* 1997;73:790–804. [PubMed: 9325594]
31. Cates W. The NIH condom report: The glass is 90% full. *Fam Plann Perspect* 2001;33:231–233. [PubMed: 11589545]
32. National Institute of Allergy and Infectious Diseases. Scientific evidence on condom effectiveness for sexually transmitted disease (STD) Prevention. National Institutes of Health, Dept. of Health and Human Services. 2001.
33. Warner L, Stone KM, Macaluso M, Buehler JW, Austin HD. Condom use and risk of gonorrhea and Chlamydia: a systematic review of design and measurement factors assessed in epidemiologic studies. *Sex Transm Dis* 2006;33:36–51. [PubMed: 16385221]

Table I
Demographic, reproductive and historical risk factors by age

	Total (n=469)	≤ 19 years (n=132)	20–24 y (n=238)	≥ 25 y (n=99)
Demographic				
N (%)				
Race/ethnicity				
White	218 (46)	64 (48)	116 (49)	38 (38)
Black	128 (27)	36 (27)	60 (25)	32 (32)
Hispanic	111 (24)	27 (20)	56 (24)	28 (28)
Other/Multiracial	170 (36)	42 (32)	89 (37)	39 (39)
Education*				
9 th grade or less	44 (9)	18 (14)	10 (4)	16 (16)
10 th – 11 th grade	73 (16)	36 (27)	22 (9)	15 (15)
High school/GED	170 (36)	59 (45)	77 (32)	34 (34)
2 yr college or more	182 (38)	19 (15)	129 (55)	34 (34)
Substance abuse in last year**	279 (60)	89 (67)	143 (61)	47 (47)
Physical abuse in last year	83 (18)	23 (18)	35 (15)	25 (25)
Forced to have sex in last year	47 (10)	16 (12)	21 (9)	10 (10)
Reproductive				
History of STD*	216 (46)	42 (32)	103 (43)	71 (73)
History of unplanned pregnancy*	235 (50)	47 (36)	116 (49)	72 (74)
Current use of hormonal contraception [†]	159 (34)	40 (31)	95 (40)	24 (25)
Partner's willingness to use condoms				
Extremely willing	183 (39)	58 (44)	90 (38)	35 (35)
Somewhat willing	176 (38)	48 (36)	94 (40)	34 (34)
Not very/not at all willing	66 (14)	17 (13)	29 (12)	20 (20)
Didn't know willingness	44 (9)	9 (7)	25 (11)	10 (10)
Sexual history				
Lifetime partners**				
1–2	58 (12)	21 (16)	28 (12)	9 (9)
3–5	166 (35)	60 (45)	78 (33)	28 (28)
6–10	110 (23)	28 (21)	61 (26)	21 (21)
11 or more	135 (29)	23 (17)	71 (30)	41 (41)
Number partners past month [†]				
1	386 (82)	108 (82)	201 (84)	77 (78)
2	49 (10)	16 (12)	23 (10)	10 (10)
3 or more	31 (7)	8 (6)	14 (6)	9 (9)
Unplanned sex after drinking (past 30 d) [‡]				
Never	199 (42)	60 (45)	86 (36)	53 (54)
1–2 times	159 (34)	42 (32)	90 (38)	27 (27)
3 or more times	111 (24)	30 (23)	62 (26)	19 (19)
Ever exchanged sex for drugs or money*	46 (10)	4 (3)	15 (6)	27 (27)
Total no. coital acts				
mean (s.d.)	11.9 (12.6)	12.0 (12.9)	11.4 (11.9)	12.8 (13.9)
median	9	8	8.5	10
No. unprotected coital acts (30 days)				
mean (s.d.)	7.7 (11.6)	7.7 (12.7)	7.9 (11.6)	7.1 (10.0)
median	3.0	2.0	4.0	3.0

* p-value < 0.0001;

** p-value < 0.01;

[†] p-value < 0.05;[‡] p-value = 0.05

Table II

Association between sociodemographic, reproductive, sexual history variables and at least 2 episodes of vaginal intercourse without barrier method use in the last 30 days

Characteristic	Episodes of Lack of Barrier Method Use in Last 30 days		Crude OR (95% CI)	Adjusted* OR (95% CI)
	None or 1 (N=162) %	2 or more (N=307) %		
Age Group	35 (22)	64 (21)	Referent	Referent
≥ 25 years	75 (46)	163 (53)	1.19 (0.73–1.95)	1.42 (0.75–2.67)
20 – 24 years	52 (32)	80 (26)	0.84 (0.49–1.44)	1.10 (0.54–2.23)
Race/ethnicity	75 (46)	143 (47)	Referent	Referent
White	46 (28)	82 (27)	0.97 (0.63 – 1.51)	1.08 (0.62–1.88)
Black	37 (23)	74 (24)	0.88 (0.49 – 1.57)	1.04 (0.52–2.09)
Hispanic	53 (33)	117 (38)	1.34 (0.80 – 2.26)	0.98 (0.52–1.84)
Other				
Substance abuse in last year	68 (42)	118 (39)	Referent	Referent
No	93 (58)	186 (61)	1.15 (0.78 – 1.70)	1.20 (0.70–2.04)
Yes				
Physically abused in the last year	134 (83)	250 (82)	Referent 1.05 (0.64 – 1.74)	Referent 1.11 (0.58–2.11)
No	28 (17)	55 (18)		
Yes				
Forced to have sex in last year	143 (89)	276 (90)	Referent	Referent
No	18 (11)	29 (10)	0.84 (0.45 – 1.56)	0.87 (0.39–1.91)
Yes				
History of STD	90 (56)	159 (52)	Referent	Referent
No	70 (44)	146 (48)	1.18 (0.80 – 1.74)	0.92 (0.55–1.52)
Yes				
Current use of hormonal contraception	119 (74)	188 (62)	Referent	Referent
No	42 (26)	117 (38)	1.76 (1.16 – 2.69)	1.59 (0.95 – 2.66)
Yes				
Partner's willingness to use condoms	99 (61)	84 (27)	Referent	Referent
Extremely willing	45 (28)	131 (43)	3.43 (2.20 – 5.36)	3.94 (2.30 – 6.73)
Somewhat willing	14 (9)	52 (17)	6.02 (3.36 – 10.8)	7.57 (3.76 – 15.2)
Not at all/not very willing	4 (2)	40 (13)		
Don't know willingness				
Other partner past month	112 (69)	236 (77)	Referent	Referent
No	50 (31)	71 (23)	0.67 (0.44 – 1.03)	0.60 (0.35–1.04)
Yes				
Unplanned sex after drinking (past 30 days)	74 (46)	125 (41)	Referent	Referent
Never	63 (39)	96 (31)	0.90 (0.59 – 1.39)	0.76 (0.43–1.34)
1–2 times	25 (15)	86 (28)	2.04 (1.20 – 3.46)	1.21 (0.58–2.53)
3 or more times				
Ever exchanged sex for drugs/money	148 (91)	275 (90)	Referent	Referent
No	14 (9)	32 (10)	1.23 (0.64 – 2.38)	1.03 (0.43–2.45)
Yes	39.0 (8.1)	34.4 (10.0)		P < 0.0001
Self Efficacy (Condom Confidence) Mean (s.d.)				
Self Efficacy	80 (49)	209 (68)	Referent	Referent
High (Score ≥ 40)	82 (51)	98 (32)	2.19 (1.48–3.23)	1.57 (0.96–2.58)
Low (Score < 40)				
No. Coital Episodes (past 30 d)	3 (1–60)	10 (2–99)	1.10 (1.07–1.14)	1.12 (1.08–1.16)
Median (range)	6.7 (8.5)	14.6 (13.6)		
Mean (std dev)				
No. Coital Episodes (past 30 d)	121 (75)	113 (37)	Referent	Referent
≤ 8	41 (25)	194 (63)	5.07 (3.32–7.74)	5.60 (3.41–9.19)
9 or more				

* Odds ratios are adjusted for race, use of hormonal contraception, frequency of coitus, more than one partner, partner willingness to use condoms, self-efficacy, and having unplanned sex after drinking.

Table III
Correlates of two or more episodes of vaginal intercourse without barrier method use in the past 30 days by age strata

Characteristic	OR* adj	Age ≥19 years		Age 20 – 24 years		Age ≥ 25 years	
		OR* adj	95% CI	OR* adj	95% CI	OR* adj	95% CI
Race/ethnicity	Referent						
White	0.74						
Black	1.02	0.22 – 2.45	Referent	0.54 – 2.63	Referent	0.23 – 2.05	
Hispanic	0.52	0.25 – 4.15	1.20	0.36 – 3.19	0.69	0.26 – 3.40	
Other	0.52	0.14 – 1.93	1.08	0.69 – 4.56	0.94	0.17 – 1.98	
Current Hormonal Contraception Use	Referent						
No	0.84	0.29 – 2.45	Referent	1.17 – 4.97	Referent	0.57 – 6.54	
Yes	1.18	1.09 – 1.28	1.12	1.06 – 1.19	1.07	1.01 – 1.12	
Frequency of Coitus in past 30 days	0.65	0.22 – 1.89	0.63	0.28 – 1.42	0.57	0.19 – 1.70	
More than one partner in the past 30 days	1.0						
Partner Willingness	5.19	1.64 – 16.5	3.12	1.50 – 6.50	3.13	0.95 – 10.3	
Willing	6.85	1.51 – 31.2	8.19	2.72 – 24.7	6.28	1.49 – 26.5	
Somewhat willing	0.93	0.87 – 0.99	0.97	0.93 – 1.01	1.00	0.95 – 1.05	
DK/Not willing	1.0						
Self Efficacy	0.86	0.29 – 2.50	0.93	0.42 – 2.08	0.79	0.25 – 2.49	
Unplanned Sex after drinking in past 30 days	0.83	0.18 – 3.89	1.66	0.61 – 4.54	0.63	0.16 – 2.42	
Never							
1 – 2 times							
3 or more times							

* Adjusted odds ratios are adjusted for race, hormonal contraception use, frequency of coitus, multiple partners, partner willingness, self efficacy, and unplanned sex after drinking.