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Condom Use among Sterilized and Non-sterilized Women in County Jail and Residential Treatment Centers

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Abstract

Purpose—While sterilized women do not need condoms for pregnancy prevention, they may still be at risk for sexually transmitted infections (STIs). Previous studies have shown that sterilized women have lower rates of condom use but have not controlled for the nested multilevel structure of data in which individual women have multiple partners with different STI risk factors. We address this limitation by testing the association of condom use and tubal ligation using multilevel analysis.

Methods—Data were obtained from a cross-sectional survey of sterilized and non-sterilized women aged 18–44 in substance abuse treatment centers or county jail. Multilevel random intercept logistic models examined the association of tubal ligation and any condom use in the 30 days prior to entry and controlled for individual- and partner- level correlates.

Findings—Of 484 pre-menopausal respondents without hysterectomy, 194 (40.1%) reported tubal ligation. Overall, 48.3% of all women reported any condom use. In unadjusted and adjusted analyses, sterilized women were less likely to report any condom use. Women were least likely to use condoms with their main partners and more likely to use condoms with other partners and partners with whom they trade sex for drugs or money. Women were also more likely to use condoms with partners they believed to be HIV positive.

Conclusion—In these high-risk settings, we found a high prevalence of women reporting tubal ligation and lower odds of condom use among these women. Condom use interventions targeting sterilized women in these settings are needed.

Introduction and Background

Tubal ligation is a highly effective method of surgical sterilization used by 10.3 million women in the U.S. (Mosher, Martinez, Chandra, Abma, & Willson, 2004). Despite its high efficacy in preventing pregnancy, tubal ligation does not provide any protection against HIV or other STIs. Because of this, sexually active women at risk, regardless of fertility status, can help prevent sexually transmitted infection (STI) and HIV transmission by using condoms.

Thus, it is worrisome that several studies have documented low rates of condom use or low rates of planned condom use among women with tubal ligations or other types of surgical sterility (e.g. hysterectomy) (Anderson, Brackbill, & Mosher, 1996; Armstrong, Samost, & Tavis, 1992; Diaz, Schable, & Chu, 1995; Sangi-Haghpeykar, Horth, & Poindexter, 2001; Sangi-Haghpeykar & Poindexter, 1998; Santelli, et al., 1992; Semaan, Lauby, & Walls,

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1997). In a study of African American women residing in low income communities, although sterilized women were at higher risk for HIV than non-sterilized women, they were less likely to report using condoms with their main partners (Semaan, et al., 1997). In another study of women from inner city minority neighborhoods in Baltimore, sterilized women were approximately half as likely as non-sterilized women to have used condoms in the previous month (12% vs. 28%) (Santelli, et al., 1992). Among Hispanic women recruited from a low income clinic in Houston, sterilized women were less likely to have used condoms every time or almost every time they had sex in the previous 3 months as compared to non-sterilized women using hormonal contraceptives (18% vs. 32%) (Sangi-Haghpeykar, et al., 2001). A report from the 1988 National Survey of Family Growth (NSFG) found that surgically sterile women were less likely to report condom use for the purpose of STI prevention every or most times they had intercourse (Anderson, et al., 1996). Even among HIV positive women across 12 U.S. states and cities, women with tubal ligations were less likely to report using condoms (Diaz, et al., 1995).

Studies among presumably fertile women have demonstrated that condom use is modified by partner type; women use condoms less often with their main partners than with other partners (Lansky, Thomas, & Earp, 1998; Macaluso, Demand, Artz, & Hook, 2000). Because women may have multiple types of partners who represent different risk factors for STI, it is likely their reasons for and odds of condom use differ across types of partners. To date, studies comparing condom use among sterilized and non-sterilized women have not adequately controlled for the influence of partner- level correlates of condom use. For example, studies either limit analysis to women with only main partners (Sangi-Haghpeykar, et al., 2001; Semaan, et al., 1997) or do not account for the type, number, or characteristics of sexual partners (Anderson, et al., 1996; Armstrong, et al., 1992; Diaz, et al., 1995; Sangi-Haghpeykar & Poindexter, 1998; Santelli, et al., 1992).

Given this complexity, multilevel studies that simultaneously control for both individual-and partner- level variables are the most appropriate method to explore the main effect of sterility on condom use. To our knowledge, no studies in this literature have employed multilevel analyses. The primary purpose of this study was to analyze the association of sterility status on condom use while controlling for the combined influence of individual-and partner-level correlates. We examined the following two research questions using samples of high-risk women recruited in substance abuse treatment centers and a large urban county jail: (1) How do sterilized and non-sterilized women differ in regard to socio-demographics and sexual partners? and (2) Are sterilized women less likely than non-sterilized women to use condoms during vaginal sex?

Methods

Procedures

The data for this secondary analysis are from a cross-sectional survey administered from November 1998 through February 2000 at three sites, including a large urban county jail and two publicly-funded drug and alcohol treatment facilities in Houston, Texas. The purpose of the primary study was to estimate the prevalence of past behaviors that could have put a woman at risk of having an alcohol-exposed pregnancy (Project CHOICES Research Group, 2002). Participants were compensated for their time in completing the survey with \$10 deposited in their commissary account (jail participants) or provided in cash (treatment program participants). The study was approved by the Institutional Review Board (IRB) at the federal sponsoring agency and the University of Texas- Health Science Center-Houston IRB which included a prisoner advocate. Additionally, a certificate of confidentiality was obtained from the National Institutes of Health.

Women were eligible for participation if they were 18–44 years, could understand and speak English, and could provide informed consent. Women in the jail who were housed on the mental health floor or were in protective custody were excluded.

In the jail, a probability sample was drawn from weekly lists of detainees who had been incarcerated for 10–14 days and were due for a legally mandated medical examination (n=8524). Over the study period, the weekly random samples drawn from these lists totaled n=872 women. Of these women, 336 (38%) were ineligible because of early release (n=206), age <18 or ≥45 (n=93), not available after a 2nd call (in court or otherwise unavailable) (n=23), non-English-speaker (n=10), or previous survey (n=4). Of the remaining 536 eligible women, 506 (94%) provided written consent and completed the survey.

At the 2 treatment sites, the study was presented to all women at the beginning of their stay after detoxification had occurred (n=591). Of these women, 137 (23%) were ineligible due to age ≤18 or ≥45 (n=129), previous survey (n=5), or unavailability after 2nd contact attempt (n=3). Of 454 eligible women, 100% provided consent; one woman had to leave before finishing the survey, leaving 453 women in the study from the treatment sites. The overall sample included 959 women from both jail and treatment sites.

For the purpose of this analysis, the sample was further restricted to women who reported vaginal sex with one or more men within 30 days of entering the facility (n=312), were not pregnant (n=45) or trying to get pregnant in the 6 months prior to entering the facility (n=81), and did not report causes of sterility such as hysterectomy, total oophorectomy, or menopause (n=90). Women could be ineligible on more than one criterion. Women who reported a history of tubal ligation and otherwise fertile women were included. The final sample size was n=484.

Data Collection

The survey was conducted by trained female research assistants as a 35–45 minute personal interview in private settings approved for HIV counseling. Questions used in this analysis assessed women's socio-demographic characteristics and vaginal sex with men in the 30 days prior to entry into the facility.

Measures

Condom Use—The dependent variable, condom use, was measured separately for each partner type with the following two questions assessing condom use motivation: “When you had vaginal sex what method(s), if any, of protection from *STIs* did you use?” and “When you had vaginal sex what method(s), if any, of protection from *pregnancy* did you use?” Of the 234 women reporting any condom use, the vast majority of women, including sterilized women, reported using condoms for dual purposes (i.e. for both pregnancy and STI prevention) (76.1%, n=178), fewer (23.1%, n=54) reported using condoms solely for STI prevention, and only 2 women (<1%) reported using condoms solely for the purpose of pregnancy prevention. For this reason, we were unable to compare the use of condoms for STI vs. pregnancy prevention, thus we restrict our analysis to condom use for any reason (yes vs. no).

Partner Variables—Each woman reported the number of male partners in the following order: those she considered a “main” partner, partners with whom she had traded sex for drugs or money, and lastly, “any other partner.” The difference between “main,” “trading,” and “other” partners were not explicitly defined in the interview. Specifically, women were asked, “*In the 30 days before coming here...:*”

...did you have vaginal or anal sex, or give oral sex, with someone you consider a **main partner?**”

...did you **TRADE** vaginal or anal sex, or give oral sex with someone for drugs or money?”

... did you have vaginal or anal sex, or give oral sex, with any other partner?”

Four additional questions were asked for each grouping of partner type(s) with whom the woman reported vaginal intercourse: number of partners of that type, HIV status (“Do you think any of the [main/trade/other] partner(s) was/were HIV positive?”), frequency of intercourse, and whether they used any other type of contraceptive method (excluding condoms) with that partner for the purpose of preventing pregnancy (e.g., depo-provera, oral contraceptives).

All questions about sexual partners, including condom use, referred to type of male partners as a group (i.e. main, other), and were not asked separately for each individual sexual partner.

Individual Variables—The characteristics of respondents were measured by responses to questions about marital status (single/never married, currently married or living with a partner, or widowed/divorced/separated), age (continuous), race (white, black, other), annual household income (< or ≥ \$20,000), highest grade of education completed (< high school or ≥ high school), survey site (jail or treatment center), pregnancy history (ever vs. never), homeless for >48 hours in the previous year, STI diagnosis in past year, and HIV status.

Analysis

Jail and Treatment Women—Prior to combining the sub-samples of women from jails and treatment centers, tests of group differences between the sub-samples were conducted using Chi-square statistics for all measured covariates. The sub-samples differed on several variables: treatment women reported lower incomes and a higher number of sexual partners, were older, were more likely to report a history of homelessness, forced sex, and partners with whom they traded sex for drugs and/or money, and were less likely to be married or to use other methods of contraception [data not shown]. However, the sub-samples did not differ in regard to racial/ethnic makeup, educational background, pregnancy, STI, or HIV history, partner history of HIV, or having main or other partners [data not shown]. Importantly, in these analyses, the sub-samples did not differ in regard to the primary dependent or independent variables of interest: condom use ($\chi^2 = 2.95$, $p = .086$) or sterility status ($\chi^2 = 2.27$, $p = .132$). For this reason we combined the sub-samples; however, to adjust for any differences by recruitment site, a dummy variable indicating recruitment site (treatment center vs. jail) was included in the final, fully adjusted multilevel model.

Sterilized and Non-sterilized Women—Tests of group differences between sterilized and non-sterilized women were conducted using the Chi square statistics. Variables used in these analyses were identified by previous research (age, education, marital status, number of lifetime pregnancies and births, use of other birth control methods) (Armstrong, et al., 1992; Sangi-Haghpeykar, et al., 2001; Santelli, et al., 1992; Semaan, et al., 1997) and also included additional demographic and study variables (survey site, race, annual household income).

Condom Use—All condom use analyses were conducted with random intercept multilevel logistic modeling. First, we ran an empty two-level model including only a random intercept to test for significant clustering of condom use at the participant level and the justification of using multilevel analysis. Additional multilevel analyses account for the clustering of

partners within individual women by simultaneously controlling for individual characteristics (level 1) and additionally, partner characteristics (level 2).

Potential individual- and partner-level correlates of condom use were identified from the literature on condom use among women with tubal ligations and among incarcerated populations (Rosengard, et al., 2005; Sangi-Haghpeykar, et al., 2001; J. S. Santelli, Davis, Celentano, Crump, & Burwell, 1995; Semaan, et al., 1997) and include age, race, education, income, marital status, pregnancy history, homelessness, STI history, HIV status, forced sex, type and number of sexual partners, and frequency of intercourse with each partner. We also examine study site and use of methods of contraception other than condoms (e.g. oral contraceptive pill) as possible correlates. All covariates were entered into a bivariate model predicting condom use. Covariates were then included in the multivariate models if they (1) were not highly correlated with another covariate ($r \leq .70$) and (2) if at least one category of the variable was associated with the outcome in unadjusted multilevel logistic regression analysis ($p < 0.05$). We present the results of the empty model, unadjusted bivariate model and a fully adjusted multivariate model. All analyses were conducted using the *gllamm* package in Stata IC 10.0 (StataCorp, 2007).

Results

Overall, the women in this sample ($n=484$) represent a racially diverse (black, white, Hispanic), low socioeconomic status group with multiple risk factors for STI, including having multiple sexual partners (Table 1). Of all women, 40.1% ($n=194$) reported a history of tubal ligation while 59.9% ($n=290$) reported no tubal ligation. These women will be referred to in the following discussion as sterilized and non-sterilized, respectively. Sterilized women were older, were more likely to have ever been pregnant, more likely to have been married, were more likely to be HIV positive than non-sterilized women, and were less likely to use other methods of contraception (Table 1).

Among non-sterilized women, while many used condoms and some used other methods of contraception (e.g. oral contraceptive pill), 38.6% ($n=112$) used no methods at all--neither condoms nor any other method of contraception (Table 2). Of non-sterilized women using some other form of contraception, the majority used oral contraceptive pills (42.3%) or Depo provera (34.6%) (Table 2).

Of the total sample, nearly half of all women (48.3%, $n=234$) reported using condoms for any purpose in the 30 days before they entered the facility. In bivariate analyses, sterilized women were less likely to report using condoms with all types of partners combined and with main partners (Table 3). Although not statistically significant, sterilized women were less to use condoms with trading partners, and were *more* likely to use condoms with other partners. The majority of all women report using condoms for both pregnancy and STI prevention while fewer report using condoms for STI or pregnancy prevention only (Table 4). In bivariate analyses, sterilized women were less likely to report using condoms for any reason or for both pregnancy and STI prevention (Table 4).

Bivariate analyses indicated that several individual-level and partner-level correlates (age, race, marital status, site, HIV status, STI history, pregnancy history, forced sex, number and type of partner(s), and partner HIV status) were eligible for inclusion in the adjusted condom use model (Table 5). Because the woman's HIV status and her partner(s) HIV status were highly correlated ($\rho=0.82$, $p<.001$) and provided similar results; only partner-level HIV status was included in the final fully adjusted model.

In an empty model of condom use including only a random intercept, significant clustering was present (Variance: 1.48, SE: 0.85, Intraclass Correlation Coefficient: 0.31), justifying

the use of a multilevel model. Overall, both unadjusted and adjusted multilevel analyses demonstrated that sterilized women were less likely than non-sterilized women to use condoms for any reason (Table 5). In adjusted analyses, women who were black, married, and were recruited from the jail were more likely to use condoms. Among the partner-level covariates in the final model, compared to main partners, women were more likely to use condoms with other partners and partners with whom they trade sex for drugs or money and were also more likely to use condoms with partners they believe to be HIV positive.

Conclusions and Discussion

We examined the association of tubal ligation and condom use and found that sterilized women were less likely to report use of condoms. Importantly, this finding held after controlling for a host of individual- and partner- level correlates, including the number and HIV status of different types of sexual partners.

Our finding that sterilized women were overall less likely to report any condom use confirms previous research (Anderson, et al., 1996; Armstrong, et al., 1992; Diaz, et al., 1995; Sangi-Haghpeykar, et al., 2001; Semaan, et al., 1997; Santelli et al., 1992). There are multiple reasons why sterilized women may be less likely to use condoms than fertile women. The first, and most obvious, is that unlike fertile women, sterilized women do not need to use condoms for pregnancy prevention. Thus, the lower rates of condom use among sterilized women should be expected and is not necessarily a cause for concern. Condoms are a unique method of contraception, however, in that they can serve dual purposes, and populations with a lower likelihood of condom use, regardless of the reasons for use, may face greater STI risk.

Our findings extend previous research by controlling for the nested structure of sexual behavior data. Some previous studies examining the association of sterilization and condom use did not adjust for any correlates at the individual- or partner- level (Anderson, et al., 1996), did not account for any partner-level correlates such as partner type (Sangi-Haghpeykar & Poindexter, 1998), or limited analyses to women with only main partners (Sangi-Haghpeykar, et al., 2001; Semaan, et al., 1997). We controlled for multiple factors at both levels using multilevel analysis and found that even after accounting for these factors, sterilized women have lower odds of condom use. Although none of the sociodemographic factors or individual-and partner- STI risk factors measured in this study accounted for the observed differences, other factors, not measured here, may explain the differences between sterilized and non-sterilized women. Possible explanatory factors include beliefs and attitudes about condoms or STI and/or relationship characteristics such as intimacy. For example, previous studies have shown that sterilized women and/or their partners may have misperceptions about the role of surgical sterilization in the prevention of STI (Santelli, et al., 1992; Semaan, et al., 1997) and/or may hold a perception of lower risk for STI (Sangi-Haghpeykar, et al., 2001).

By measuring several partner-level factors, we were able to demonstrate higher odds of condom use with trading and other partners, with increasing number of partners, and with partners who are HIV positive. While the lower odds of condom use with main partners may indicate common misperceptions of risk about main partners, the diminishing use of condoms over time in a relationship, or cultural norms regarding condom use with new vs. consistent partners (Macaluso, et al., 2000), we are encouraged that women are using condoms more often when they have more partners and they or their partners' have HIV.

Overall, however, only 48.3% of all women in our sample reported ever using condoms in the 30 days before entry into their facility. This low rate and the even lower rate among

sterilized women is concerning given that the women in our sample, recruited from county jail and residential drug and alcohol treatment centers, are at particularly high risk for STI. Women from these settings have several indicators of social disadvantage that put them at risk, including ethnic minority status, poverty, mental health problems, high rates of drug use, risky drinking, a greater number of sexual partners, high prevalence of sex work, and low rates of condom use (Hogben, Lawrence, & Eldridge, 2001; Mullen, Cummins, Velasquez, von Sternberg, & Carvajal, 2003; Schilling, et al., 1994; Woods, et al., 2000). Accordingly, our low-SES sample fits this profile and is distinguished by having multiple partners, and high rates of history of homelessness, forced sex, sex work, and treatment for STI.

Also of concern is the high level of risk for both pregnancy and STI among non-sterilized women. Of these women, while several used condoms, very few reported use of other methods of contraception. In all, over one-third (38.6%) weren't using any method at all—neither condoms nor other methods. In addition to their high risk of STI, women in jails and residential treatment facilities face additional risks associated with an unintended pregnancy during their incarceration or treatment and after their release (e.g. high rates of fetal drug and alcohol exposure)(Burd, Selfridge, Klug, & Bakko, 2004).

Of all reversible contraceptive methods used in this sample, condoms were used the most, followed by the oral contraceptive pill. These results are similar to findings of other studies of incarcerated and treatment center women (Armstrong, Kenen, & Samost, 1991; Clarke, et al., 2006; Hale, et al., 2009; Shah, Hoffman, Shinault, & LaPoint, 1998), where condoms are the most predominant method of reversible contraception. In a sensitivity analysis supporting our use of all non-sterilized women, regardless of other method use, as our comparison group, we compared condom use among non-sterilized women using and not using other contraceptive methods with condom use among sterilized women. By other contraceptive method status, 53.4% and 51.9% of those non-sterilized women *using* other methods (e.g. pill, depo) or not using other methods, respectively, report condom use. Therefore, among non-sterilized women, both method users and method non-users are reporting a higher percentage of condom use than sterilized women, of whom only 42% report condom use.

We also found several differences between sterilized and non-sterilized women, namely, that sterilized women were older, less likely to be single, and more likely to have had a previous pregnancy. These differences confirm previous research demonstrating similar sociodemographic profiles among sterilized women (Armstrong, et al., 1992; Sangi-Haghpeykar, et al., 2001; Semaan, et al., 1997). In our study, sterilized women were also more likely to report being HIV positive but equally as likely to report a history of STI. The higher rate of HIV among sterilized women may be related to the greater likelihood of having an HIV positive partner among this group. Previous studies report conflicting findings regarding STI and STI risk differences among sterilized and non-sterilized women. Of recent studies, some demonstrate higher rates of sterilization among HIV-positive women (Stanwood, Cohn, Heiser, & Pugliese, 2007) while others do not (Massad, et al., 2007). In a study of African American women with main partners, while sterilized women were equally likely to have had an HIV test, they were more likely to have higher HIV/STI risk profiles (indicating greater use of street drugs, history of trading sex, STI history, more partners, and binge drinking) than non-sterilized women (Semaan, et al., 1997). A study of women in drug treatment programs demonstrated that sterilized women were more likely to have ever injected drugs and to have had a history of pelvic inflammatory disease (Armstrong, et al., 1992). However, in a study of Hispanic women, when compared to hormonal contraceptive users, sterilized women were equally as likely to report a history of STI and also reported lower perceived chance of either HIV or STI infection (Sangi-

Haghpeykar, et al., 2001). It is likely these differing findings are a result of the dramatically different target populations in these studies.

Our findings are limited by the use of an English-speaking sample and the validity of self-reported measures. Additionally, while other correlates such as psychosocial factors have demonstrated consistent associations with condom use, these were not measured in the primary study, and were therefore unavailable for this analysis. The women were asked about their condom use behavior with a class of partners as a whole (e.g. main partners). Because some women reported multiple partners of the same type, this approach is somewhat imprecise. On the other hand, because many of the women in this sample reported 10 or more partners, asking about each partner separately would have dramatically increased respondent burden and may have resulted in less accurate reporting. Related to this issue, our grouping of partner types may represent an oversimplification of the reality for these women—for example, we were unable to explicitly examine sexual assault and single encounters. This grouping may also have led to different interpretations of the meaning of “main” “trading” and “other” partners among our participants. Finally, the majority of women in this sample reported using condoms for both STI and pregnancy prevention and far fewer reported condoms for a single purpose. Due to this distribution, we were unable to examine whether sterilized and non-sterilized women differed with regard to motives for condom use using multilevel modeling. It is unknown whether this response pattern is a true reflection of the predominance of dual motivations in our sample or whether our measures simply were not able to adequately capture distinct motives. Finally, as we noted, there were several observed differences between our jail and treatment sub-samples. However, we controlled for recruitment site in the final, fully adjusted multivariable models and in sensitivity analyses, conducted the final analyses separately by sub-sample and found no discernible differences.

Despite these limitations, our study represents one of a very few studies in this area to study condom use behaviors among women with multiple partners, and to our knowledge, the first study comparing condom use among sterilized and non-sterilized using multilevel analyses.

The tendency of individual-level psychosocial models to explain only a small percentage of the variance in individual condom use has been noted previously (Ogden, 2003). Condom use, rather than being a behavior driven solely by individual-level predictors, is driven by the sociodemographics of individuals and their partners, the perceived and actual partner-level beliefs, attitudes, and risk factors, as well as perceptions on the part of both partners regarding relationship-level characteristics such as intimacy (Bowen, Williams, Dearing, Timpson, & Ross, 2006). Failure to recognize the hierarchical structure of sexual behavior data, in which individuals may have multiple partners with multiple risk factors for STI, may lead to misinterpretation of effects. Multilevel models allow researchers to simultaneously control for the effects of individual- and partner-level variables in nested datasets. We support the adoption of multilevel analyses in future contraceptive research among individuals with multiple partners, a move that will necessitate, in addition to the traditional measurement of individual-level factors, the more labor intensive data collection of behaviors and correlates specific to each sexual partner, or alternatively, random sampling of sexual partners.

In 2002, tubal ligation was the second leading contraceptive method, used by 16% of all women and 21% of married women aged 15–44 in the U.S. (Mosher, et al., 2004). Tubal ligation is even more common among subgroups of women at risk of STI, including older women, women with more children, black and Hispanic women, and among those with lower education (Chandra, Martinez, Mosher, Abma, & Jones, 2005). Arguably, incarcerated and treatment center populations contain a disproportionate number of these

disadvantaged at risk populations. We found a high prevalence of women reporting tubal ligation in our study, and lower odds of condom use among sterilized women, suggesting that in high risk settings such as treatment centers and jails, women sterilized with tubal ligation represent a large subgroup of women who may be at particular risk for STI. It is not clear why sterilization is so prevalent in these settings and this gap in the literature deserves some attention. The need for accurate information about continued STI risk following surgery at the time of sterilization has been noted previously (Sangi-Haghpeykar & Poindexter, 1998). Our findings suggest that jail and treatment center programs should reiterate these messages by focusing on educating sterilized women about the importance of condoms as a method of disease prevention for use with all types of sexual partners.

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Table 1

Characteristics of Sterilized and Non-sterilized Women and Behaviors in 30 days Prior to Incarceration or Treatment

Characteristic	Total n=484	Sterilized n=194	Non-sterilized n=290	t (df) p
	n (% of total)	n (% of sterilized)	n (% of nonsterilized)	Chi-square(df) p
Age				
18–29	172 (35.5)	38 (19.6)	134 (46.2)	36.1 (2) p<.001
30–39	233 (48.1)	118 (60.8)	115 (39.7)	
40–44	79 (16.3)	38 (19.6)	41 (14.1)	
Site				
Treatment center	218 (45.0)	85 (43.8)	133 (45.9)	.197 (1) p=.709
Jail	266 (55.0)	109 (56.2)	157 (54.1)	
Race				
White	178 (36.9)	61 (31.4)	117 (40.5)	4.68 (2) p=.096
Black	232 (48.0)	104 (53.6)	128 (44.3)	
Other	63 (13.0)	29 (14.9)	44 (15.2)	
Education				
Less than high school	183 (37.8)	73 (37.6)	110 (37.9)	.005(1) p=.946
High school/GED or more	301 (62.2)	121 (62.4)	180 (62.1)	
Annual household income				
< 20,000	356 (73.9)	143 (73.7)	213 (74.0)	.690 (2) p=.708
≥20,000	125 (25.9)	51 (26.3)	74 (25.7)	
Marital status				
Single, never married	179 (37.0)	48 (24.7)	131 (45.2)	24.89 (2) p<.001
Currently married or living with a partner	120 (24.8)	49 (25.3)	71 (24.5)	
Widowed, Divorced, Separated	185 (38.2)	97 (50.0)	88 (30.3)	
Pregnancy history				
Never pregnant	46 (9.5)	0 (0)	46 (15.9)	34.00(1) p<.001
Ever pregnant	438 (90.5)	194 (100%)	244 (84.1)	
Homeless in past year				
Yes	206 (42.6)	86 (44.2)	100 (55.7)	.414(1) p=.520
No	278 (57.4)	120 (41.4)	170 (58.6)	
STI treatment in past year				
Yes	117 (24.2)	49 (25.3)	68 (23.4)	.208 (1) p=.649
No	367 (75.8)	145 (74.7)	222 (76.6)	
HIV Positive				
Yes	27 (6.0)	16 (9.0)	11 (4.1)	4.57(1) p=.032
No	421 (94.0)	162 (91.0)	259 (95.9)	
History of forced sex in last year				
Yes	120 (24.8)	52 (26.8)	68 (23.4)	.702(1) p=.402
No	364 (75.2)	142 (73.2)	222 (76.6)	
Type of sexual partner(s)				

Characteristic	Total n=484	Sterilized n=194	Non-sterilized n=290	t (df) p
	n (% of total)	n (% of sterilized)	n (% of nonsterilized)	Chi-square(df) p
Main partner				
Yes	405 (83.7)	168 (86.8)	237 (81.7)	2.02(1) p=.155
No	79 (16.3)	26 (13.4)	53 (18.3)	
Trading partner				
Yes	151 (31.2)	60 (30.9)	91 (31.4)	.011(1) p=.916
No	333 (68.0)	134 (69.1)	199 (68.6)	
Other partner				
Yes	47 (9.7)	14 (7.2)	33 (11.4)	2.297(1) p=.130
No	437 (90.3)	180 (92.8)	257 (88.6)	
Number of sexual partner(s)				
1 partner	290 (59.9)	120 (61.9)	170 (58.6)	.683(2) p=.711
2, 3 partners	85 (17.6)	31 (16.0)	54 (18.6)	
≥4 partners	109 (22.5)	43 (22.2)	66 (22.8)	
Any use of other birth control (not including condoms)				
Yes	53 (11.0)	1 (0.5)	52 (17.9)	36.16(1) p<.001
No	431 (89.0)	193 (99.5)	238 (82.1)	
Partner(s) is HIV Positive				
Yes	41 (8.5)	24 (12.4)	17 (5.9)	6.3(1) p=.012
No	440 (91.5)	169 (87.6)	271 (94.1)	

Table 2

Use of Contraceptive Methods by Non-sterilized Women (n=290)

Use of Other Contraceptive Methods and Condoms		
Use of Contraceptive Methods other than Condoms		
	No (% of non-sterilized women)	Yes (% of nonsterilized women)
Condom Use		
Yes (n=154)	126 (43.4)	28 (9.7)
No (n=136)	112 (38.6)	24 (8.3)
Total	238 (82.1)	52 (17.9%)

Use of Other Contraceptive Methods by Non-sterilized Women (n=52)

Other Contraceptive Methods Types	
	n (% of those using other methods) ^a
Oral contraceptive	22 (42.3)
Depo provera	18 (34.6)
Norplant	5 (9.6)
Spermicide	4 (7.7)
Diaphragm or Cervical Cap	2 (3.8)
Emergency Contraception	1 (1.9)
IUD 1	(1.9)

^a Percents add to >100% because one woman used two methods (spermicide and Depo).

Table 3

Any Reported Condom Use by Type of Partner

Characteristic	Total n=484	Sterilized n=194	Non-sterilized n=290	t (df) p
	n (% of total)	n (% of sterilized)	n (% of nonsterilized)	Chi-square(df) p
All types of partners	234 (48.3)	80 (41.2)	154 (53.1)	6.55(1) p=.010
Main partner(s)	144 (35.6)	46 (27.4)	98 (41.4)	8.37(1) p=.004
Trading partner(s)	110 (72.9)	40 (66.7)	70 (76.9)	1.92(1) p=.166
Other partners(s)	30 (63.8)	11 (78.6)	19 (57.6)	1.9 (1) p=.171 ^a

^aExpected cell sizes n<5: Fisher's Exact p=.204

Table 4

Any Reported Condom Use by Reason for Use

Characteristic	Total n=484	Sterilized n=194	Non-sterilized n=290	t (df) p
	n (% of total)	n (% of sterilized)	n (% of nonsterilized)	Chi-square(df) p
For Any Reason	234 (48.4)	80 (41.2)	154 (53.1)	6.55(1) p=.010
For Pregnancy Prevention only	2 (.40)	0 (0)	2 (.69)	1.34(1) p=.246 ^a
For STI Prevention only	54 (11.2)	28 (14.4)	26 (9.0)	3.51(1) p=.061
For Both Pregnancy and STI Prevention	178 (36.8)	52 (26.8)	126 (43.5)	13.85(1) p<.001

^aExpected cell sizes n<5: Fisher's Exact p=.519

Table 5**Odds Ratios for Women Reporting Condom Use**

	Unadjusted		Adjusted ^a	
	OR	95% CI	OR	95% CI
Individual-level Variables				
Fertility				
Non-sterilized	1		1	
Sterilized	0.53	0.33–0.85	0.50	0.36–0.96
Site				
Jail	1		1	
Treatment center	0.52	0.34–0.81	0.28	0.14–0.56
Age				
18–29	1		1	
30–39	0.85	0.53–1.37	1.09	0.55–2.16
40–44	0.49	0.25–0.94	0.64	0.25–1.65
Race				
White	1		1	
Black	3.40	1.92–6.02	3.33	1.60–6.97
Other	1.85	0.94–3.65	1.99	0.82–4.87
Marital status				
Single	1		1	
Married/living with partner	0.18	0.08–0.37	0.21	0.08–0.52
Widowed, divorced, separated	0.40	0.23–0.69	0.55	0.27–1.14
Education				
<High school	1		-	-
≥High school/GED	0.77	0.49–1.21	-	-
Annual household income				
< 20,000	1		-	-
≥20,000	0.77	0.47–1.28	-	-
Pregnancy history				
Never pregnant	1			
Ever pregnant	0.22	0.09–0.53	0.34	0.11–1.10
Ever homeless in last year				
No	1		-	-
Yes	1.22	0.78–1.90	-	-
HIV positive				
No	1		1	
Yes	5.67	1.85–17.44	9.80	2.17–44.23
STI treatment				
No	1		1	
Yes	2.27	1.33–3.89	1.42	0.82–2.81
History of forced sex				

	Unadjusted		Adjusted ^a	
	OR	95% CI	OR	95% CI
No	1		1	
Yes	1.93	1.15–3.23	1.39	0.70–2.73
Partner-level Variables				
Use of other contraceptive				
No	1		-	-
Yes	1.30	0.64–2.65	-	-
Partner type				
Main partners	1		1	
Trading partners	9.19	4.43–19.04	3.87	1.75–8.57
Other partners	3.22	2.27–17.07	5.59	1.90–16.41
Number of sexual partners	1.16	1.09–1.24	1.12	1.04–1.21
Partner(s) HIV Positive				
No	1		-	
Yes	3.65	1.50–8.85	-	

^a Adjusted for individual (age, race, marital status, site, STI, pregnancy, forced sex) and partner (number, type of partner, partner HIV) characteristics.