



Published in final edited form as:

*AIDS Behav.* 2010 August ; 14(4): 949–959. doi:10.1007/s10461-008-9458-1.

## Determinants of Consistent Condom Use Vary by Partner Type among Young Men in Kisumu, Kenya: A Multi-level Data Analysis

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## Abstract

To evaluate whether determinants of consistent condom use vary by partner type among young sexually active Kenyan men, we conducted a cross-sectional assessment of lifetime sexual histories from a sub-sample of men enrolled in a clinical trial of male circumcision. 7913 partnerships of 1370 men were analyzed. 262 men (19%) reported never, 1018 (74%) sometimes and 92 (7%) always using a condom with their partners. Condoms were always used in 2672 (34%) of the total relationships—212 (70%) of the relationships with sex workers, 1643 (40%) of the casual and 817 (23%) of the regular/marital relationships. Factors influencing condom use varied significantly by partner type, suggesting that HIV prevention messages promoting condom use with higher-risk partners have achieved a moderate level of acceptance. However, in populations of young, single men in generalized epidemic settings, interventions should promote consistent condom use in all sexual encounters, independently of partner type and characteristics.

## Keywords

Condom use; Partner type; Multiple partners; Concurrent partners; Kenya; Africa

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## Introduction

Condoms continue to be an important tool for reducing disease incidence in sexually active people, and promotion of correct and consistent condom use is a cornerstone of HIV prevention worldwide. Taking all-cause condom failure into account, estimates for the effectiveness of condoms used consistently for HIV prevention are 90% and above (Hearst and Chen 2004; Steiner et al. 2000). Nevertheless, examples of reductions in HIV incidence through promotion of consistent condom use are few. Condoms have been promoted effectively in organized brothel settings in Thailand and Cambodia (Ford and Koetsawang 1999; Monitoring the AIDS Pandemic (MAP) network 2002; UNAIDS 2006) and among sex workers in several other regions (Levine et al. 1998; Meda et al. 1999; Ngugi et al. 1996). Inducing large proportions of men to use condoms consistently in the context of longer term relationships, however, has proven more challenging. Because it is within these longer term relationships that many HIV transmissions occur, use of condoms in this context is of importance (Halperin and Epstein 2004).

Considerable research has been dedicated to understanding the behavioral and psychosocial correlates of condom use in a variety of populations and settings (Noar et al. 2006; Sheeran et al. 1999). Factors found to be associated with inconsistent condom use include general negative attitudes towards condoms, low education level, and economic asymmetries between partners (Hounton et al. 2005; Lagarde et al. 2001; Luke 2005; Plummer et al. 2006; Sunmola 2005; Thomsen et al. 2004). Because individuals may assess personal risk prior to or during a given sexual encounter, determining condom use by partner type could result in better targeted intervention programs (Noar et al. 2006; Sheeran and Abraham 1994).

In 1994, Sheeran and Abraham found that three fourths of studies examining condom use either did not specify or did not analyze condom utilization by partner type (Sheeran and Abraham 1994). More recently, 57% of condom use measures were found to be non-partner specific (Noar et al. 2006). And yet, prevalence of male condom use varies considerably by partner type: highest with sex workers, lower with casual partners, and lowest with regular or marital partners (de Visser et al. 2003; Douthwaite and Saroun 2006; Ferguson et al. 2004; Macaluso et al. 2000; Norman 2003; Van Rossem et al. 2001). Because of this variability, different factors are likely to influence the decision to use a condom within and between various partner types.

The purpose of this analysis is to evaluate whether determinants of consistent condom use vary according to partner type based on the multiple partnerships of 18–24 year old men in Kisumu, Kenya. This paper examines the factors that influence condom use with regular/marital partners, casual partners and commercial sex workers (CSW). We employ mixed-effects models to control for an individual's overall propensity to use condoms.

## Methods

### Study Design, Recruitment, and Measures

Data for this analysis came from a sub-study to a large randomized controlled trial (RCT) of male circumcision (MC) conducted in Kisumu, Kenya investigating the safety and effectiveness of MC as an HIV prevention method (Bailey et al. 2007). The specific purpose

of this sub-study was to investigate risk factors for HIV, and other sexually transmitted infections (STIs), in young Kenyan men through the collection of in-depth lifetime sexual histories on a sub-sample of MC-RCT participants. Men who were screened for the RCT between March 2004 and September 2005, including HIV-positive and HIV-negative men, were recruited for participation. At the completion of the screening visit for the RCT and after receiving the results of the HIV test, men were notified about this sub-study and, if interested, received a flier with additional information. HIV-positive men were not eligible for participation in the MC RCT; however, if they expressed interest in this study HIV-positive men were invited to participate. All men were issued a standard study ID card specifically for the purpose of sub-study enrollment. All participants were men, sexually active in the last 12 months, between the ages of 18–24, and either HIV-negative clients of the RCT or HIV-positive individuals who were screened for the RCT. Eligibility was verified by the RCT client card showing the study ID number and marked with an official RCT stamp. Participants were informed about the study procedures and permission was obtained for procurement of each participant's laboratory (HIV/STI) test results, demographic, tracing and behavioral survey data from the RCT. Informed consent was obtained in the participants' language of choice (English, Kiswahili, or Dholuo). Participants were interviewed alone in private rooms.

To obtain comprehensive lifetime sexual histories, information concerning all sexual relationships was collected for up to 12 partners. The well-validated Timeline Followback (TLFB) approach (Carey et al. 2001) was used to enhance memory recall. The following variables were obtained for each partner: age, gender, type of partner (wife, regular or steady girlfriend/boyfriend, casual girlfriend/boyfriend, commercial sex worker), month and year the relationship began and ended, length of time knowing a partner prior to sex, approximate number of sexual encounters (once, 2 to 5, 6 to 10, more than 10), sexual practices (oral, anal, vaginal, sex during menstruation), exchange of money or gifts for sex, condom use (ever, first encounter, last encounter, every encounter), perception of whether a partner had other partners at the time of the relationship, and beliefs about the partner's HIV/AIDS status. Relationships were considered concurrent if there was any overlap, by one month or more, of the start and end dates of two relationships. For example, if one relationship began in September and ended in December, and another began in December and ended in February, those relationships were considered concurrent. Participants were also interviewed regarding their most important reasons for using, or not using, condoms with each partner and these answers were stratified by partner-type.

To minimize the potential of self-report and recall biases, the interviewers were extensively trained on the importance of neutrality in conducting the face-to-face interviews and on the use of the Timeline Followback approach. Additionally, questionnaires contained validity checks that allowed for detection of unreliable data, both during the interview and at the data analysis stage. Questionnaires were administered to participants in their language of choice (English, DhoLuo or Kiswahili).

### Statistical Analyses

Mixed-effects models were used to correct for any correlation between the multiple reports provided by each participant. Our main outcome of interest was consistent condom use reported by participants as "always using" a condom with a given partner. Potential determinants of consistent condom use explored in this analysis included both participant-level (i.e., attributes of the man in the study such as demographics and HIV status) and partnership-level (i.e., reported partnerships characteristics) variables (Table 1).

Adjusted effect estimates were obtained for the three partner types separately by including all variables presented in Table 2 along with participants' demographic characteristics in

mixed-effects models. HIV status was controlled for in all models. Statistically significant independent predictors ( $P < .05$ ) were considered for inclusion in final modeling. Due to the small sample size of marital partnerships, (92 out of 7913 or 1.16%), marital and regular relationships were combined into one category.

The SAS procedure PROC NLMIXED (SAS V 8.2, SAS Institute, Cary, NC) was used to carry out the mixed-effect modeling of consistent condom use as a binary outcome (always vs. not always using condoms with a partner). Intra-class correlation coefficients were calculated to estimate the proportion of variance attributable to within subject variation, and the regression coefficient estimates were used to calculate subject-specific odds ratios of consistent condom use. To compare our results with those from non-clustered data studies, the marginal or population-averaged odds ratios were calculated by transforming the subject-specific regression coefficient estimates (Hu et al. 1998). Throughout this paper, all presented odds ratios are population-averaged odds ratios.

## Results

### Sample Size

We enrolled 1393 of the 2059 eligible men who were screened for the RCT during the recruitment period, which gave a response rate of 68%. Sub-study participants were younger, with 46% falling into the youngest, 18–20 years age group, compared to 41% of those who did not enroll ( $\chi^2 = 3.6$ ,  $P = 0.06$ ). Additionally, those who chose to enroll were more likely to have completed secondary school (58% vs. 51%,  $\chi^2 = 3.6$ ,  $P < 0.05$ ), and more likely to be unemployed (67% vs. 60%,  $\chi^2 = 8.4$ ,  $P < 0.05$ ) than MC-RCT clients who did not enroll. There were no significant differences between the median number of lifetime sexual partners (Wilcoxon Two Sample Z Test = 0.01,  $P = 0.95$ ), partners in the last 6 months ( $\chi^2 = 0.53$ ,  $P = 0.77$ ), or in occurrence of prevalent STIs ( $\chi^2 = 0.17$ ,  $P = 0.68$ ) at baseline.

The information on 23 participants was excluded resulting in data from 1370 participants available for analysis. Reasons for exclusion included: 6 participants chose not to finish their interview, 12 had a substantial proportion of data missing, 3 were identified as imposters (i.e., the study ID they presented belonged to a different client in the trial), and information from 2 participants was rated as ‘‘highly unreliable’’ as determined by validity checks built into the questionnaire and interview process.

The final models for the 3,531 regular/marital partners, 4,079 casual partners, and 303 commercial sex workers are presented in Tables 3, 4, and 5. Factors associated with consistent condom use common to all three partner types were modeled using the complete sample of 1370 men and 7913 partnerships. The results of this analysis are not presented, however, as factors associated with condom use for the entire study population did not differ significantly from those identified for the casual partnership subset.

### Sample Description

Study participants were predominantly single (92%) and employed in sales or service (29%). Over 70% had at least some secondary education and 19% reported being a current student (Table 1). The median age at sexual debut was 15 years and the median number of lifetime partners was 5. Twenty-five percent of participants reported 9 or more lifetime partners and 21% reported previous STI treatment. Most men (83%) reported having a casual partner at some time in his life, 14% reported sex with a CSW, and 41% reported intercourse with a partner the same day they met. Seventy-one percent reported having concurrent partnerships at least once (median number of concurrent partnerships = 2). Seven percent of respondents always used condoms with all current and past partners, 74% used condoms inconsistently,

and 19% never used condoms with any partners. Fourteen percent of men reported more than 12 lifetime partners, which was the limit for data collection. These men were instructed to report their first 11 partners plus their current partner.

The 1370 men in the study provided information on a total of 7913 relationships. Condoms were always used in 2672 (34%) of the total relationships, 212 (70%) of relationships with CSWs, 1643 (40%) of casual relationships, and 817 (23%) of regular/marital relationships. Based on univariate analyses (Table 2) controlling for the within-participant correlation (i.e. individual men's propensity to use condoms across relationships) between multiple partnerships reported by participants, condom use increased with decreasing intimacy, defined by shorter duration of the relationship, shorter length of time before first sexual encounter with a partner, and fewer sexual encounters. Condom use also increased with exchange of money or gifts for sex, having concurrent partnerships, and believing that partners had other partners or were HIV-positive. Consistent condom use was lower in relationships where receptive oral sex (reported in 3% of marital/regular, 2% of casual, and 5% of relationships with sex workers;  $\chi^2 = 4.05$ ,  $P < 0.05$ ) or sex during menstruation (reported in 10% of marital/regular, 4% of casual, and 3% of relationships with sex workers;  $\chi^2 = 106.89$ ,  $P < 0.01$ ) were practiced; these relationships also tended to be of longer average duration. As shown by intraclass correlation coefficients (ICC), participant effect accounted for 34–44% of the overall variance for variables presented in Table 2 indicating that a large proportion of the variance in condom use was attributable to individual propensity to use condoms.

Participants reported 991 (13%) relationships that began with a sexual encounter after knowing the partner for one day or less, and condoms were used in 544 (55%) of these. Additionally, 2500 relationships (31% of all partnerships) consisted of a single sexual encounter. When single encounter relationships were compared to relationships involving 10 or more encounters, an 8.7 (95% CI 7.30– 10.37) times greater level of condom use was observed.

Of the 7913 total partnerships, 4927 (62%) were concurrent. Sixty one percent of all marital, 63% of all regular, 61% of all casual, and 75% of all relationships with a CSW were concurrent. Condoms were used consistently in 1767 (36%) of concurrent partnerships, 815 (56%) of the 1445 concurrent partnerships involving a single sexual encounter, and 242 (16%) of the 1551 concurrent partnerships involving more than 5 sexual encounters. Consistent condom use was 1.35 (95% CI 1.21–1.50) times more likely to occur in concurrent partnerships than in a non-concurrent relationship. When adjusted for other correlates, however, this association held true only for casual partnerships (Table 4).

### **Consistent Condom Use with Regular/Marital Partners**

1,310 men (96%) reported having a cumulative total of 3,531 regular/spousal partnerships. Controlling for the within-participant correlation, participant's educational level, ages of participant and partner at the time of relationship, believing that a partner had other partners, uncertainty about a partner's HIV status, and a low number of sexual encounters, were factors significantly associated with consistent condom use (Table 3). Sex during menstruation was one determinant of decreased condom use for regular/marital partners. However, practicing receptive oral sex, exchanging gifts or money for sex, having concurrent relationships and time before first sex were not associated with consistent condom use with regular and marital partners after adjusting for other factors. The likelihood of using a condom consistently with regular partners decreased with the greater number of sexual encounters.

### Consistent Condom Use with Casual Partners

1,140 men (83%) reported having a cumulative total of 4,079 casual partnerships. As with regular partners, controlling for the within-participant correlation, participant's educational level, participant's age at the time of relationship, age of his partner, believing a partner has other partners, and a low number of sexual encounters were factors associated with consistent condom use in casual relationships (Table 4). Believing that a partner was HIV-positive, exchanging gifts or money for sex, having concurrent relationships and shorter time before first sex were also associated with consistent condom use in casual relationships. Believing that a partner was infected with HIV was the single strongest predictor for consistent condom use.

### Consistent Condom Use with Sex Workers

195 men (14%) reported having a cumulative total of 303 relationships with commercial sex workers. Controlling for the within-participant correlation, the set of determinants of consistent condom use with commercial sex workers was different from those found in casual and regular relationships (Table 5). The greatest predictor of condom use with CSWs was the participant's age (over 15) at the time of the relationship, followed by concern about the partner's HIV status.

### Reasons for Using or not Using Condoms

For regular partnerships where condoms were not always used, the most frequently reported reasons for not using condoms were trust between the client and partner (31%), the wish to increase sexual pleasure (12%), self-professed ignorance about the importance of condom use (12%), and condom unavailability (11%). For casual partners and sex workers, lack of condom availability was the most frequent reason stated (27% and 30%, respectively) followed by self-reported ignorance about the importance of condom use for casual partnerships (20%) and the belief that condoms decrease sexual pleasure for relationships with sex workers (5%). Fear of HIV/STI was the single most important reason given for using condoms in all three types of partnerships (53% of regular/marital, 62% of casual, and 61% of CSW) followed by contraception and a general lack of trust in the partner.

### Discussion

In our sample of young sexually active men in Kisumu, Kenya, partner type and partnership characteristics played a central role in predicting the consistency of condom use. Condom use was far more common with sex workers and casual partners than with regular or marital partners. For all partner types, consistent condom use was more likely to occur if participants believed their partners were HIV-positive or if there was a perceived uncertainty about a partner's HIV status. In relationships with either casual or regular/marital partners, consistent condom use was more likely to occur when intimacy levels were decreased: relationships of shorter duration, fewer encounters, and/or with the perception that the partner had other partners. Notably, for both regular and casual partnerships, practicing sex during menstruation was a significant determinant of decreased condom use. This finding may reflect the perception that the contraceptive properties of condoms were not needed in this setting or that the practice of sex during menstruation served as an indicator of increased intimacy. Condom use predictors varied greatly by partner type, although several factors appeared to have consistent significance across types (i.e., education, number of sexual encounters with the partner, participant's and partner's ages at the time of the relationship). These findings indicate that study participants distinguished between different types of partners, assessed the risk of HIV infection with each partner, and adjusted their condom use behavior accordingly.

The overall prevalence of condom use with regular/marital, casual partners and sex workers observed in our study mirrors condom use patterns in a variety of populations and geographical settings (de Visser et al. 2003; Douthwaite and Saroun 2006; Ferguson et al. 2004; Macaluso et al. 2000; Norman 2003; Van Rossem et al. 2001). Similar to our findings, several previously published studies have also shown that condom use patterns changed with level of intimacy and across different partner types (Bajos et al. 1997; Benefo 2004; Ferguson et al. 2004; Macaluso et al. 2000; Murray et al. 2007). A study of the partnership patterns of female sex workers in Tanzania found that condoms were more frequently used with single-time contact clients than with long-term partners (Outwater et al. 2000). We found that a similar association held true for male clients of CSWs: participants were 2.2 times more likely to use condoms if they had a single encounter with a sex worker when compared to more than one encounter.

Several studies have shown that individuals use partner selection as a risk reduction strategy based on their knowledge or perception of their partner's HIV-status or risk for HIV (Noar et al. 2006; Noar et al. 2004; Stoner et al. 2003). In our study, factors reflecting participants' perception of their partners' risk-level played a prominent role in condom use decisions. The belief that a partner had HIV/AIDS was one of the strongest determinants of condom use, a finding that is consistent with previous studies (Maharaj and Cleland 2005; Pool et al. 2006). Notably, believing that partner had HIV was not a predictor of consistent condom use with regular/marital partners, possibly due to the perceived concordance in HIV status in regular relationships.

Due to our in-depth evaluation of participants' sexual histories, this study was able to confirm several previously identified condom use predictors (e.g., oral sex associated with a decrease and perception of the risk level of the partner associated with increase in consistent condom use), as well as uncover factors that have not been well documented in the literature (e.g., sex during menstruation associated with a decrease, and simultaneous adjustment for participant's and partner's ages at the time of relationship, and concurrent relationships associated with an increase in consistent condom use). There have been few studies of condom use in concurrent relationships and those published have found contradicting results. In U.S. adolescent participants who had concurrent partners were 1.2 times ( $P=0.04$ ) more likely to use condoms than those who did not have concurrent partners (Ford et al. 2002). Also in the U.S., adolescents who were in concurrent relationships were significantly less likely (47.3%) to use condoms than those in sequential (55.2%) or single relationships (58.1%) (Kelley et al. 2003). In U.S. adults, concurrency was more frequent among infrequent condom users compared to frequent condom users (32% vs. 23%,  $P=0.025$ ) (Manhart et al. 2002). In our study, men were 1.42 times more likely to use condoms consistently in concurrent relationships in which at least one of the partnerships was defined as casual. This variation and contradiction in the observed associations between condom use and concurrent partner status may be due to differences between the study populations and differences in the measurement and definition of the concurrency.

Previous research has shown that marriage is an HIV risk factor for women, that men frequently acquire HIV from outside of marriage, and that condom use in marital relationships is very low (Bunnell et al. 2008; de Visser et al. 2003; Ferguson et al. 2004; Glynn et al. 2001; Glynn et al. 2003; Smith 2007; Van Rossem et al. 2001). We found that 61% of marital and 62% of regular relationships were concurrent with other partnerships and that in 95% and 78% of these relationships, respectively, condoms were not used consistently. Based on our findings, the marital and regular female partners of young men in Kisumu are at risk of HIV infection by virtue of the high frequency of men's unprotected concurrent sex with other women.

There are several limitations of this study. First, the 1393 men enrolled were recruited from among uncircumcised participants in a RCT of MC and among men found to be HIV-positive upon screening for the RCT. It is possible that men who enrolled in the study engaged in different behaviors than same-aged men in Kisumu, limiting the generalizability of our results. Second, our measurement of condom use may be hindered by self-report and recall biases. HIV-positive men were interviewed shortly after finding out of their HIV status, thus their responses may be biased by this new knowledge. The direction and magnitude of such bias is difficult to estimate, as both over-reporting and under-reporting of risky behaviors, including condom use, are plausible under these conditions. Third, we collected a comprehensive lifetime sexual history on each participant, up to 12 partners, and the recall period for some participants was as long as 7–10 years. We were not able to account for any effect the dynamics of the HIV/AIDS epidemic in Kenya may have had on behavior, including condom use, over this period. Additionally, the longer the period of recall, the less accurate the reporting of sexual behaviors may be (Noar et al. 2006; Sheeran and Abraham 1994). While the accuracy of recall in our study was enhanced by the use of Timeline Followback approach, the magnitude and direction of recall bias are difficult to estimate. To minimize the self-report and recall biases, in both HIV-positive and HIV-negative participants, interviewers underwent extensive training and the questionnaire was constructed to detect inconsistencies in responses. Finally, the definition of partner types was based on a self-reported categorization by study participants with no explicit parameters regarding partner type definition provided to them. Thus, it is possible that participants and researchers may differ in their interpretations of partner type definitions, which could lead to partner type misclassification. However, the advantage of this approach is that it leads to an evaluation of condom use patterns driven by participants' views and perceptions of their partners, rather than researchers' arbitrary classifications.

Despite these limitations, this analysis has unique and important properties. Unlike previous studies (Benefo 2004; de Visser and Smith 2001; Douthwaite and Saroun 2006; Maharaj and Cleland 2005; Murray et al. 2007; Noar et al. 2006; Sheeran and Abraham 1994), this study was designed to enable the assessment of patterns and correlates of condom use with multiple lifetime partners of several partner types for each study participant. This design allowed us to investigate whether the same person made different condom use decisions with his multiple partners depending on partner type and partnership characteristics. Based on the intra-class correlation coefficient produced by the presented models (Table 3, 4, and 5), 52%, 52%, and 35% of the total variation in condom use patterns in regular/marital, casual, and CSW relationships, respectively, could be explained by the participants' propensity to use condoms. In other words, the decision to use condoms in regular/marital and casual relationships was equally based on a men's individual propensity to use condoms and on the characteristics of partnerships. However, in relationships with sex workers it was the partnerships' characteristics that explained most of the variation in a participant's decision to use or not use condoms. There have been few studies able to evaluate condom use in multiple sexual partners of each participant and by partner type either prospectively or retrospectively (Cooper and Orcutt 2000; de Visser and Smith 2001; Ferguson et al. 2004; Lescano et al. 2006; Macaluso et al. 2000; Norman 2003; Van Rossem et al. 2001). Several studies have assessed condom use patterns in multiple partners of different types for the same study participant (Ferguson et al. 2004; Lescano et al. 2006; Van Rossem et al. 2001), but few have evaluated the determinants of condom use separately for each partner type (Chatterjee et al. 2006; de Visser and Smith 2001; Van Rossem et al. 2001), as was possible in our study.

It is evident that individuals in this population use partner selection as a risk reduction strategy based on a perception of a given partner's HIV-status and HIV risk. Our findings indicate that factors influencing condom use vary greatly by partner type and suggest that



HIV prevention messages promoting condom use with higher-risk partners have achieved a moderate level of adoption. However, for young men residing in an area of high HIV prevalence, the definition of high-risk relationships needs to be extended to include multiple long-term relationships. In this setting, sexually active people should not assume safety even in the most intimate relationships. It is within these intimately defined partnerships that condom use is at its lowest and that many HIV transmissions likely occur (Halperin and Epstein 2004).

While men's risk perception of a given relationship to a large extent determined whether they used a condom, their assessment of risk may not be accurate. HIV prevention programs need to reinforce messages focused on partner reduction, using condoms with all partners, the importance of HIV testing of couples regardless of perceptions of intimacy and/or the length of a relationship, and the benefits of repeating the testing on regular basis.

## Acknowledgments

We thank the participants, without whom this work would not have been possible, and Bob Ogollah, Kevine Kamolloh, and the entire UNIM Project staff for their assistance in data collection and recruitment. This research was supported by Award Number U01AI050440 from the National Institute of Allergy and Infectious Diseases. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Allergy and Infectious Diseases or the National Institutes of Health. Additionally, S. Moses was supported by a CIHR Investigator Award.

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**Table 1**Participants characteristics ( $n = 1370$ )

	<i>n</i>	%
Age group		
18–20	726	53
21–24	644	47
Marital status		
Single	1254	92
Married or cohabitating	115	8
Occupation		
Farmer, forestry, fishing	156	11
Bicycle transporter	51	4
Manual worker	147	11
Sales, service worker	400	29
Professional, manager	10	1
Student	254	19
None	233	17
Other	119	9
Income		
2500 KSH/month	855	62
>2500 KSH/month	515	38
Education		
Primary	272	20
Any secondary	773	56
Post-secondary	262	19
Missing	63	5
Condom use with all partners		
Always	92	7
Ever	1018	74
Never	262	19
HIV status		
Positive	64	5
Negative	1306	95
Ever treated for STI		
Yes	292	21
No	1069	79
Sex the same day met with a partner		
Yes	556	41
No	814	59
Number of lifetime partners		
One	67	5
Two to four	518	38

	<i>n</i>	%
Five or more	785	57
Number of lifetime partners (continuous)		
Median (IQR)	5	(3, 9)
Age at sexual debut		
Median (IQR)	15	(13, 17)
Number of concurrent relationships		
Median (IQR)	2	(0, 4)

**Table 2**

Prevalence of partnership characteristics of interest among partnerships and participants reporting such partnerships; and odds ratio estimates, calculated by controlling for correlation between multiple partnerships of same participant, for partnership characteristics associated with consistent condom use in a sample of 18–24 year old Kenyan men

Partnership characteristics	Participants <sup>a</sup> <sub>n</sub> (%) (1370)	Partnerships <sup>b</sup> <sub>n</sub> (%) (7913)	OR	95% CI
Partner type				
Wife or regular girlfriend (reference)	1310 (96%)	3531 (45%)	1.00	
Casual partner	1140 (83%)	4079 (51%)	2.64**	(2.39; 2.93)
Sex worker	195 (14%)	303 (4%)	9.18**	(7.09; 11.89)
Duration of relationship				
Under 1 month	959 (70%)	2812 (36%)	4.09**	(3.56; 4.71)
1 to under 2 months	483 (35%)	668 (8%)	2.69**	(2.23; 3.25)
2 to under 12 months	1070 (78%)	2581 (33%)	1.90**	(1.66; 2.17)
One year and over (reference)	996 (73%)	1850 (23%)	1.00	
How long knew the partner before first sex				
One day or less	550 (40%)	991 (13%)	3.67**	(3.17; 4.25)
Under 2 weeks	665 (49%)	1182 (15%)	1.91**	(1.67; 2.19)
Under 2 months	754 (55%)	1275 (16%)	1.35**	(1.19; 1.54)
Over 2 months (reference)	1286 (94%)	4465 (56%)	1.00	
Number of sexual encounters				
Once	963 (70%)	2500 (31%)	8.7**	(7.30; 10.37)
2–5 times	1155 (84%)	3153 (40%)	4.06**	(3.42; 4.83)
6–10 times	584 (43%)	853 (11%)	2.16**	(1.75; 2.67)
Over 10 (reference)	725 (53%)	1407 (18%)	1.00	
Age group				
15	1321 (96%)	6005 (76%)	3.57**	(3.12; 4.09)
>15 (reference)	846 (62%)	1908 (24%)	1.00	
Participant's age at the time of relationship				
15	1357 (99%)	6915 (87%)	5.25**	(4.29; 6.42)
<15 (reference)	576 (42%)	998 (13%)	1.00	
Having sex during menstruation				
Yes	328 (24%)	513 (6%)	0.35**	(0.27; 0.44)
No (reference)	–	7400 (94%)	1.00	
Having receptive oral sex				
Yes	103 (8%)	208 (3%)	0.40**	(0.28; 0.57)
No (reference)	–	7705 (97%)	1.00	
Performing oral sex				
Yes	71 (5%)	138 (2%)	0.34**	(0.22; 0.53)

Partnership characteristics	Participants <sup>a</sup> <sub>n</sub> (%) (1370)	Partnerships <sup>b</sup> <sub>n</sub> (%) (7913)	OR	95% CI
No (reference)	–	7775 (98%)	1.00	
Concurrent relationships				
Yes	967 (71%)	4927 (62%)	1.35**	(1.21; 1.50)
No (reference)	–	2986 (38%)	1.00	
Ever exchanging money or gifts for sex with this partner				
Yes	497 (36%)	1079 (14%)	1.75**	(1.53; 2.01)
No (reference)	–	6834 (86%)	1.00	
Always exchanging money or gifts for sex with this partner				
Yes	253 (18%)	405 (5%)	3.71**	(2.77; 4.97)
No (reference)	–	7508 (95%)	1.00	
Believing that partner has other partners				
Yes	1066 (78%)	3699 (47%)	2.47**	(2.23; 2.73)
No (reference)	–	4214 (53%)	1.00	
Believing partner has HIV or AIDS				
Yes	108 (8%)	160 (2%)	8.39**	(5.88; 11.99)
Don't know	455 (33%)	1134 (14%)	6.32**	(5.35; 7.45)
No (reference)	–	6619 (84%)	1.00	

\*  $P < 0.05$

\*\*  $P < 0.01$

<sup>a</sup> Number and percent of participants reporting one or more partnerships with listed characteristics. Percentage may not add up to 100% as each participant may contribute to several categories due to the reported multiple partners

<sup>b</sup> Number and percent of partnerships possessing listed characteristics

**Table 3**

Results of the multivariable mixed effects model for factors associated with consistent condom use with regular partners or wives (1,310 participants; 3,531 partnerships)

Parameter	$\beta$	OR	95% CI
Intercept	-5.93		
Participant HIV status (positive vs. negative)	-1.52	0.48**	(0.30; 0.76)
Participant education (reference: Primary)			
Secondary	0.57	1.46*	(1.08; 1.98)
Post-secondary	0.97	1.91**	(1.35; 2.69)
Partner's age ( $\geq 15$ vs. $< 15$ )	1.14	2.14***	(1.68; 2.73)
Participant's age at the time of relationship ( $\geq 15$ vs. $< 15$ )	1.31	2.40**	(1.69; 3.39)
Believing partner has HIV or AIDS (reference: No)			
Yes	0.45	1.35	(0.51; 3.62)
Don't know	2.46	5.19**	(3.85; 6.99)
Sex during menstruation (reference: No)	-1.02	0.5**	(0.35; 0.73)
Believing partner has other partners (reference: No)	0.33	1.25*	(1.04; 1.50)
Number of sexual encounters (reference: $> 10$ )			
Once	2.67	5.96**	(4.35; 8.16)
2-5 times	1.50	2.72**	(2.16; 3.44)
6-10 times	0.92	1.85**	(1.41; 2.41)
Intraclass Correlation Coefficient (ICC)			0.52**

\*  $P < 0.05$

\*\*  $P < 0.01$



**Table 4**

Results of the multivariable mixed effects model for factors associated with consistent condom use with casual partners (1140 participants; 4079 partnerships)

Parameter	$\beta$	OR	95% CI
Intercept	-6.93		
Participant HIV status (positive vs. negative)	-1.10	0.48**	(0.3; 0.76)
Participant Education (reference: primary)			
Secondary	0.64	1.54**	(1.17; 2.02)
Post-secondary	1.23	2.27**	(1.65; 3.13)
Partner's age ( 15 vs.<15)	1.10	2.08**	(1.71; 2.53)
Participant's age at the time of relationship 15 vs.<15)	1.71	3.13**	(2.33; 4.20)
Ever exchanging money or gifts for sex with this partner (reference: No)	0.34	1.25*	(1.01; 1.55)
Believing partner has HIV or AIDS (reference: No)			
Yes	3.36	9.47**	(5.32; 16.86)
Don't know	2.29	4.61**	(3.65; 5.83)
Practicing receptive oral sex with this partner (reference: No)	-1.25	0.43**	(0.25; 0.76)
How long knew the partner before first sex (reference:>2 months)			
One day or less	0.89	1.81**	(1.49; 2.20)
Under 2 weeks	0.64	1.53**	(1.27; 1.85)
Under 2 months	0.27	1.20	(0.98; 1.46)
Sex during menstruation (reference: No)	-0.69	0.63*	(0.44; 0.90)
Concurrent relationships (reference: No)	0.52	1.42**	(1.21; 1.66)
Believing partner has other partners (reference: No)	0.83	1.74**	(1.50; 2.02)
Number of sexual encounters (reference:>10)			
Once	2.14	4.19**	(2.80; 6.26)
2-5 times	1.60	2.91**	(1.97; 4.32)
6-10 times	1.20	2.23**	(1.39; 3.58)
Intraclass Correlation Coefficient (ICC)			0.52**

\*  $P < 0.05$

\*\*  $P < 0.01$

**Table 5**

Results of the multivariable mixed effects model for factors associated with consistent condom use with sex workers (195 participants; 303 partnerships)

Parameter	$\beta$	OR	95% CI
Intercept	-3.07		
Participant HIV status (positive vs. negative)	-1.07	0.43	(0.30; 0.76)
Post-secondary education (reference: less than post-secondary education)	1.00	2.20	(1.04; 5.11)
Participant's age at the time of relationship ( 15 vs.<15)	3.09	11.41*	(1.18; 110.81)
Believing partner has HIV or AIDS (reference: No)			
Yes	1.96	4.70**	(1.28; 10.35)
Don't know	0.63	1.64	(0.81; 2.70)
Practicing receptive oral sex with this partner (reference: No)	-1.93	0.22*	(0.07; 0.80)
A single sexual encounter with this partner (reference: more than one sexual encounter)	0.98	2.16*	(1.18; 4.02)
Intraclass Correlation Coefficient (ICC)			0.35**

\*  $P < 0.05$

\*\*  $P < 0.01$