The Effect of Marriage and HIV status on Condom Use in Rural Malawi

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Abstract:
As the HIV/AIDS epidemic spreads to the general population, a large and increasing proportion of HIV transmissions occur within marriage. Condom use within marriage could, therefore, be an important prevention strategy in sub-Saharan Africa, but there is considerable debate about whether married couples would be willing to use condoms. This paper contributes to this debate by identifying key factors that affect the acceptability of condom use within married for men and women in rural Malawi using three waves of longitudinal data from Malawi Diffusion and Ideational Change Project (MDICP). Specifically, we focus on the effect of (1) first marriage, and (2) HIV status on condom use acceptability within marriage. Using fixed-effects regression to control for unobserved characteristics that may affect condom use acceptability, marriage, and HIV status, we find that getting married leads to lower acceptability of condom use; and that perceived HIV status, rather than actual HIV status, affects the acceptability of condom use within marriage.

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Introduction

As the HIV/AIDS epidemic spreads to the general population, a large and increasing proportion of HIV transmissions occur within marriage. Empirical evidence from countries throughout sub-Saharan Africa shows that many married individuals are at high risk of HIV infection from their spouses: according to a recent study in urban Zambia and Rwanda, between 55.1% and 92.7% of new heterosexually-acquired HIV infections take place within serodiscordant married or cohabiting (Dunkle 2008). Furthermore, age patterns of HIV incidence imply increasing risk of HIV infection within marriage (Zaba et al 2008). Discordant couples (i.e. couples where only one partner is infected with HIV) represent the majority of HIV-infected couples in sub-Saharan Africa, (de Walque, 2007). Although HIV positive individuals are more likely to experience marital dissolution (either via divorce or the death of a spouse) than the HIV negative (Floyd et al. 2008 for Malawi; Gregory et al. 2007 for Tanzania; Lopman et al. 2009 for Zimbabwe; Porter et al. 2004 for Uganda), male divorcees and widowers are likely to remarry after marital dissolution regardless of their HIV status (Gregory 2007, Ntozi 1997, Reniers 2003).

Individuals in high prevalence settings of sub-Saharan Africa appear to be aware of the risk of HIV infection presented by their spouse. Evidence from rural Malawi shows that many are worried about HIV infection from a husband or wife: rural Malawians are more likely to overestimate their spouse's likelihood of HIV infection than to underestimate (Anglewicz et al 2008), and some are divorcing spouses who they believe are a potential source of HIV infection (Reniers 2008, Watkins 2004). In addition, unmarried men and women in Malawi state that "being HIV-negative" is the single most important characteristic of a potential future spouse (Clark et al 2009). Still, the fact that it is more likely for couples to be HIV sero-discordant than concordant HIV positive in many sub-Saharan African countries implies that either these strategies are not effective or widespread, or that remarriage for HIV positive is not uncommon.

As a result of the widespread risk of HIV infection within marriage, condom use within marriage is an important strategy in preventing the spread of HIV/AIDS. Despite this, condom use does not appear to be a widely-accepted strategy to prevent HIV infection. While survey data throughout sub-Saharan Africa indicates that individuals are well aware of the threat of HIV

infection and know that condoms can prevent HIV infection, many prefer not to use condoms with a spouse (Chimbiri 2007, Watkins 2004).

Several reasons have been offered to explain the widespread aversion to condom use, including reduced sensation and sensuality during sexual intercourse (Bond and Dover 1997, Varga 1997, Whyte 1999); the belief that suggesting condom use with a spouse implies one has had an extramarital partner (Chimbiri 2007, Tavory and Swidler 2009); fear that condoms transmit various diseases (such as HIV/AIDS), cause sores, or reduce fertility (Kaler 2004, Varga 1997, Whyte 1999); and cultural norms which dictate that condoms are used primarily with sexual partners who are less formal than a spouse (Tavory and Swidler 2009).

While qualitative research has examined issues related to condom use, a quantitative approach is less common. Furthermore, longitudinal data that allow for the examination of trends in attitudes towards condom use, as well as actual HIV status, are relatively rare. In this paper, we use unique longitudinal data from rural Malawi to describe trends in condom use among married couples and identify the correlates of condom use with a spouse.

Background

Condoms are generally not used as a means of birth control for married couples in Malawi, for many of the reasons stated above: reduced sensation, the implication of infidelity, or cultural norms which classify condom use within marriage as inappropriate (Chimbiri 2007, Tavory and Swidler 2009, Watkins 2004). Malawians typically prefer other contraceptive methods for birth control. According to the 2004 Malawi Demographic and Health Survey (MDHS), more than 90% of men and women had heard of the male condom, but only 1.8% of currently married women reported using the male condom, compared with 18% using injectables and 6% sterilization (MDHS 2005). MDHS also supports the claims that condoms are more often used for non-marital partners: 22% and 65% of sexually active currently-unmarried women and men reported condom use in 2004 (MDHS 2005).

However, there are signs that attitudes towards condom use are perhaps changing in Malawi. Many men and women in Malawi are concerned about HIV infection, and seem to understand

that their risk of infection often comes from a spouse (Anglewicz and Kohler 2009). In fact, research indicates that many are using marriage-related strategies to avoid HIV infection from a potentially risky spouse (Reniers 2008, Watkins 2004). If individuals are aware of their risk and are adopting safe behaviors, is condom use acceptability changing over time?

Data from the Malawi Diffusion and Ideational Change Project (MDICP) shows that the acceptability of condom use within marriage appears to be increasing. Using an attitudinal question on condom use in MDICP surveys, phrased as "Do you think it is acceptable to use a condom with a spouse to protect against HIV infection" (we henceforth refer to this question as "CUA"), there appears to be a trend of increasing acceptability: in 2008, 45% of men and women thought that condom use within marriage is acceptable, compared with 40% in 2004.

Does this reflect changing attitudes towards CUA or other changes that take place over time? Behind the percentages for MDICP men and women combined there is substantial variation over time, and by respondent's age. For example, Figures 1 and 2 (below) show relatively large differences by age in CUA. For these figures, the MDICP data is divided into adolescents (age 15-24) and adults (age 25 or older), and tabulated for the three most recent waves of data: 2004, 2006 and 2008. Figure 1 (for women) and 2 (men) shows that a higher percentage of the 15-24 age group consistently finds condom use within marriage more acceptable. Furthermore, there are large differences in CUA by actual marital status. As shown below in Figures 3 and 4, individuals who are ever-married are significantly less likely to find condom use within marriage to be acceptable, compared with MDICP respondents who are never-married.

While the patterns of CUA shown in Figures 1-4 are intriguing, they do not resolve the issue of whether CUA is a cohort effect, or if marriage itself can affect views towards condom use within marriage. Are younger generations more likely to accept condom use within marriage than older individuals? Or do individuals change their mind about condom use after becoming married?

Furthermore, what is the effect of actual HIV status on condom use acceptability within marriage? If marriage itself makes individuals less likely to accept condom use, does being HIV positive change one's mind? We address these questions in this paper.

Data

MDICP Data Collection

Data used for this research comes from the Malawi Diffusion and Ideational Change Project (MDICP), a longitudinal panel survey that is implemented in three sites in rural Malawi. MDICP started data collection with a sample of 1,541 ever-married women aged 15-49 and 1,065 of their spouses in 1998. The first follow-up survey took place in 2001, at which time respondents from the 1998 wave were re-interviewed, along with any new spouses since 1998.

In 2004, MDICP again interviewed respondents and new spouses from the original 1998 sample, and also added two new components to data-collection. First, a new sample of 1,476 adolescents from each sample site was added, which included both ever- and never-married individuals. Of these 1,476 new adolescents, 45% (665) were never-married in 2004 (53% of men and 36% of women). This sample is of particular interest, as we examine the relationship between transitions to marriage and CUA.

MDICP also offered HIV testing and test results to all respondents in 2004[3]. In total, approximately 2,900 respondents accepted testing, while 291 refused (a 9.1% refusal rate for testing) in 2004. HIV testing can be a sensitive matter and requires some technical expertise, and as a result MDICP used trained VCT counselors or nurses to collect HIV test specimens in 2004 and 2006, instead of the interviewers employed to administer the main MDICP survey. Since the HIV testing and survey were administered by separate teams, it is important to note that as a result of the separation of teams, some respondents were found by the survey team but not by the VCT counselors.

MDICP returned for a fourth wave of data collection in 2006, and followed-up with all previously interviewed respondents and new spouses, and again offered HIV testing and results for all consenting respondents. Finally, in 2008 MDICP returned for a fifth wave of data

[3] A detailed description of MDICP's HIV testing procedure is available in Bignami-Van Assche, Simona et al. 2004. "Research Protocol for Collecting STI and Biomarker Samples in Malawi, 2004" SNP Working Paper No.7, Philadelphia: University of Pennsylvania, available at: http://www.malawi.pop.upenn.edu/Level%203/Papers/level3_papers_byauthor.htm

collection, which similarly included follow-up interviews and HIV testing for all respondents previously interviewed in waves 1-4. A description of MDICP data and sample is presented in Watkins et al (2003) and Anglewicz et al (2009) provide an assessment of MDICP data quality for the 2004-2006 MDICP data.

Attitudes towards condom use have several advantages over reported actual condom use. Most notably, self-reports of sensitive behaviors are often unreliable (Curtis and Sutherland 2004; Mensch et al. 2008; Mensch, Hewett and Erulker 2003; Nnko et al. 2004; Plummer et al. 2004). Since, as described above, condom use within marriage implies infidelity in Malawi, it is also expected that self-reports of condom use in marriage would not be reliable. Furthermore, we are not interested in reported condom use for contraception, but for prevention of HIV transmission. Self-reported condom use with a spouse would not allow us to distinguish between couples who are using condoms for birth control from those using condoms for protection from HIV transmission (even though there would be relatively few of both). Finally, it is reasonable to expect that attitudes towards condom use would change before actual condom use would change- so attitudes can be considered to be potential future predictors of actual condom use in the future.

Background Characteristics

In this analysis, we use all respondents who were interviewed by MDICP in 2004, 2006 and 2008 waves of MDICP data collection, which yields a total of 1,754 respondents (1,001 women and 753 men). Background characteristics for these individuals are displayed in Table 1 (fixed characteristics such as age, region of residence and level of education are in the top portion of the table; the bottom portion contains characteristics that change from 2004-2008 for MDICP respondents).

On the average, men in the sample are older than women and have completed more years of education. As measures of household economic status, we use ownership of a radio, bicycle and house with an iron sheet roof, the ownership of which generally increases from 2004-2008 (with the exception of radio ownership in 2008). As religious status can influence attitudes towards condom use, I also include a measure of respondents' religious denomination, which is categorized into Muslim, Christian, Evangelical Christian, Traditional African, or other. The

most common religion in this sample is Christian. While the religious denominations are fairly consistent across waves, there are relatively large gains in the percentage of respondents who are Evangelical Christians, and declines in the percentage of "other" religious category between 2004 and 2008. Research in sub-Saharan Africa indicates that individuals change their religion upon marriage to someone of another denomination (Agadjanian 2001), and some also change religious status to protect against HIV infection (Trinitopoli and Regnerus 2006). As such, religion is considered to be time-varying.

There is not a clear trend in CUA for MDICP respondents between 2004 and 2008. While the overall percentages of men and women who believe that condom use is acceptable within marriage increases from 2004 to 2008, the percentages accepting condom use decreases between 2004 and 2006 before increasing again between 2006 and 2008. However, as shown in the above figures, the overall percentage of respondents accepting condom use within marriage belies important variation by marital status and age for MDICP respondents. Also, Table 1 shows relatively large percentages who change their response to CUA across waves: although the overall percent of CUA changes only by 3%-8% in between waves for men and women, over 40% of women and 34% of men change their response to CUA across waves. The fact that the overall percentages of CUA don't change more than 8% is because the percentage of respondents who change from "not accept CUA" to "accept CUA" is approximately the same size as the percentage changing from "accept CUA" to "not accept CUA".

As the primary variable of interest is condom use acceptability within marriage, marital characteristics are of particular importance in this research. As shown in Table 1, women are more likely to be ever-married in all MDICP waves, but are also more likely to be currently divorced in 2004-2008. More men than women were married for the first time between 2004 and 2008: 95 (12.7%) of men and 63 (6.3%) of women were married for the first time between MDICP waves 3-5. Also, a larger percentage of women were in polygamous marriages than were men in all three MDICP waves. Men have a higher average number of lifetime marriages than do women.

Research from AIDS affected areas of sub-Saharan Africa shows that HIV appears to be increasingly spread within marriage (Zaba et al 2008), and individuals are developing strategies related to perceived HIV risk from a spouse to shape risk-reduction behaviors (Reniers 2008, Watkins 2004). As a result, perceived HIV risk and marital infidelity (for oneself and a spouse) can be expected to be importantly related to condom use acceptability within marriage. Among MDICP respondents in the present sample, men are more likely than women to admit marital infidelity, and similarly women are more likely than men to suspect or know that their current spouse has been unfaithful.

Although women are less likely to report infidelity than men, they are more likely to think they are HIV positive: in all three waves, a larger percentage of women estimate a medium or high likelihood of current HIV infection. However, women are also more likely than men to think that their spouse is currently infected with HIV, which supports research that shows that women tend to estimate higher HIV prevalence and infection likelihoods than do men (Anglewicz and Kohler 2009, Anglewicz et al 2008).

However, these self-estimated likelihoods of HIV infection are all higher than actual HIV prevalence for men and women. For respondents in this sample, HIV prevalence was 2.2% and 4.4% for men and women respectively, in 2004; increased to 3.0% of men and 5.7% of women in 2006; and to 4.6% (men) and 8.6% (women) by 2008. Since MDICP conducted HIV testing for MDICP respondents in 2004, it is expected that the percentage of respondents who had been tested for HIV increases over time. Additional information on the trends in HIV testing, prevalence and incidence for the MDICP sample can be found in Obare et al (2009).

Methods

Next, we focus on the effect of marriage on CUA. To examine this relationship, we run two regressions separately for men and women, with the dichotomous condom use acceptability as the dependent variable. In the second set of regressions, we add a variable measuring actual HIV status. The model used in this research can be expressed as:

$$Y_{it} = \beta_0 + X_{it}\,\beta_1 + M_{it}\,\beta_2 + H_{it}\,\beta_3 + \varepsilon_{it},$$

where Y_{it} represents CUA by individual *i* at time *t*. M_{it} is a vector of marriage-related characteristics described above, in which our primary variable of interest is ever-married status. Next, H_{it} represents perceptions of HIV infection and other HIV-related variables, including actual HIV status in the second set of regressions (along with perceptions related to HIV status in both regressions). Finally, X_{it} represents a set of observed background characteristics for MDICP respondents, such as age, level of education, and household economic status (measured by ownership of a bicycle, radio or house with an iron-sheet roof), and religious status; and ε_{it} is a random, logically-distributed disturbance term for person *i* at time *t*.

To examine the relationship between becoming married and condom use acceptability, I use binary fixed effects regression to estimate the above relation, with condom use acceptability as the dependent variable. The use of fixed effects is appealing because it enables us to control for any time-invariant (observed or unobserved) differences across respondents that may affect the outcome: condom use acceptability. For example, this feature of fixed effects models is particularly useful due to possible selection bias of less risk-averse individuals to both reject condom use and also get married at younger ages. If more risk-tolerant individuals are less cautious or selective in choosing a spouse and are also less likely to find condom use acceptable, this unobserved risk-tolerance might also be correlated both with marriage and condom use. Thus, the relationship between becoming married for the first time and views towards condom use would suffer from an omitted variable bias that exists due to the selection of risk-averse individuals with comparatively lower levels of CUA into marriage. It is therefore necessary to account for the possibility that this bias would affect our analysis.

The necessity for fixed effects regression can be understood through the above equation, where the error term (ε_{it}) can be considered to consist of two components: individual-specific error that is time-invariant but varies across individuals (α_i), and error that varies within individuals over time (v_i). If unobserved, time-invariant characteristics of individuals (such as risk tolerance) are correlated with the likelihood of becoming married for the first time, then α_i will be correlated with the independent variables in the above equation (specifically M_{it}). Such a correlation

between the error term and the independent variables in the above equation will lead to biased estimates of β_2.

Fixed effects regression eliminates the possible correlation between the error term and independent variables by utilizing difference scores for all variables between MDICP waves 2004 and 2008. Because fixed factors of individuals do not change across time, these fixed characteristics are eliminated when the difference scores are created using 2004, 2006 and 2008 data. In doing so, all observed variables whose effects are constant over time (such as age or level of schooling), along with any unobserved time-invariant characteristics (represented by α_i) drop out of the model. Thus, if certain respondents have a greater risk tolerance that simultaneously affects likelihoods of marriage and CUA, this unobserved characteristic will be differenced out of the above equation when using fixed effects (Allison 2005, Hsiao 2003).

To provide a comparison with the fixed effects models, I also run random effects regression models. The equation for random effects is the same as above: $Y_{it} = \beta_0 + X_{it}\,\beta_1 + M_{it}\,\beta_2 + H_{it}\,\beta_3 + \varepsilon_{it}$. As with fixed effects, random effects also controls for the correlation of CUA for individuals across time. The difference between these methods is in the treatment of α_i, where instead of assuming that α_i is a set of fixed characteristics, the random effects technique assumes that α_i is a random variable with a specified probability distribution that is independent of X_{it}, M_{it}, H_{it} and ε_i. Since, in this case α_i is a random variable instead of a set of fixed characteristics, random effects does not control for any fixed characteristics, observed or unobserved. In the random effects regression we therefore include time invariant variables such as level of education, region of residence, and age.

We run Hausman tests to determine to compare the fixed and random effects models (Allison 2005). The p-values for these tests allow us to reject the null hypothesis that that there is no significant ($p<0.05$) correlation between the random effect and the measured predictors for both sets of regressions for men, but these tests do not allow us to reject the random effects models for women. Because the Hausman test does not reject random effects models for both men and women, we retain the random effects models for comparison with the fixed effects regression

results. However, as fixed effects models are the more efficient of the two (Allison 2005), we rely more on results of the fixed effects regressions.

Finally, to control for secular trends in CUA that are not explained by marriage patterns or HIV-related beliefs and characteristics, we include a dummy variable for the 2006 and 2008 waves of MDICP in the fixed and random effects regressions.

Results

First marriage has a strong effect on CUA. Table 2 displays the results for the fixed effects and random effects regressions run to examine the relationship between ever-married and the acceptability of condom use. The fixed effects results reveal that, among male respondents who changed their views towards CUA between 2004 and 2008, men who were married for the first time between waves were significantly less likely to find condom use acceptable within marriage than were men who remained unmarried between 2004 and 2008. Women who got married for the first time are also significantly less likely to find condom use acceptable, but the effect is significant at a relatively low level ($p>0.10$).

While being ever-married appears to be the most important determinant of condom use acceptability for men, women exhibit a different pattern. For women, self-assessed likelihood of current HIV infection is significantly related to CUA. In an encouraging result, it is consistent in the random and fixed-effects models that women who think they are HIV positive are significantly more likely to find condom use acceptable within marriage than are women who think they are HIV negative.

Further gender patterns are found in the relationship between religious status and CUA. While religious status does not appear to be importantly related to views towards condom use for women, religious status is significantly associated with condom use for men. Table 2 shows that Muslim men are significantly less likely to find condom use within marriage acceptable, compared with men of all other religions.

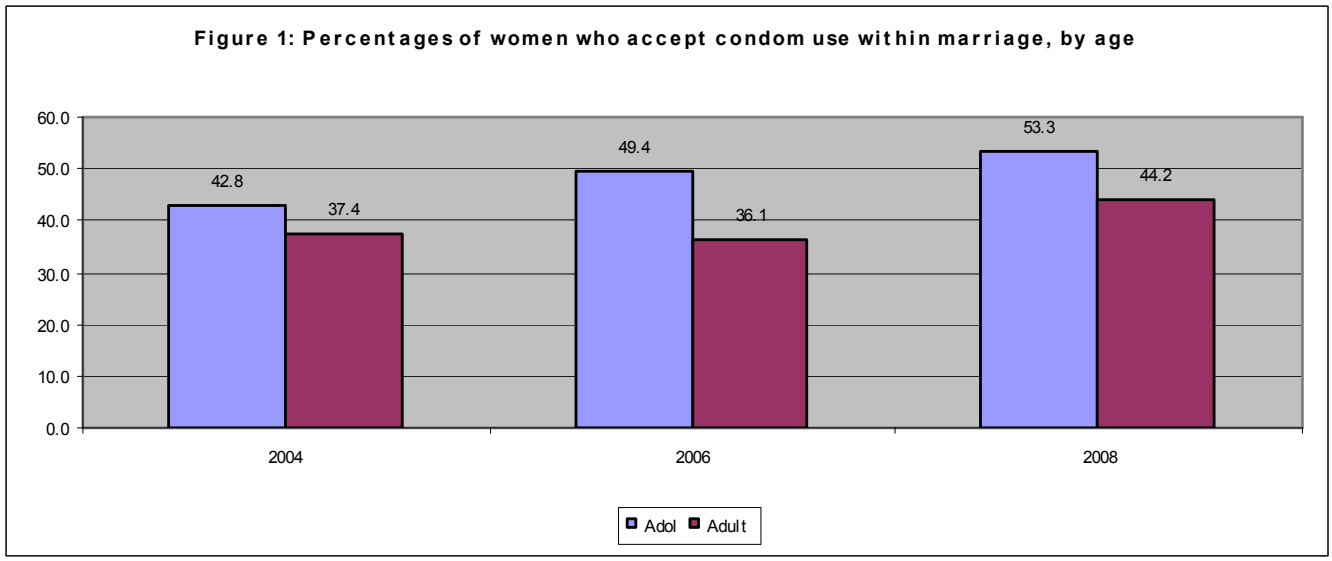
Finally, it is important to note the dummy variables for MDICP waves 2006 and 2008 are not significant in either fixed effects models for men, but the 2008 variable is significant for women. This indicates that changes in CUA are not due to a time trend of greater acceptability for men, but more related to marriage patterns and religious beliefs. However, for women, the strongest effect is on perceived risk of HIV, but there is also evidence that CUA is increasing for women over time.

Results for the random effects models show that fixed background characteristics are importantly associated with condom use acceptability within marriage. For example, we see that, as age increases for men and women, the likelihood of accepting condom use within marriage declines. This result likely reflects the age patterns of HIV infection, which generally decline after individuals reach later reproductive ages. Also, regional patterns are also evident: individuals in the southern region of Malawi are significantly more likely to accept condom use than those from the north. This pattern matches differences in HIV prevalence in Malawi: the northern region has lowest HIV prevalence of the three regions in Malawi, and the southern region has the highest.

Next, Table 3 shows results for the regressions including actual HIV status. Interestingly, for women, actual HIV status is a less important influence on CUA than is perceived HIV status. While the actual HIV status of women is not significantly related to condom use acceptability, we again find that women who *think* they are HIV positive are significantly more likely to find condom use acceptable. Again, there is a gendered pattern to CUA in these regressions: for men, neither actual nor perceived HIV status has a significant effect on CUA. However, there is once again a strong and significant effect of first marriage, similar to the regression results above. As with the previous models, religious status has an important role in CUA for men. In a new result, men who were unfaithful were less likely to find condom use acceptable with their spouse. Since HIV infection often spreads within marriage as the result of infidelity, this result has obvious unpleasant implications for the prevention of HIV spread in Malawi.

Discussion

Tables and Figures



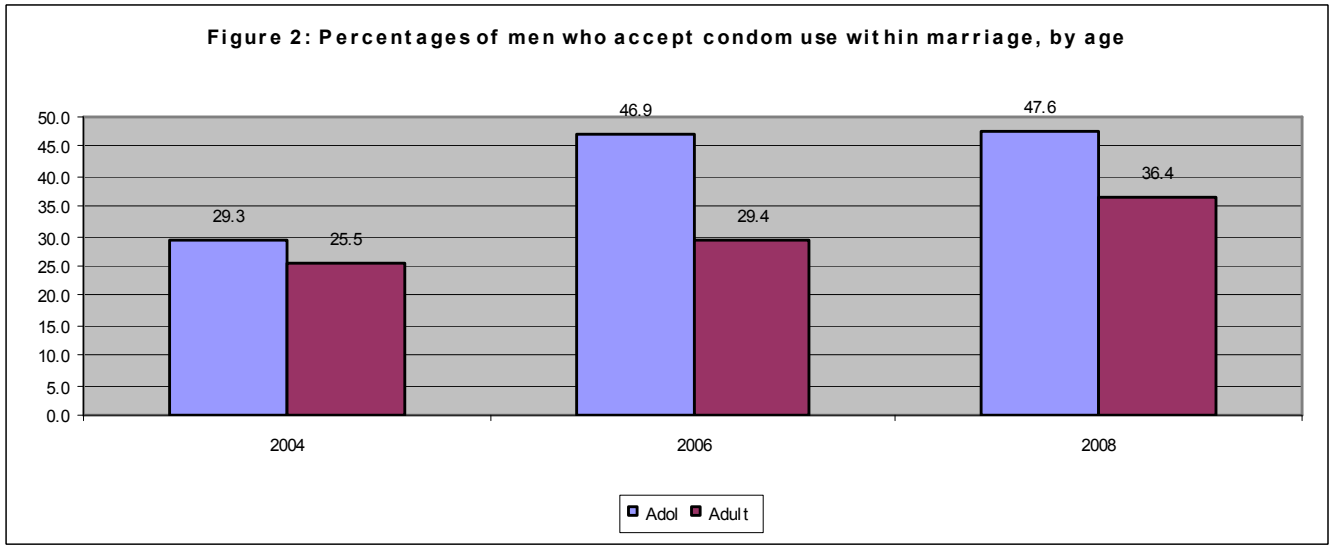


Figure 3: Percentage of women who accept condom use within marriage, by marital status

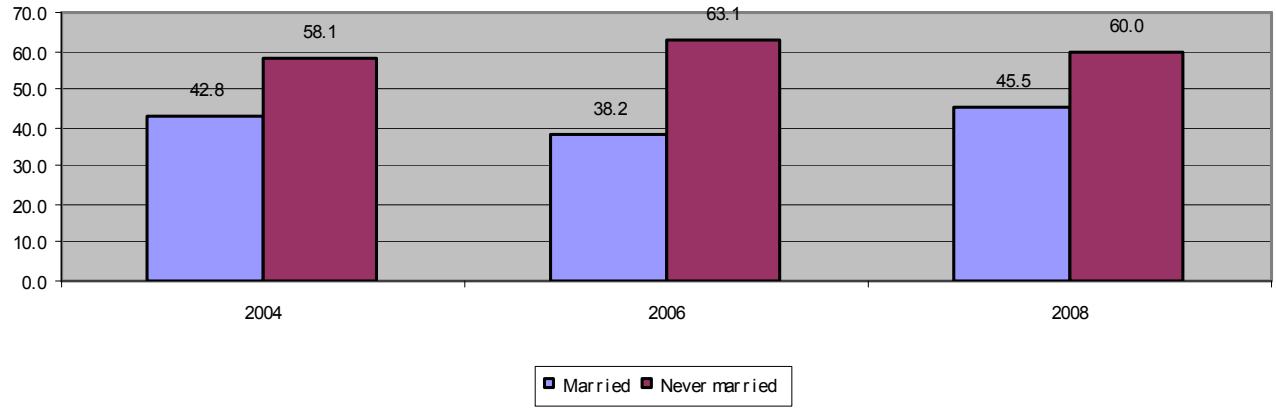


Figure 4: Percentages of men who accept condom use within marriage, by marital status

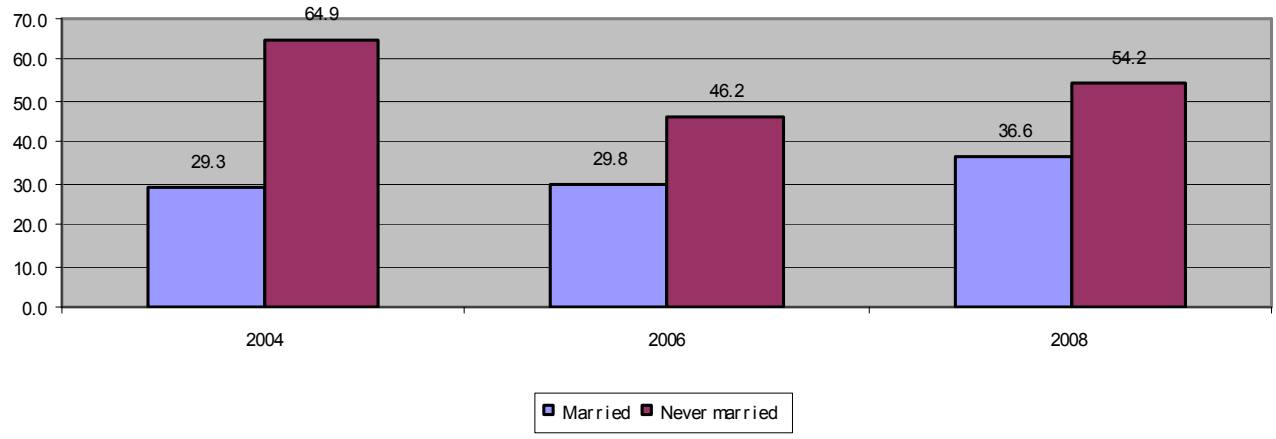


Table 1: Background characteristics for MDICP men and women, 2004-2008

	Women			Men		
Mean 2008 age (SD)	37.3 (12.0)			40.5 (14.2)		
Region of residence						
Central	30.5			29.5		
South	35.5			32.8		
North	34.0			37.7		
Schooling						
None	29.3			12.3		
Primary	62.7			67.2		
Secondary	8.0			20.5		
	2004	**2006**	**2008**	**2004**	**2006**	**2008**
Condom use acceptability (CUA)	**41.1**	**38.6**	**46.3**	**36.1**	**33.6**	**37.1**
CUA consistency across waves						
% changed since previous wave		40.1%	43.6%		34.5%	39.6%
% consistent since previous wave		59.9%	56.4%		65.5%	60.4%
% changed not accept to accept		18.8%	25.6%		15.9%	21.6%
% changed accept to not accept		21.4%	18.0%		18.7%	18.0%
% no change accept		19.8%	20.6%		17.7%	15.6%
% no change not accept		40.1%	35.8%		47.8%	44.8%
Household economic status						
Iron	12.1	14.9	18.1	12.8	15.1	19.0
Bicycle	51.2	55.1	57.2	60.0	64.3	65.5
Radio	79.2	72.7	67.5	80.0	81.8	78.7
Religion						
Muslim	21.6	22.9	23.6	22.6	25.0	24.8
Christian	34.2	35.2	34.5	29.8	34.4	33.6
Evangelical	10.0	18.7	17.6	9.2	19.0	17.0
Traditional African	14.3	16.8	15.3	15.0	15.8	15.5
Other	20.0	6.5	9.1	23.5	5.8	9.0
Marriage-related						
Mean number of living children (SD)	3.7 (2.4)	4.0 (2.3)	4.3 (2.3)	3.8 (3.3)	4.0 (3.4)	4.4 (3.3)
Ever married	91.5	95.3	97.8	78.0	83.5	90.7
Divorced	8.6	9.1	11.4	0.2	1.7	2.3
Mean number of times married (SD)	1.3 (0.8)	1.4 (0.7)	1.4 (1.6)	1.4 (1.1)	1.4 (1.1)	1.5 (1.0)
Unfaithful to spouse/partner	2.9	3.9	1.0	15.9	35.4	19.6
Perceived spousal infidelity	34.0	36.4	23.6	12.1	14.6	2.3
Polygamous marriage	30.9	28.4	30.8	20.7	13.4	13.2
HIV-related						
Med/high likelihood of HIV infection	15.9	9.5	21.4	9.2	4.7	12.0
Med/high spouse's likelihood of HIV infection	12.8	10.6	49.3	4.5	6.6	25.0
Tested for HIV and received results	7.9	63.7	86.1	13.8	66.0	80.7
HIV prevalence	4.4	5.7	8.2	2.2	3.0	4.6
N=		1002			756	

Table 2: Random and fixed-effects regression results for the effect of marriage and other characteristics on condom use acceptability, MDICP 2004-2008

	Women Random		Women Fixed		Men Random		Men Fixed	
	Odds	SE	Odds	SE	Odds	SE	Odds	SE
Age	0.99***	0.00			0.98***	0.01		
Region of residence								
Central	1.00	0.13			1.02	0.16		
South	2.19***	0.34			1.82***	0.39		
North								
Schooling								
None								
Primary	1.12	0.13			0.75*	0.13		
Secondary	1.26	0.27			0.76	0.17		
Household economic status								
Iron	0.83	0.11	1.09	0.26	0.96	0.16	1.46	0.44
Bicycle	0.97	0.09	1.07	0.15	0.87	0.10	0.85	0.14
Radio	1.06	0.11	0.97	0.14	1.05	0.15	1.05	0.19
Religion								
Muslim (ref)								
Christian	0.82	0.13	0.75	0.35	0.74	0.16	4.04**	2.43
Evangelical	0.84	0.15	0.62	0.29	0.79	0.19	3.80**	2.24
Traditional African	0.72*	0.14	0.60	0.29	0.74	0.19	3.53**	2.14
Other	0.87	0.16	0.57	0.26	0.87	0.21	3.51**	1.96
Marriage-related								
Number of living children	0.99	0.02	1.00	0.05	1.01	0.03	1.12*	0.07
Ever married	**0.39*** **	**0.09**	**0.55***	**0.20**	**0.30*** **	**0.06**	**0.35*** **	**0.11**
Divorced	1.45**	0.22	1.42	0.33	1.32	0.61	1.90	1.05
Number of times married	0.94	0.07	0.86	0.11	1.10	0.09	1.05	0.12
Unfaithful to spouse/partner	1.67*	0.44	1.31	0.40	0.78*	0.11	0.76	0.14
Perceived spousal infidelity	0.96	0.10	0.98	0.12	1.41*	0.25	1.03	0.22
Polygamous marriage	1.18	0.13	1.00	0.15	1.16	0.24	0.96	0.30
HIV-related								
Med/high likelihood of HIV infection	2.36***	0.29	1.94***	0.30	1.25	0.24	1.15	0.26
Med/high spouse's likelihood of HIV infection	1.00	0.12	1.14	0.15	0.99	0.18	1.13	0.22
Tested for HIV and received results	0.93	0.10	0.81	0.11	0.84	0.11	0.98	0.15
2006	1.06	0.13	1.06	0.14	1.12	0.16	0.94	0.15
2008	1.48*	0.23	1.41**	0.23	1.59**	0.35	1.08	0.23
N=	1002		642		756		425	

Notes: * Significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Random and fixed-effects regression results for the effect of marriage and other characteristics on condom use acceptability, MDICP 2004-2008, including actual HIV status

	Women Random		Women Fixed		Men Random		Men Fixed	
	Odds	SE	Odds	SE	Odds	SE	Odds	SE
Age	0.99**	0.01			0.98***	0.01		
Region of residence								
Central	0.96	0.13			1.05	0.19		
South	1.97***	0.33			2.03***	0.50		
North								
Schooling								
None								
Primary	1.08	0.14			0.66**	0.13		
Secondary	1.21	0.29			0.66	0.16		
Household economic status								
Iron	0.82	0.12	0.99	0.26	0.96	0.18	1.17	0.40
Bicycle	1.06	0.11	1.19	0.19	0.83	0.11	0.78	0.15
Radio	1.11	0.13	1.00	0.15	1.12	0.18	1.11	0.23
Religion								
Muslim (ref)								
Christian	0.77	0.14	0.57	0.31	0.77	0.19	16.74***	14.46
Evangelical	0.80	0.15	0.44	0.24	0.78	0.21	7.60**	6.49
Traditional African	0.66**	0.14	0.43	0.24	0.74	0.22	8.90**	7.66
Other	0.79	0.16	0.40*	0.21	0.77	0.22	6.74**	5.44
Marriage-related								
Number of living children	0.98	0.03	0.98	0.05	1.04	0.03	1.18**	0.09
Ever married	**0.39*** **	**0.10**	**0.66**	**0.27**	**0.29*** **	**0.07**	**0.33*** **	**0.12**
Divorced	1.50**	0.25	1.47	0.38	0.73	0.38	1.58	0.99
Number of times married	0.95	0.07	0.84	0.12	1.08	0.10	1.07	0.14
Unfaithful to spouse/partner	1.44	0.42	1.07	0.35	0.73*	0.12	0.63**	0.14
Perceived spousal infidelity	0.94	0.10	0.94	0.12	1.46*	0.30	1.16	0.28
Polygamous marriage	1.15	0.13	0.93	0.15	1.26	0.30	1.01	0.35
HIV-related								
Med/high likelihood of HIV infection	2.49***	0.33	2.04***	0.34	1.11	0.24	1.10	0.28
Med/high spouse's likelihood of HIV infection	1.07	0.14	1.15	0.17	1.03	0.22	1.39	0.31
Tested for HIV and received results	0.92	0.12	0.83	0.14	0.88	0.15	1.08	0.21
HIV positive	**1.02**	**0.21**	**1.92**	**1.11**	**3.57*** **	**1.36**	**5.71**	**6.70**
2006	1.06	0.14	1.02	0.15	1.06	0.19	0.85	0.16
2008	1.46**	0.28	1.33	0.27	1.55*	0.40	0.86	0.23
N=	846		541		600		337	

Notes: * Significant at 10%; ** significant at 5%; *** significant at 1%

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