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Pregnancy desire and dual method contraceptive use among people living with HIV attending clinical care in Kenya, Namibia and Tanzania

Gretchen Antelman¹, Amy Medley², Redempta Mbatia³, Sherri Pals⁴, Gilly Arthur⁵, Sabina Haberen⁶, Marta Ackers⁷, Batya Elul⁸, Julie Parent⁹, Anath Rwebembera¹⁰, Lucy Wanjiku¹¹, Nicholas Muraguri¹², Justice Gweshe¹³, Sandra Mudhune¹⁴, and Pamela Bachanas¹⁵ for the Prevention in Care and Treatment Settings Study Group

¹Research and Evaluation Director (Tanzania), ICAP, Mailman School of Public Health, Columbia University, New York, NY, USA

²Behavioral Scientist, US Centers for Disease Control and Prevention, Atlanta, GA, USA

³Executive Director, Tanzania Health Promotion Support, Dar es Salaam, United Republic of Tanzania

⁴Mathematical Statistician, US Centers for Disease Control and Prevention, Atlanta, GA, USA

⁵Associate Director of Science, CTS Global Inc., assigned to US Centers for Disease Control and Prevention, Dar es Salaam, United Republic of Tanzania

⁶Science Office Team Lead, CTS Global Inc., assigned to US Centers for Disease Control and Prevention, Dar es Salaam, United Republic of Tanzania

⁷HIV Care and Treatment Branch Chief, US Centers for Disease Control and Prevention, Nairobi, Kenya

⁸Director of Strategic Information (ICAP) and Assistant Professor of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY, USA

⁹Study Coordinator, Ministry of Health and Social Services, Windhoek, Namibia

¹⁰Pediatrician, Ministry of Health and Social Welfare, Dar es Salaam, United Republic of Tanzania

Correspondence to: Dr Gretchen Antelman, ICAP, Mailman School of Public Health, Columbia University, 722 West 16th Street, New York, NY 10032, USA; ga_zzz@yahoo.com.

Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Competing interests

None.

Ethics approval

Six Institutional Review Boards (IRBs) approved the protocol (Centers for Disease Control and Prevention, Columbia University, and IRBs in Kenya, Namibia, Tanzania and Zanzibar).

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¹¹Senior Care and Treatment Medical Officer, US, Centers for Disease Control and Prevention, Nairobi, Kenya

¹²Director of Medical Services, Ministry of Health, Nairobi, Kenya

¹³Chief Medical Officer and National Programme Manager, Ministry of Health and Social Services, Windhoek, Namibia

¹⁴Senior M&E Officer, Research and Evaluation, The International Center for AIDS Care and Treatment Programs (ICAP), Mailman School of Public Health, Columbia University, New York, NY, USA

¹⁵Behavioral Scientist, US Centers for Disease Control and Prevention, Atlanta, GA, USA

Abstract

Aim—To describe factors associated with pregnancy desire and dual method use among people living with HIV in clinical care in sub-Saharan Africa.

Design—Sexually active HIV-positive adults were enrolled in 18 HIV clinics in Kenya, Namibia and Tanzania. Demographic, clinical and reproductive health data were captured by interview and medical record abstraction. Correlates of desiring a pregnancy within the next 6 months, and dual method use [defined as consistent condom use together with a highly effective method of contraception (hormonal, intrauterine device (IUD), permanent)], among those not desiring pregnancy, were identified using logistic regression.

Results—Among 3375 participants (median age 37 years, 42% male, 64% on antiretroviral treatment), 565 (17%) desired a pregnancy within the next 6 months. Of those with no short-term fertility desire ($n=2542$), 686 (27%) reported dual method use, 250 (10%) highly effective contraceptive use only, 1332 (52%) condom use only, and 274 (11%) no protection. Respondents were more likely to desire a pregnancy if they were from Namibia and Tanzania, male, had a primary education, were married/cohabitating, and had fewer children. Factors associated with increased likelihood of dual method use included being female, being comfortable asking a partner to use a condom, and communication with a health care provider about family planning. Participants who perceived that their partner wanted a pregnancy were less likely to report dual method use.

Conclusions—There was low dual method use and low use of highly effective contraception. Contraceptive protection was predominantly through condom-only use. These findings demonstrate the importance of integrating reproductive health services into routine HIV care.

INTRODUCTION

High rates of unintended pregnancy and unmet need for contraception are well documented in sub-Saharan Africa within the general population and in people living with HIV (PLHIV).^{1–3} Safe and effective contraception has been identified as a primary strategy for prevention of vertical transmission of HIV through unintended pregnancies,⁴ and is also highly cost-effective.^{5,6} While comprehensive HIV care and treatment programmes have scaled up in sub-Saharan Africa over the past decade, reaching a significant proportion of

PLHIV, there has not been a corresponding increase in access to integrated family planning (FP) services within HIV care programmes, a service model which remains a challenge.^{7–10}

PLHIV may have lower fertility desires compared to the general population,^{211–13} but there is also clear evidence that PLHIV continue to want children, especially those who are younger or report fewer children.^{14–17} Limited fertility desire among PLHIV has been associated with not feeling healthy enough to sustain a pregnancy, fears that pregnancy could hasten disease progression, and fears of transmission to infants or sex partners.¹⁸¹⁹ Initiation of antiretroviral treatment (ART) improves the health and quality of life among PLHIV and may lead to increased sexual activity, reduced fears associated with transmitting HIV, and a renewed desire to have children.²⁰ There is some evidence that ART increases the fertility of women living with HIV;¹⁹²¹ however, studies have not consistently shown that being on ART¹²²² or having a healthy CD4 cell count²³²⁴ are associated with a desire for fertility. Societal norms and cultural influences also play a large role in fertility desire among PLHIV,^{2325–28} with studies suggesting that societal and cultural pressures to have children may diminish the health concerns that PLHIV have regarding childbearing.¹⁹²⁹

Evidence indicates a high unmet need for contraception in sub-Saharan Africa among PLHIV who wish to delay or stop childbearing.⁵⁶³⁰ In a cohort of Ugandan women, 17% became pregnant within 2 years of initiating ART, despite 93% not wanting or planning pregnancy. Only 14% were using a modern contraceptive.³¹ High rates of unintended pregnancy among women initiating ART have also been found in South Africa¹⁹³² and Rwanda.³³

Most HIV care providers encourage condom use among PLHIV but few discuss the benefits of additional contraceptive methods.³⁴ Male condom use alone is associated with a 1-year cumulative incidence of unintended pregnancy of about 18% for typical users.³⁵ Other methods of contraception such as sterilisation, intrauterine devices (IUDs) and hormonal contraceptives are more effective, but do not protect against HIV transmission or acquisition of other sexually transmitted infections (STIs). Thus, using only condoms for *dual protection* against HIV/STIs and unintended pregnancy is not as reliable or effective as *dual method* use,³⁸ which combines consistent condom use with a highly effective contraceptive method.³⁶ However, studies indicate that fewer than 20% of PLHIV in sub-Saharan Africa report dual method use.³³⁰³⁷

The primary aim of this study was to inform efforts to expand FP and safer pregnancy counselling to PLHIV attending HIV clinical care services in sub-Saharan Africa. The study identified the frequency of fertility desire and dual method use among men and women living with HIV attending care and treatment clinics in Kenya, Namibia and Tanzania, and factors associated with both outcomes.

METHODS

Study design

This article presents data from the baseline assessment of a cluster-randomised trial evaluating a clinic-based HIV prevention intervention. From October 2009 to June 2010,

3538 HIV-positive sexually active men and women attending 18 HIV care and treatment clinics in Kenya, Tanzania and Namibia enrolled in the ‘HIV Prevention for People Living with HIV/ AIDS: Evaluation of an Intervention Toolkit for HIV Care and Treatment Settings’ study. The intervention and sampling procedure for this study have been described previously.³⁸ In brief, six clinics in each country were paired on key characteristics (e.g. patient volume, provider/patient ratio, services offered, etc.) and then randomly assigned to either intervention or to a control arm. At the intervention clinics, health care providers and lay counsellors were trained to provide a package of HIV prevention messages and services as part of the routine care offered to HIV-positive clients. At the comparison clinics, clients received standard care. Participant eligibility criteria included being HIV-positive, aged over 18 years, sexually active in the past 3 months, attended the clinic at least twice and planning to attend for at least 1 year. Exclusion criteria included women who reported a current pregnancy or men who reported that their partner was pregnant. All eligible patients attending the study clinics during the recruitment period were screened for participation. All enrolled patients provided written informed consent in their local language.

Six Institutional Review Boards (IRBs) approved the protocol (Centers for Disease Control and Prevention, Columbia University, and IRBs in Kenya, Namibia, Tanzania and Zanzibar).

Measures

Data on outcomes and most potential correlates of those outcomes were collected via a structured questionnaire administered in the respondent’s language of choice upon enrolment in the study. Eligible participants were identified by research interviewers who completed all study procedures including screening, consent, enrolment, interviews and medical chart abstraction for clinical correlates. The primary outcomes were desire for pregnancy in the next 6 months and use of dual contraceptive method. For the first outcome, female participants were asked if they desired a pregnancy and male participants were asked if they desired their partner to become pregnant in the next 6 months. For the second outcome, dual method use was classified as the use of a hormonal, IUD or permanent method together with consistent condom use, defined as condom used at every sexual encounter over the past 3 months. Both men and women reported on the contraceptive used within the partnership. The accuracy and completeness of the ‘self-report’ measurement was contingent upon the level of the men’s knowledge of their partner’s use of woman-controlled contraceptive methods.

Potential correlates included socio-demographic factors (age, education level, marital status, number of living children, and duration of partnership), health status (length of time since HIV diagnosis, most recent CD4 count, current ART status), health provider communication about FP and/or safe pregnancy in the past 6 months, perception of partner’s desire for pregnancy, comfort asking partner to use condoms, experience of intimate partner violence, HIV disclosure to partner (spouse, main or most recent partner), and knowledge of partner’s HIV status.

Analysis

Of the 3538 adults enrolled in the study, the analytic sample for fertility desire ($n=3375$) excluded women aged >49 years (the upper limit of reproductive age; $n=63$) and participants with missing data on pregnancy desire ($n=100$). The analytic sample for dual method use ($n=2542$) excluded women who desired a pregnancy ($n=286$) and men who desired their partner to become pregnant ($n=279$ men) because they would be likely to make contraceptive choices consistent with actively trying to become pregnant. In addition, women aged >49 years ($n=63$), participants with missing data on condom use (men, $n=64$; women, $n=60$), highly effective contraceptive methods (men, $n=143$; women, $n=1$), or whose data on pregnancy desire were missing (men, $n=78$; women, $n=22$) were excluded from the dual method analysis.

Descriptive statistics were computed for variables of interest overall and by gender. Correlates of both outcomes – fertility desire and dual method use – were assessed for the overall study population and for women and men separately using logistic regression models controlling for clustering of observations within clinics. The reference category for fertility desire was not wanting a pregnancy in the next 6 months. For the dual method analysis, the reference category included those not using dual methods (i.e. using condoms only, using any other method without condoms, or not using any method). Those with missing values for the outcome variables were compared to those included and no significant differences were observed. All variables of interest were entered in the multiple regression models, and variables were considered statistically significant at a p value less than 0.05. Analyses were conducted using SAS V.9.3 (SAS Institute Inc., Cary, NC, USA).

RESULTS

Study participants

Among the 3375 participants in the fertility desire analysis, 1406 (42%) were men, the mean age was 37 years [standard deviation=8], 63% were married/ cohabitating, and 69% reported having two or more children. Compared to women, men were more likely to be older, married/cohabitating, and to be on ART (Table 1). While a high proportion (83%) of participants reported HIV disclosure to partners, 32% reported a partner of unknown serostatus and this was more commonly reported among women than men (41% vs 20%; $p<0.0001$).

Frequency and correlates of fertility desire among men and women

Overall, 565 (17%) participants reported desiring a pregnancy within the next 6 months. In the full multivariable model (Table 2), respondents from Tanzania [adjusted odds ratio (AOR) 2.13, 95% confidence interval (CI) 1.55–2.93; $p<0.0001$] and Namibia (AOR 2.07, 95% CI 1.46–2.93; $p<0.0001$) were twice as likely to desire a pregnancy compared to those in Kenya. In addition, participants who were married (AOR 2.14, 95% CI 1.41–3.25; $p<0.0001$), had fewer children (AOR_{none vs 4+} 10.24, 95% CI 6.87–15.26; AOR_{1 vs 4+} 4.81, 95% CI 3.41–6.78; AOR_{2 vs 4+} 2.45, 95% CI 1.74–3.44; $p<0.0001$), and were in recent partnerships (AOR_{<1 year vs 4+} 1.51, 95% CI 1.04–2.18; AOR_{1 to <2 years vs 4+} 1.68, 95% CI 1.20–2.35; $p=0.02$) were more likely to desire a pregnancy. Compared to men, women were

significantly less likely to desire a pregnancy in the next 6 months (AOR 0.56, 95% CI 0.45–0.71; $p<0.0001$). Clinical characteristics – time since HIV diagnosis, CD4 status, and provider communication – were not associated with pregnancy desire.

In the gender-stratified models, country, being married, and having fewer children remained positively associated with pregnancy desire in women compared to men (Table 2). In addition, ART was associated with increased desire for pregnancy among women but not men (AOR 1.62, 95% CI 1.15–2.27; $p=0.006$). Other clinical characteristics were not associated with pregnancy desire.

Frequency and correlates of dual method use

Among the 2542 sexually active PLHIV not desiring a pregnancy in the next 6 months, 2268 (89%) reported some type of contraceptive use. Only 27% reported dual method use, 10% reported a highly effective method of contraception only, and 52% reported condom use only (Tables 3 and 4). Injectables were the most commonly reported highly effective method, used alone or as part of dual method use. Reported condom use was significantly lower among those using highly effective contraception (73%) compared to those not using highly effective methods (83%; $p<0.0001$).

Men were more likely to report only condom use and less likely to report dual method or highly effective contraception compared to women (Table 3). Frequency of any contraceptive use was similar among Kenyan and Namibian participants (91% and 93%, respectively), but lower among Tanzanian participants (83%; Table 4). Condom-only use was reported by more than half of participants in all countries; dual method use was higher in Namibia (34%) and Kenya (28%) compared to Tanzania (19%; $p<0.0001$).

Among all participants, factors associated with a decreased odds of dual method use included older age (AOR 0.96, 95% CI 0.95–0.98; $p=0.001$), being separated/divorced compared to never married (AOR 0.62, 95% CI 0.39–0.97; $p=0.04$), having fewer living children (AOR_{none vs. 4+} 0.32, 95% CI 0.18–0.55; AOR_{1 vs. 4+} 0.65, 95% CI 0.47–0.91; $p<0.0001$), and reporting that their partner wants a pregnancy/child (AOR 1.51, 95% CI 1.08–2.11; $p<0.001$) (Table 5). Women were more likely to report dual method use than men (AOR 1.54, 95% CI 1.21–1.97; $p=0.001$). Participants who reported being comfortable asking their partner to use a condom (AOR 3.58, 95% CI 2.04–6.25; $p<0.0001$) or who recently discussed family planning with a health care provider (AOR 1.37, 95% CI 1.10–1.69; $p=0.006$) were also more likely to report dual method use. Education level, disclosure, partner's HIV status, partner violence, and clinical factors (on ART, CD4 level) were not associated with dual method use.

In the gender-stratified models, country-level differences in dual method use were observed. Women in Tanzania were less likely (AOR 0.59, 95% CI 0.37–0.95; $p<0.0001$) to report dual method use compared to women in Kenya, while women in Namibia were more likely to report dual method use (AOR 2.78, 95% CI 1.68–4.61; $p<0.0001$). In addition, women who reported an HIV diagnosis in the past year were more likely to report dual method use compared to women who had known of their diagnosis for ≥ 3 years (AOR 1.45, 95% CI 1.02–2.06; $p<0.003$). Among men, the strongest correlate of decreased odds of dual method

use was shorter duration of partnership ($AOR_{<1 \text{ vs } 4 \text{ years}} 0.43$, 95% CI 0.17–1.12; $AOR_{1-2 \text{ vs } 4 \text{ years}} 0.12$, 95% CI 0.03–0.53; $p=0.02$).

DISCUSSION

This was one of the largest multi-country studies on pregnancy desires, and is among the first to examine dual contraceptive method use among HIV-positive men and women enrolled in HIV care in sub-Saharan Africa. These findings therefore provide important insights into the social and clinical correlates of reproductive health behaviours and the service needs of PLHIV attending HIV clinical care. Only 17% of participants reported desiring a pregnancy in the next 6 months, an estimate lower than other studies among PLHIV in sub-Saharan Africa including studies from Nigeria (63%), Tanzania (37%), Uganda (31%) and South Africa (29%),^{15–1739} but higher than estimates from Uganda (8%) and Rwanda (8%).³¹³⁷ Significant correlates of fertility desire included being currently married, having fewer children, and being in a recent relationship. Other studies have also found that having fewer children¹⁵¹⁹²²²³³⁷ and duration of relationship¹⁶ were important predictors of fertility desire among PLHIV.

Providing safer conception and pregnancy counselling to PLHIV who currently desire a pregnancy is important to reduce the risk of horizontal transmission to partners as well as vertical transmission to infants.⁴⁰ HIV care providers are uniquely placed to provide this information, given their frequent contact with patients over a long period of time. Providers can assess the reproductive desires and intentions of their patients and inform them about how to conceive safely.¹⁹ Safer pregnancy counselling should include messages on the importance of ART adherence as well as teaching couples about ovulation and timed intercourse during the most fertile period.⁴⁰ Treating genital infections, ensuring the woman is healthy enough for pregnancy (e.g. high CD4 count, low viral load, no opportunistic infections), and verifying that the mother is on a non-teratogenic ARV regimen are important clinical interventions supporting safer pregnancy.³²⁴⁰ Unfortunately, studies indicate that providers have not received training on how to provide safer pregnancy counselling,⁴⁰ and some have unsupportive attitudes toward fertility desires in HIV-positive patients.¹⁵¹⁹⁴¹

While 83% of participants did not desire a pregnancy within the next 6 months, only 27% reported dual method use. This rate was high compared to studies in Rwanda (1%), Uganda (11%) and Zambia (18%),³³⁰³⁷ but lower than in a study from South Africa (33%).²¹ Although PLHIV already linked into the health care system should be able to access a full range of contraceptive methods, limited integration between HIV and FP services and HIV care providers' focus on counselling around consistent condom use may lead to the low rates of dual method use observed in this and other studies. Efforts toward integrating FP counselling and services into HIV clinical care have improved uptake of dual method use,²⁸³²⁴² but there are substantial barriers to FP/HIV integration such as different funding streams resulting in vertical programming both at the policy and clinic level, inadequate training of HIV providers in reproductive health and contraceptive method choice counselling, and restricted availability of contraceptives at HIV clinics.³⁴⁴³ Because condom use was lower among men and women using highly effective contraception, programmes

should also ensure that appropriate messages and access to condoms continue to be reinforced.

Several partner-related variables were significantly associated with fertility desire and dual method use. For example, duration of partnership was associated with both men's fertility desire and dual method use. Similarly, comfort asking a partner to use condoms was associated with dual method use for both men and women. These findings highlight the need for couple-level interventions.^{44,45} In Zambia, a video-based intervention tailored towards HIV-affected (serodiscordant or seroconcordant) couples led to a significant increase (from 22% to over 90%) in the uptake of a highly effective contraceptive method.⁴²

While no clinical factors – CD4 count, ART use, duration of HIV infection – were associated with dual method use, discussing family planning with a health provider was. This suggests that strengthening provider-initiated interventions promoting reproductive health counselling and providing integrated FP services could have significant impact on reducing unmet need for dual method use.

Finally, country-level differences were observed for both fertility desire and dual method use, suggesting that fertility desire and contraceptive use are influenced by cultural factors. Few studies looking at fertility desire and contraceptive use among PLHIV include consideration of culture,²⁰ but in many African societies, having children is an imperative for both men and women and their social status is often tied to the number of children they have.^{19,29} Programmes should balance acknowledging these influences with initiatives toward addressing the potential unmet need for safer pregnancy planning, which includes spacing or limiting fertility.

While this study has several important strengths, a few limitations should be noted. The condom use component of the dual method outcome was not assessed for levels of correct condom use, and being subject to social desirability bias, is likely to be overestimated. Conversely, bias toward underestimating dual method may also be a factor because many of the highly effective contraceptives are female-controlled and their use may be under-reported by male respondents. Finally, fertility desire and fertility intentions were not measured as separate constructs, and some literature has shown these two constructs to be different.¹⁵

We found significant unmet reproductive health needs among PLHIV attending HIV clinical care. Respecting the sexual and reproductive health rights of PLHIV should include programme interventions that ensure that all HIV patients' pregnancy desires are discussed as part of routine consultations. Couples who desire children should be offered counselling on safer conception and pregnancy, while couples wishing to delay or stop child-bearing should be counselled on the importance of dual method use and offered a broad range of contraceptive methods, and condoms. While recommendations around consistent and correct condom use are important, health care workers should be aware of the likelihood that patients who report consistent and correct condom use may not be adequately protected against unintended pregnancy. Furthermore, efforts to integrate FP services into HIV clinical care will require strong policy directives, collaboration and commitment between

polymakers within HIV and reproductive health programmes, and resources for implementation.

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Key message points

- This study demonstrates significant unmet reproductive health needs among people living with HIV attending HIV clinical care.
- Characteristics of partner communication and perception of partner's fertility desire were significantly associated with dual method use; men should be equally included in reproductive health counselling and decision-making regarding contraceptive use.
- HIV care providers are uniquely placed to provide reproductive health information, given their frequent contact with patients over a long period of time.

Table 1

Distribution of selected characteristics of the analytic sample for desiring a pregnancy ($n=3375$; all men, women aged 18–49 years), overall and by gender

Variable	Levels	Overall [n (%)]	Female ($n=1969$) [n (%)]	Male ($n=1406$) [n (%)]	p
Country	Kenya Namibia Tanzania	1106 (33) 1137 (34) 1132 (34)	645 (33) 641 (33) 683 (35)	461 (33) 496 (35) 449 (32)	0.16
Age in years	Mean (SD) (median; 25–75 percentile)	37 (8.4) (36; 31–42)	34 (7.2) (34; 29–39)	41 (8.7) (40; 35–46)	<0.0001
Education	None Primary Secondary+	308 (9) 1814 (54) 1248 (37)	169 (9) 1064 (54) 733 (37)	139 (10) 750 (53) 515 (37)	0.43
Marital status	Married/living together Divorced/separated Widowed Never married	2109 (63) 318 (9) 198 (6) 748 (22)	1092 (56) 220 (11) 152 (8) 503 (26)	1017 (72) 98 (7) 46 (3) 245 (17)	0.0001
Living children (n)	0 1 2 3 4	306 (9) 737 (22) 838 (25) 639 (19) 852 (25)	191 (10) 463 (24) 508 (26) 409 (21) 397 (20)	115 (8) 274 (20) 331 (24) 230 (16) 455 (32)	0.0001
Time since HIV diagnosis (years)	<1 1 to <2 2 to <3 3+ Yes	885 (26) 769 (23) 687 (20) 1032 (31) 2164 (64)	504 (26) 456 (23) 392 (20) 617 (31) 1154 (59)	381 (27) 313 (22) 295 (21) 415 (30) 1010 (72)	0.49
On ARVs	No	1210 (36)	814 (41)	396 (28)	0.0001
Last CD4 count	Mean (SD) (median; 25–75 percentile)	372 (241) (331; 203–490)	410 (256) (372; 226–539)	318 (207) (288; 178–422)	<0.0001
CD4 count clinical categories	<200 201–349 350–500 >500	787 (24) 987 (30) 759 (23) 806 (24)	376 (19) 519 (27) 472 (24) 583 (30)	411 (30) 468 (34) 287 (21) 223 (16)	<0.0001

Variable	Levels	Overall [n (%)]	Female (n=1969) [n (%)]	Male (n=1406) [n (%)]	p
Time since last CD4 measure (months)	0–6	2760 (83)	1650 (85)	1110 (80)	0.002
	7–12	433 (13)	224 (11)	209 (15)	
Duration of partnership (years)	>12	146 (4)	76 (4)	70 (5)	<0.0001
	<1	380 (11)	246 (12)	134 (10)	
	1 to <2	340 (10)	229 (12)	111 (8)	
	2 to <4	457 (14)	275 (14)	182 (13)	
	4	1947 (58)	1060 (54)	887 (63)	
Disclosed to partner	Not reported/unknown	251 (7)	159 (8)	92 (7)	<0.0001
	Yes	2691 (83)	1494 (79)	1197 (88)	
Knowledge of partner's HIV status	No	564 (17)	402 (21)	162 (12)	<0.0001
	Partner HIV-positive	1575 (48)	767 (40)	808 (59)	
	Partner known HIV-negative	629 (19)	351 (19)	278 (20)	
	Partner HIV status unknown	1053 (32)	779 (41)	274 (20)	
	Never violent or forced sex in last 6 months	2618 (78)	1408 (72)	1210 (86)	
Partner violence or forced sex in last 6 months	Violent/forced sex in last 6 months	283 (8)	211 (11)	72 (5)	<0.0001
	Unknown/not reported	474 (14)	350 (18)	124 (9)	
HCP discussed FP, safe pregnancy, or FP referral received in the last 6 months	Yes	1994 (59)	1301 (66)	693 (49)	<0.0001
	No	1378 (41)	665 (34)	713 (51)	

ARVs, antiretrovirals; FP, family planning; HCP, health care provider; SD, standard deviation.

Table 2

Multivariable adjusted full and gender-stratified odds ratio estimates of desiring a pregnancy (self or partner) in the next 6 months

Variable	Levels	Desire pregnancy [<i>n</i> (%)]	Full model (<i>n</i> =3192)*				Female (<i>n</i> =1858) [†]				Male (<i>n</i> =1334) [‡]			
			AOR	95% CI	<i>p</i>		AOR	95% CI	<i>p</i>		AOR	95% CI	<i>p</i>	
Country	Kenya	125 (11)	1.00		<0.0001		1.00		0.0002		1.00		0.031	
	Namibia	197 (17)	2.07	1.46	2.93		3.51	1.71	6.21		1.36	0.91	2.03	
	Tanzania	243 (22)	2.13	1.55	2.93		2.90	1.65	5.39		1.66	1.14	2.41	
Gender	Female	286 (15)	0.56	0.45	0.71	<0.0001	NA							
	Male	279 (20)	1.00											
Age in years	Mean (SD) (median; 25–75 percentile)	37 (8.4) (36; 31–42)	0.99	0.97	1.00	0.16	0.99	0.97	1.02	0.52	0.99	0.97	1.01	0.18
Education	None	54 (18)	1.07	0.73	1.58	0.03	1.07	0.59	1.93	0.08	1.24	0.73	2.11	0.17
	Primary	320 (18)	1.35	1.07	1.72		1.49	1.02	2.15		1.38	0.99	1.92	
	Secondary	191 (15)	1.00				1.00				1.00			
Marital status	Married/living together	396 (19)	2.14	1.41	3.25	<0.0001	1.66	0.96	2.87	<0.0001	2.91	1.46	5.77	0.004
	Divorced/separated	40 (13)	0.90	0.56	1.43		0.60	0.32	1.12		1.56	0.74	3.31	
	Widowed	18 (9)	0.78	0.41	1.48		0.46	0.19	1.11		1.70	0.62	4.68	
	Never married	110 (15)	1.00				1.00				1.00			
Living children (<i>n</i>)	0	124 (41)	10.24	6.87	15.26	<0.0001	18.08	9.48	34.50	<0.0001	6.13	3.43	10.94	<0.0001
	1	185 (25)	4.81	3.41	6.78		8.91	4.87	16.31		3.28	2.10	5.23	
	2	131 (16)	2.45	1.74	3.44		3.64	1.98	6.70		2.14	1.39	3.29	
	3	55 (9)	1.24	0.84	1.84		1.63	0.83	3.19		1.20	0.73	1.98	
	4	70 (8)	1.00				1.00				1.00			
	<1	153 (17)	0.90	0.67	1.22	0.75	1.07	0.68	1.68	0.55	0.79	0.52	1.20	0.46
Time since HIV diagnosis (years)	1 to <2	138 (18)	1.00	0.74	1.37		1.37	0.86	2.16		0.74	0.48	1.14	
	2 to <3	102 (15)	1.07	0.80	1.44		1.25	0.81	1.93		0.95	0.63	1.42	
	3+	172 (16)	1.00				1.00				1.00			
On ARVs	Yes	386 (18)	1.24	0.98	1.58	0.07	1.62	1.15	2.27	0.006	0.90	0.64	1.27	0.56
	No	179 (15)	1.00				1.00				1.00			
CD4 count	<200	136 (17)	0.89	0.69	1.22	0.87	0.71	0.45	1.12	0.27	1.16	0.73	1.86	0.91
	201–349	164 (17)	0.91	0.79	1.21		0.72	0.49	1.06		1.17	0.76	1.82	
	350–500	119 (16)	0.90	0.67	1.21		0.74	0.49	1.11		1.11	0.69	1.78	

Variable	Levels	Desire pregnancy [n (%)]	Full model (n=3192) [*]			Female (n=1858) [†]			Male (n=1334) [‡]		
			AOR	95% CI	p	AOR	95% CI	p	AOR	95% CI	p
Duration of partnership (years)	>500	135 (17)	1.00			1.00			1.00		
	<1	72 (19)	1.51	1.04 2.18	0.02	1.44	0.87 2.39	0.24	1.51	0.86 2.66	0.006
	1 to <2	82 (24)	1.68	1.20 2.35		1.25	0.79 1.98		2.52	1.51 4.22	
	2 to <4	82 (18)	1.05	0.77 1.42		0.76	0.48 1.20		1.41	0.93 2.14	
	4	296 (15)	1.00			1.00			1.00		
Disclosed to partner	Unknown/not reported	33 (13)	0.90	0.51 1.60		0.97	0.46 2.06		0.65	0.24 1.75	
	Yes	469 (17)	1.27	0.89 1.83	0.19	1.22	0.76 1.96	0.41	1.18	0.65 2.14	0.59
	No	78 (14)	1.00			1.00			1.00		
Knowledge of partner's HIV status	Partner known HIV-positive	273 (17)	1.14	0.85 1.53	0.07	1.07	0.73 1.57	0.51	1.28	0.78 2.12	0.09
	Partner known HIV-negative	120 (19)	1.43	1.04 1.98		1.28	0.83 1.98		1.74	1.01 2.98	
	Partner HIV status unknown	155 (15)	1.00			1.00			1.00		
Partner violence or forced sex in last 6 months	Violent/forced sex in last 6 months	58 (21)	1.00		0.18	1.00		0.12	1.00		0.93
	Never violent or violence >6 months ago	445 (17)	0.77	0.54 1.10		0.74	0.48 1.16		0.89	0.48 1.67	
	Unknown/not reported	62 (13)	0.66	0.43 1.03		0.56	0.32 0.97		0.92	0.43 2.00	
HCP discuss FP, safe pregnancy or provide referral in past 6 months	Yes	3154 (16)	1.00		0.85	1.00		0.78	1.00		0.72
	No	251 (18)	1.02	0.83 1.26		0.95	0.69 1.32		1.05	0.79 1.41	

^{*} 95% of n=3375 observations included in the full multivariable model.

[†] 94% of n=1969 observations included in the female multivariable model.

[‡] 95% of n=1406 observations included in the male multivariable model.

AOR, adjusted odds ratio; ARVs, antiretrovirals; CI, confidence interval; FP, family planning; HCP, health care provider; NA, not applicable; SD, standard deviation.

Table 3

Gender distribution of reported condom and contraceptive method use among sexually active HIV-positive patients who do not desire a pregnancy in the next 6 months

Contraceptive method	Overall (<i>n</i> =2542 [*]) [<i>n</i> (%)]	Female (<i>n</i> =1622) [<i>n</i> (%)]	Male (<i>n</i> =920) [<i>n</i> (%)]	<i>p</i>
Dual method	686 (27)	498 (31)	188 (20)	<0.0001
Highly effective method only [*]	250 (10)	210 (13)	40 (4)	
Condom only	1332 (52)	716 (44)	616 (67)	
No method	274 (11)	198 (12)	76 (8)	
Dual method use				<0.0001
Condom+pill	117 (17)	67 (13)	50 (27)	
Condom+injectable	381 (56)	303 (61)	78 (41)	
Condom+LAPM [†]	134 (20)	85 (17)	49 (26)	
Condom+multiple methods [‡]	54 (8)	43 (9)	11 (6)	0.76
Highly effective method				
Pill	57 (23)	45 (21)	12 (30)	
Injectable	133 (53)	113 (54)	20 (50)	
LAPM [†]	40 (16)	34 (16)	6 (15)	
Multiple methods [‡]	20 (8)	18 (9)	2 (5)	<0.0001
Unmet need for dual method	1856 (73)	1124 (69)	732 (80)	

N=3538 excluding those who desired a pregnancy (*n*=565); women aged >49 years (*n*=63); participants with missing data on contraceptive use (*n*=268); or missing data on pregnancy desire (*n*=100).

^{*} Highly effective methods included hormonal methods (pill, injectable, implant), intrauterine device or permanent.

[†] LAPM, long-acting or permanent methods (implants, intrauterine device, tubal ligation, vasectomy).

[‡] Multiple highly effective methods reported.

Table 4

Country distribution of reported condom and contraceptive method use among sexually active HIV-positive patients who do not desire a pregnancy in the next 6 months

Contraceptive method	Kenya (<i>n</i> =943) [<i>n</i> (%)]	Namibia (<i>n</i> =811) [<i>n</i> (%)]	Tanzania (<i>n</i> =788) [<i>n</i> (%)]	<i>p</i>
Dual method	261 (28)	279 (34)	146 (19)	<0.0001
Highly effective method only [*]	118 (13)	56 (7)	76 (10)	
Condom only	479 (51)	419 (52)	434 (55)	
No contraception, no protection	85 (9)	57 (7)	132 (17)	
Dual method use				
Condom+pill	57 (22)	35 (13)	25 (17)	<0.0001
Condom+injectable	138 (53)	188 (67)	55 (38)	
Condom+LAPM [†]	62 (24)	30 (11)	42 (29)	
Condom+multiple methods [‡]	4 (2)	26 (9)	24 (16)	
Highly effective method				
Pill	39 (33)	4 (7)	14 (18)	<0.0001
Injectable	57 (48)	39 (70)	37 (49)	
LAPM [†]	20 (17)	4 (7)	16 (21)	
Multiple methods [‡]	2 (2)	9 (16)	9 (12)	
Unmet need for dual method	682 (72)	532 (66)	642 (81)	<0.0001

^{*} Highly effective methods included hormonal methods (pill, injectable, implant), intrauterine device or permanent.

[†] LAPM, long-acting or permanent methods (implants, intrauterine device, tubal ligation, vasectomy).

[‡] Multiple highly effective methods reported.

Table 5

Multivariable adjusted full and gender-stratified odds ratio estimates of dual method use among sexually active HIV patients who do not desire a pregnancy in the next 6 months

Variable	Levels	Dual method [n (%)]	Full model (n=2243)*			Female (n=1430) [†]			Male (n=834) [‡]		
			AOR	95% CI	p	AOR	95% CI	p	AOR	95% CI	p
Country	Kenya	261 (27.7)	1.00		0.010	1.00		<0.0001	1.00		0.76
	Namibia	279 (34.4)	1.56	0.92 2.64		2.78	1.68 4.61		0.74	0.33 1.66	
	Tanzania	146 (18.5)	0.66	0.40 1.11		0.59	0.37 0.95		0.90	0.41 1.97	
Gender	Female	498 (30.7)	1.54	1.21 1.97	0.001	NA					
	Male	188 (20.4)	1.00								
Age in years	Mean (SD) (median; 25–75% percentile)	37 (8.4) (36; 31–42)	0.96	0.95 0.98	<0.0001	0.94	0.92 0.96	<0.0001	0.98	0.95 1.00	0.06
Education	None	59 (27.1)	1.12	0.76 1.66	0.07	1.16	0.69 1.96	0.163	1.35	0.70 2.59	0.66
	Primary	317 (23.5)	0.81	0.65 1.01		0.81	0.61 1.07		1.04	0.70 1.54	
	Secondary	309 (31.9)	1.00			1.00			1.00		
	Married/living together	406 (26.3)	0.79	0.53 1.17	0.04	0.63	0.40 1.00	0.018	1.18	0.47 2.97	0.08
Marital status*	Divorced/separated	60 (23.4)	0.62	0.39 0.97		0.50	0.29 0.85		0.42	0.14 1.30	
	Widowed	48 (28.7)	1.19	0.72 1.96		1.09	0.62 1.91		1.34	0.33 5.44	
	Never married	172 (30.1)	1.00			1.00			1.00		
Living children (n)	0	24 (14.6)	0.32	0.18 0.55	<0.0001	0.17	0.08 0.34	<0.0001	1.50	0.53 4.30	0.30
	1	124 (24.7)	0.65	0.47 0.91		0.49	0.32 0.76		0.81	0.45 1.46	
	2	184 (28.1)	0.77	0.58 1.03		0.66	0.45 0.96		0.77	0.46 1.29	
	3	176 (33.1)	1.08	0.81 1.43		0.91	0.63 1.32		1.30	0.78 2.14	
	4	178 (26.0)	1.00			1.00			1.00		
Time since HIV diagnosis (years)	<1	146 (22.7)	1.26	0.96 1.66	0.022	1.45	1.02 2.06	0.003	1.14	0.68 1.91	0.88
	1 to <2	140 (23.8)	0.93	0.69 1.26		0.87	0.60 1.29		1.16	0.68 2.00	
	2 to <3	172 (32.2)	0.80	0.60 1.07		0.72	0.50 1.04		0.98	0.58 1.66	
	3+	228 (29.5)	1.00			1.00			1.00		
On ARVs	Yes	403 (25.1)	0.93	0.74 1.16	0.52	0.91	0.69 1.20	0.500	0.91	0.59 1.41	0.68
	No	282 (30.1)	1.00			1.00			1.00		
CD4 count	<200	125 (22.4)	0.89	0.64 1.22	0.90	0.75	0.50 1.13	0.35	1.24	0.67 2.30	0.27
	201–349	201 (27.4)	0.96	0.74 1.26		0.80	0.57 1.12		1.59	0.91 2.79	

Variable	Levels	Dual method [n (%)]	Full model (n=2243) [*]			Female (n=1430) [†]			Male (n=834) [‡]		
			AOR	95% CI	p	AOR	95% CI	p	AOR	95% CI	p
Duration of partnership (years)	350–500	173 (28.9)	0.96	0.73	1.27	0.99	0.72	1.37	1.09	0.59	2.01
	>500	185 (29.4)	1.00			1.00			1.00		
	<1	70 (25.3)	0.92	0.62	1.36	0.57	0.78	1.97	0.43	0.17	1.12
	1 to <2	56 (23.1)	0.74	0.51	1.09		0.64	1.55	0.12	0.03	0.53
	2 to <4	88 (26.2)	0.84	0.62	1.15		0.59	1.27	0.76	0.42	1.38
Disclosed to partner	4	431 (28.6)	1.00			1.00			1.00		
	Unknown/not reported	41 (22.7)	0.87	0.52	1.46		0.60	2.00	0.26	0.06	1.21
	Yes	582 (28.7)	1.03	0.71	1.48	0.88	0.69	1.58	0.92	0.36	2.32
	No	93 (21.4)	1.00			1.00			1.00		
	Partner known HIV-positive	359 (30.1)	1.18	0.85	1.63	0.25	0.99	2.11	0.78	0.37	1.68
Knowledge of partner's HIV status	Partner known HIV-negative	127 (27.4)	1.27	0.96	1.69		0.87	1.67	1.31	0.66	2.59
	Partner HIV status unknown	189 (23.4)	1.00			1.00			1.00		
	Partner wants pregnancy	61 (22.3)	1.00		0.001	1.00		0.019	1.00		0.18
	Partner does not want pregnancy	574 (28.1)	1.51	1.08	2.11		0.95	2.00	2.50	0.91	6.86
	Unknown/not reported	22 (14.3)	0.71	0.39	1.30		0.22	1.25	1.99	0.60	6.64
Comfortable asking partner to use condoms	Comfortable	668 (28.3)	3.58	2.04	6.25	<0.0001	4.84	2.33	2.59	1.02	6.67
	Not comfortable	18 (10.5)	1.00			1.00			1.00		
	Violence in last 6 months	62 (29.7)	1.02	0.71	1.47	0.52	0.63	1.45	1.20	0.52	2.70
Partner violence or forced sex in last 6 months	Never or violence >6 months ago	503 (25.9)	1.00			1.00			1.00		
	Unknown/not reported	121 (31.0)	0.87	0.58	1.32		0.52	1.35	0.78	0.30	2.04
	Yes	482 (31.0)	1.37	1.10	1.69	0.006	1.59	2.13	1.14	0.79	1.64
HCP discuss FP, safe pregnancy or provide referral in past 6 months	No	201 (20.6)	1.00			1.00			1.00		

^{*} 95% of n=2366 observations converged in the full multivariable model.

[†] 94% of n=1518 observations converged in the female multivariable model.

[‡] 98% of n=848 observations converged in the male multivariable model.

AOR, adjusted odds ratio; ARVs, antiretrovirals; CI, confidence interval; FP, family planning; HCP, health care provider; NA, not applicable; SD, standard deviation.