Hindawi Publishing Corporation
Infectious Diseases in Obstetrics and Gynecology
Volume 2012, Article ID 340782, 9 pages
doi:10.1155/2012/340782

Clinical Study

Contraceptive Use and Associated Factors among Women Enrolling into HIV Care in Southwestern Uganda

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Received 5 July 2012; Accepted 28 August 2012

Academic Editor: Consuelo Beck Sague

Background. Preventing unintended pregnancies among women living with HIV is an important component of prevention of mother-to-child HIV transmission (PMTCT), yet few data exist on contraceptive use among women entering HIV care. *Methods*. This was a retrospective study of electronic medical records from the initial HIV clinic visits of 826 sexually active, nonpregnant, 18–49-year old women in southwestern Uganda in 2009. We examined whether contraceptive use was associated with HIV status disclosure to one's spouse. *Results*. The proportion reporting use of contraception was 27.8%. The most common method used was injectable hormones (51.7%), followed by condoms (29.6%), and oral contraceptives (8.7%). In multivariable analysis, the odds of contraceptive use were significantly higher among women reporting secondary education, higher income, three or more children, and younger age. There were no significant independent associations between contraceptive use and HIV status disclosure to spouse. *Discussion*. Contraceptive use among HIV-positive females enrolling into HIV care in southwestern Uganda was low. Our results suggest that increased emphasis should be given to increase the contraception uptake for all women especially those with lower education and income. HIV clinics may be prime sites for contraception education and service delivery integration.

1. Introduction

Sub-Saharan Africa has the highest prevalence and incidence of HIV-1 infection in the world [1]. Women of reproductive age account for 60 percent of all adult infections and 75 percent of infections among people 15–24 years old [2]. Sub-Saharan Africa also has high fertility rates with an estimated 14 million unintended pregnancies annually [3]. In 2008, the number of children newly infected with HIV was approximately 430,000, of which 90 percent were infected through mother-to-child transmission (MTCT) [4]. The World Health Organization (WHO) lists preventing unintended pregnancies among people living with HIV as a second pillar of preventing mother-to-child transmission (PMTCT) [4]. Not only is preventing unintended pregnancies in HIV-infected women an effective strategy for reducing perinatal transmission [5–8], but it is also cost saving [8, 9] and would contribute to the reduction of maternal mortality, which may be higher among HIV-infected women [10–12]. However, most PMTCT efforts to date prioritize the provision of antiretroviral (ARV) prophylaxis to HIV infected pregnant women, their infants, and safer breastfeeding strategies [4, 13, 14].

In Uganda, HIV-1 seroprevalence among adults is 6.5%, and 57% of the HIV-positive adults are women [1]. The total fertility rate (TFR) in Uganda is 6.7 children per woman

and among the highest worldwide [15]. An estimated 24% of married women in Uganda use contraceptive methods, with an unmet need for contraception of 41% among women of reproductive age [15]. MTCT of HIV contributes 20% of new HIV infections in Uganda, although PMTCT services provide 60% of pregnant women living with HIV with ARV prophylaxis [16]. Many HIV-positive women have unintended pregnancies [17–20] with a concomitant risk of MTCT; however, the risk is greatly diminished if ARV prophylaxis is initiated early in pregnancy [21]. A modeling study in Uganda showed that contraception has the potential to avert twice the number of vertical HIV infections and pediatric AIDS deaths as compared to PMTCT interventions initiated among already pregnant women living with HIV [7]. Reports show that living with HIV may be associated with a desire to limit child bearing [22]; on the other hand, fertility desires may increase with access to HIV treatment [23, 24]. Several Ugandan reports suggest that, among women in HIV care, the most common contraceptive method reported is condom use [17, 20, 25], which has a high contraceptive failure rate [26].

Little is known about contraceptive use among HIV positive women entering HIV care in Uganda, a country in which access to reproductive health care is limited [27]. Entry into HIV care may represent an opportune time to assess women's fertility plans and intervene to prevent unintended pregnancies and reduce MTCT of HIV. We therefore conducted a retrospective analysis of electronic medical records from initial visits to a large HIV clinic in southwestern Uganda to document the use of contraception among women of reproductive age. In addition, we examined correlates of contraceptive use with the goal of informing strategies to increase the uptake of contraception. We sought to determine whether HIV disclosure to one's spouse and other sexual partners was associated with increased contraceptive use, because this factor has previously been shown to be correlated with increased condom use, and decreased sexual risk behavior, in Uganda and other countries in Sub-Saharan Africa [20, 28–32]. We also examined demographic characteristics as possible confounders.

2. Methods

2.1. Setting and Study Population. Our sample included HIV-positive women of reproductive age (18–49 years) who enrolled into the Mbarara Regional Hospital HIV clinic (also known as the Immune Suppression Syndrome (ISS) clinic) during 2009. Mbarara Regional Referral Hospital serves a population of 2.5 million people in southwestern Uganda. As of December 2009, the ISS clinic, which provides free HIV care, had 7500 active adult (age 18 and older) HIV-positive clients, 4500 of whom were women. The total number of adult clients receiving antiretroviral therapy (ART) by the end of 2009 was 5300. We excluded pregnant women, those who reported sexual abstinence, and women over age 49 from the analysis. We chose the cutoff of age 49 to be consistent with reproductive health data reported in the Uganda Demographic and Health Survey (UDHS) report [15].

2.2. Data Collection. Data for this study were abstracted from patient records that are routinely collected at the initial ISS Clinic visit. Data are collected on standard forms adapted from the Open Medical Records System (Open MRS) framework developed by Moi University and Indiana University for use in developing countries. The ISS Clinic enrollment visit form includes sociodemographic and behavioral data, including contraception use (collected by counselors and nursing officers) and clinical information (collected by physicians). The data from this form are entered into the Open MRS data management system by data clerks. Regular quality control checks are performed on 5% of entered records by comparing each variable with the original source document: entry errors occur in less than 1% of the data but omission of data from several variables on the form is frequent (see below).

2.3. Measurements

2.3.1. Outcome Variable. The outcome variable was self-reported use of one or more contraceptive methods at enrollment into care. The methods extracted from the electronic Open MRS included hormonal methods (combined oral contraceptives (COCs), injectable hormones including depot medroxyprogesterone acetate (DPMA), and implants), as well as nonhormonal methods (male condoms, diaphragms, cervical caps, intrauterine devices (IUDs), natural rhythm methods), and sterilization methods (bilateral tubal ligation and hysterectomy). We categorized hormone-based contraception (injection, implant, or pill), IUDs, or sterilization methods as highly effective. Other contraceptive methods available in Uganda but not captured in the electronic data include progestin only pills and emergency contraceptives.

2.3.2. Independent Variables. The main covariate of interest was self-reported disclosure of HIV status to a spouse or sexual partner(s) at the initial clinic visit. The disclosure variable captured whether a woman had disclosed to a spouse or sexual partner, had disclosed to someone other than a spouse or partner, or had not disclosed. Other independent variables included age, marital status ("married" was defined as legal or common-law marriage), number of children, education level, monthly income, religion, WHO clinical stage, CD4 cell count, and spouse's HIV status.

2.4. Statistical Methods. We evaluated records of 1110 females of reproductive age (18–49 years) who presented to the ISS clinic from January to December 2009. 210 were either pregnant (151; 13.6%) or reported current sexual abstinence (59; 5.7%) at their initial visit and were excluded, and further 74 (6.7%) were missing data on contraceptive use and were also excluded, leaving 826 women for analysis. Women who were missing data on contraception were less likely to be currently married (34.4%) compared to those who were not missing contraception data (48.5% married,

$P = 0.01$), but, otherwise, those with missing data were comparable to those with contraception data on all other variables of interest (data not shown).

We calculated summary statistics to describe the study population and conducted bivariate analyses using Pearson's chi-square (χ^2) tests of association to assess associations between contraceptive use and categorical variables using $n = 826$. Where more than 3% of a predictor variable was missing, we included missing as a separate category for bivariate and multivariable analyses. We performed multivariable logistic regression to identify independent correlates of contraceptive use, including missing categories as noted above. As this approach may introduce bias [33], we also imputed the missing values using multiple (five) imputations by chained equations in Stata and conducted multivariable logistic regression using this imputed dataset. The results using the imputed dataset were not substantially different; thus, the results presented in this paper are those from the original dataset. Because the sample size was relatively large and we did not believe that any of the correlates were on the causal pathway from HIV disclosure, our primary covariate of interest, to the outcome, contraceptive use, we included all the variables of interest in the model. To better examine the influence of disclosure to either a spouse or sexual partner, we stratified the multivariable analyses by marital status (married versus nonmarried). However, there were no substantial changes in the associations with contraceptive use among any covariates, so we present the results from the model including all women, both married and nonmarried, using a composite variable representing disclosure to either a spouse or a sexual partner. We also examined condom use in comparison to other contraception methods, primarily to determine whether condoms were being used to protect against the spread of HIV to uninfected spouses and whether condom use was more common among partnerships in which the HIV status of the women had been disclosed and among serodiscordant partners.

2.5. Ethical Considerations. The Institutional Review Boards of Mbarara University of Science and Technology, the University of California, San Francisco, and the Uganda National Council of Science and Technology approved the protocol of this study, which was comprised of the analysis of deidentified data.

3. Results

3.1. Baseline Characteristics. The median age of women of reproductive age enrolling at the ISS Clinic in 2009 ($n = 1110$) was 29 years (interquartile range (IQR) 24–35). Approximately, half had a primary school education (56%), half were married (48%), and about two-thirds (70%) had a monthly income of less than 100,000 Uganda shillings (equivalent to about 40 US dollars).

The median age of the nonpregnant, sexually active women included in analysis ($n = 826$) was 29 years (IQR 24–35) (Table 1). Approximately half had primary school education (55%), half were married (49%), and two-thirds (70%) had a monthly income of less than 100,000 Uganda shillings. Of those who were married, 71% of the women reported an HIV-positive spouse, 5% reported having an HIV-negative spouse, 18% did not know their spouse's HIV status, and 7% did not report their spouse's status. Of those who were married, 70% of women had disclosed their status to a spouse while 12% had disclosed to someone else other than the spouse, and 18% had not disclosed to anyone. Of those who were not married, 3% disclosed to a sexual partner, 71% disclosed to someone else, and 26% disclosed to no one. Most women were enrolled within 3 months of HIV diagnosis (72%) with mild HIV-associated symptoms placing them in WHO HIV clinical stages 1 or 2 (64%), and few (7%) were on ART at clinic entry, presumably prescribed by other clinics.

3.2. Use of Contraception. 230 women (28%) reported use of contraception at enrollment. The most common methods reported included the use of injectable hormones (52%), condoms (30%), and oral contraceptives (9%). Use of highly effective contraceptive methods was reported for 18% of the study subjects, two-thirds (65%) of those using contraception.

3.3. Bivariate and Multivariable Analysis. HIV disclosure was not associated with contraceptive use in bivariate or multivariable analyses. The variables significantly associated with the use of contraception in bivariate analyses were education, marital status, monthly income, having living children, and HIV status of spouse (Table 2).

In multivariable analysis, we found the odds of contraceptive use among single and previously married women remained significantly lower than that among married women (Table 2). Age (less than 24 years inclusive), education (completing secondary education), income (>250,000 Uganda shillings/month), and parity (having 3 or more living biological children) were independently associated with increased odds of contraception. HIV status of spouse was not significantly associated with contraceptive use in multivariable analysis; the association in bivariate analysis seemed to be due to colinearity with the marital status of the women. These associations remained significant in multivariable analysis using the multiple imputed dataset (data not shown). Additionally, women with one or two living biological children (versus none) had significantly increased odds of use of contraception using the imputed dataset.

We conducted a subanalysis of those reporting any contraception, to examine how condom use compared to other contraception methods (data not shown) within different variable groups. We found no significant difference in condom use versus other contraceptive use by HIV status disclosure ($P = 0.49$), or HIV status of spouse ($P = 0.59$).

4. Discussion

We found low contraceptive use (27.8%) among sexually active, not pregnant HIV-positive women enrolling at the ISS

Table 1: Demographic and behavioral characteristics among non-pregnant, sexually active women enrolling at ISS Clinic, Mbarara Uganda, during 2009.

	Total *n* (col%)
All	826 (100.0)
Demographics	
Age (years) (median (IQR))	29 (24–35)
18–24	211 (25.5)
25–29	206 (25.0)
30–35	234 (28.3)
36–39	175 (21.2)
Education	
None	0 (0.0)
Primary level	453 (54.8)
Secondary	148 (17.9)
Tertiary	64 (7.8)
Missing	161 (19.5)
Marital status	
Married	398 (48.5)
Previously married (separated, divorced, or widowed)	348 (42.4)
Not married	75 (9.1)
Tribe	
Kiga	81 (9.8)
Nkole	596 (72.2)
Other	109 (13.2)
Missing	40 (4.8)
Religion	
Catholic	246 (29.8)
Protestant	419 (50.7)
Muslim	83 (10.0)
Other	22 (2.7)
Missing	56 (6.8)
Monthly income (USH)	
<100,000	575 (69.7)
100,000–250,000	73 (8.8)
>250,000	16 (1.9)
Missing	162 (19.6)
Among married persons: HIV status of spouse	
Negative	21 (5.3)
Positive	281 (70.6)
Unknown	70 (17.6)
Missing	26 (6.5)
Among married persons: HIV status disclosure	
Disclosed to spouse	279 (70.1)
Disclosed to someone but not to spouse	48 (12.6)
No disclosure reported	71 (17.8)
Among un-married persons: HIV status disclosure	
Disclosed to sexual partner	13 (3.1)
Disclosed to others but not to sexual partner	301 (71.2)
No disclosure reported	109 (25.8)
Health status	
WHO clinical stage*	
Stage 1 or 2	526 (63.7)
Stage 3 or 4	200 (24.2)
Missing	100 (12.1)
CD4 cell count (/mm^3)	
≤200	219 (26.5)
201–350	149 (18.0)
351–500	115 (14.0)
>500	205 (24.8)
Missing	138 (16.7)
Number of living biological children	
0 children	39 (4.7)
1-2 children	208 (25.2)
3 or more children	186 (22.5)
Missing	393 (47.6)
Type of contraceptive method used	
None	596 (72.2)
Condoms	68 (8.2)
Oral contraceptives	20 (2.4)
Injectable hormones	119 (14.4)
Norplant	0 (0.0)
Natural family planning/rhythm method	7 (0.9)
Intrauterine device	1 (0.1)
Sterilization	5 (0.6)
Diaphragm	2 (0.2)
Other	3 (0.4)
Condom use + another method	5 (0.6)

* WHO clinical stage refers to the World Health Organization clinical staging for HIV disease based on symptoms, signs and diagnosed opportunistic infections in clients with HIV infection. Stages 1 and 2 are considered asymptomatic or mild disease, while stages 3 and 4 are considered severe disease and patients in these categories should begin antiretroviral therapy.

Clinic in Mbarara Hospital, consistent with contraception rates of the general Ugandan population [15], as well as HIV-positive women in Uganda [30, 31], Kenya, and Malawi [34]. The use of highly effective contraceptive methods was also low (18%), also consistent with the general Ugandan population [15] as well as those with HIV [20]. Thus, the low levels of contraceptive use in the sample may reflect the same root causes for low contraception uptake in Uganda, including insufficient information about the advantages of, fear of side effects from, and lack of access to contraception.

Table 2: Use of any contraception among women enrolling at ISS Clinic, Mbarara Uganda, during 2009, by demographic and behavioral characteristics ($n = 826$).

	Use of any contraception*		Adjusted Odds Ratio**	95% Confidence Interval
	No, *n* (%)	Yes, *n* (%)		
All	596 (72.2)	230 (27.8)		
Demographics				
Age at enrollment (years)				
18–24	148 (70.1)	63 (29.9)	1.00	
25–29	148 (71.8)	58 (28.2)	0.83	(0.51, 1.34)
30–35	163 (69.7)	71 (30.3)	0.89	(0.55, 1.43)
36–49	137 (78.3)	38 (21.7)	0.49	(0.28, 0.86)
Education				
Primary level	331 (73.1)	122 (26.9)	1.00	
Secondary	93 (62.8)	55 (37.2)	1.71	(1.10, 2.67)
Tertiary	46 (71.9)	18 (28.1)	0.91	(0.44, 1.88)
Missing	126 (78.3)	35 (21.7)	0.80	(0.51, 1.26)
Marital status				
Married	251 (63.1)	147 (36.9)	1.00	
Previously married (separated, divorced, or widowed)	279 (80.2)	69 (19.8)	0.50	(0.30, 0.82)
Not married	62 (82.7)	13 (17.3)	0.39	(0.18, 0.83)
Tribe				
Nkole	436 (73.2)	160 (26.8)	1.00	
Kiga	52 (64.2)	29 (35.8)	1.52	(0.89, 2.61)
Other	80 (73.4)	29 (26.6)	1.14	(0.67, 1.93)
Missing	28 (70.0)	12 (30.0)	0.84	(0.39, 1.82)
Religion				
Catholic	181 (73.6)	65 (26.4)	1.00	
Protestant	300 (71.6)	119 (28.4)	1.07	(0.73, 1.57)
Muslim	60 (72.3)	23 (27.7)	0.89	(0.47, 1.70)
Other	16 (72.7)	6 (27.3)	1.16	(0.40, 3.37)
Missing	39 (69.6)	17 (30.4)	1.38	(0.69, 2.75)
Monthly income (USH)				
<100,000	417 (72.5)	158 (27.5)	1.00	
100,000–250,000	50 (68.5)	23 (31.5)	1.16	(0.64, 2.11)
>250,000	6 (37.5)	10 (62.5)	4.80	(1.48, 15.61)
Missing	123 (75.9)	39 (24.1)	0.94	(0.61, 1.47)
HIV status of spouse/partner				
Positive	183 (64.7)	100 (35.3)	1.00	
Negative	9 (42.9)	12 (57.1)	1.80	(0.69, 4.72)
Unknown	40 (56.3)	31 (43.7)	1.27	(0.71, 2.27)
N/A: no spouse	343 (80.7)	82 (19.3)		
Missing	21 (80.8)	5 (19.2)	0.43	(0.15, 1.26)
HIV status disclosure				
Disclosed to spouse/partner	202 (64.5)	111 (35.5)	1.00	
Disclosed to someone other than spouse/partner	259 (78.3)	72 (21.8)	0.93	(0.56, 1.54)
No disclosure reported	135 (74.2)	47 (25.8)	0.86	(0.53, 1.40)
Health status				
WHO clinical stage				
Stage 1 or 2	365 (69.4)	161 (30.6)	1.00	
Stage 3 or 4	157 (78.5)	43 (21.5)	0.72	(0.47, 1.10)
Missing	74 (74.0)	26 (26.0)	0.90	(0.53, 1.51)

Table 2: Continued.

	Use of any contraception*		Adjusted Odds Ratio**	95% Confidence Interval
	No, *n* (%)	Yes, *n* (%)		
CD4 count				
>500	139 (67.8)	66 (32.2)	1.00	
351–500	78 (67.8)	37 (32.2)	1.19	(0.70, 2.03)
201–350	111 (74.5)	38 (25.5)	0.85	(0.51, 1.42)
≤200	161 (73.5)	58 (26.5)	0.93	(0.58, 1.50)
Missing	107 (77.5)	31 (22.5)	0.71	(0.41, 1.24)
Number of living biological children				
0 children	33 (84.6)	6 (15.4)	1.00	
1-2 children	143 (68.8)	65 (31.2)	2.62	(0.99, 6.96)
3 or more children	112 (60.2)	74 (39.8)	4.26	(1.54, 11.75)
Missing	308 (78.4)	85 (21.6)	1.84	(0.70, 4.84)

*Any contraception refers to self-reported use of one or more of the methods of contraception in Table 1.
**Estimates from logistic regression adjusting for all other variables in the table.

In addition, some of these women may have wanted to have children [20, 23, 35] but our medical records did not capture this desire. Furthermore, some women who want to access contraception may be thwarted by the plans of her spouse or sexual partner [36, 37].

Among clients who reported use of contraception, more than half (52%) used hormonal injectable contraception, and 30% used condoms. Other studies conducted at HIV clinics in Uganda found that the most commonly reported contraception method is condom use [17, 20, 25]. The women in these other studies were either initiating or already on ART and thus may have already been in HIV care for some time with easier access to condoms and frequent exposure to counseling promoting condoms to prevent HIV transmission and pregnancy. In contrast, 70% of the women in our sample were recently diagnosed with HIV and only 7% were on ART. While the Uganda AIDS Control Program National guidelines advocate for dual family planning methods (condoms plus another contraceptive method) to prevent HIV/STI transmission and unintended pregnancies for HIV-positive individuals, only a small proportion used dual protection in this study (2%), consistent with other Ugandan studies [17, 20, 22, 38]. Use of condoms alone or dual contraception methods may have been low in our study; however, because 70% of married women reported having HIV-infected spouses, they therefore may have been less likely to use condoms to prevent sexual transmission of HIV. The high proportion of women choosing injectable hormonal contraception emphasizes the need to continue to unravel the relationship between hormonal contraception use and HIV risk [39, 40].

Our primary predictor variable of interest, HIV status disclosure, was not associated with use of contraception in either bivariate or multivariable analyses. Demographic factors (e.g. marital status, already having several children, younger age) and socioeconomic factors (e.g. education and income) were more strongly associated with contraception use at clinic entry. This is in contrast to a recent study in Uganda that showed that the lack of HIV disclosure was associated with lower odds of use of modern contraceptives among HIV women enrolled in HIV clinics in Uganda, in which 68% of the women were on ART [20]. In addition, we did not find any significant association between HIV status disclosure and use of condoms, in contrast to the findings of other studies [20, 28, 31, 32, 41]. Seventy percent of the married women in our study reported seroconcordant positive spouses, thus condoms to prevent HIV transmission may not be perceived to be applicable to this group. The observed association of decreased use of contraception with increased age was consistent with previous findings of lower modern contraceptive use among older women on ART in Zambia [41] and HIV-infected women in Uganda [20, 30]. Parity and education have also been associated with contraceptive use in other studies [28, 30, 34, 41, 42]. Younger age [22, 23, 43–46] and having fewer children [22, 24, 43, 46] are often associated with increased fertility desires and could thus be expected to be associated with decreased contraceptive use [34]. While the association of younger age with increased contraceptive use in our study is consistent with others, it is the opposite of what would be expected based on fertility desires. Older HIV-positive women may have a larger unmet need for contraception to limit childbearing, while younger women may have a larger unmet need to control spacing of births [15]. Given that many women in Uganda, especially those with HIV, face difficult economic and social circumstances [47] including bearing children whom they may raise as widows or divorced, the associations between contraception and education, as well as marital status and monthly income, are particularly important. The low use of contraception by women in this study, most of whom were recently diagnosed with HIV, points to the possibility that entry into HIV care could be a good time to intervene with contraception education and provision.

Our findings are limited by a high degree of missing data that is inherent to data collected as part of routine

clinical care. However, the missing data categories were not associated with the use of contraception in the multivariable analysis, suggesting that the data were not missing systematically, and the results did not change when we performed multiple imputation. The data were collected by clinic counselors rather than by research assistants trained in systematic data collection and therefore may be especially subject to interviewer bias and social desirability bias or other types of response bias. In addition, these data do not account for desired pregnancy by the women and/or their partners [25, 28, 34, 48]. We also recognize that the cross sectional nature of this analysis focusing on contraceptive methods used at point of entry into HIV care does not allow inference about the method used at the time of HIV acquisition. In addition, the women served by the ISS clinic are a mixture of those from rural and urban areas; therefore, the findings may not fully translate to women enrolling in urban HIV clinics or those in very rural settings.

However, the strength of this study is that we were able to study a large number of HIV-infected women of reproductive age entering chronic HIV care, a population which may have had little previous exposure to health care and reproductive services. Our study highlights the need to establish cost effective strategies for lower income countries to improve the uptake of contraception among those infected with HIV who do not want to have children. We also found that dual methods of contraception were rarely used; therefore, contraception programs should also educate clients about the value of dual methods in order to prevent HIV/STI transmission to partners as well as to prevent unintended pregnancies. A study using the same database found an increasing incidence of pregnancies from 2006 to 2010 and the use of contraception was protective against pregnancy [49].

Given the low contraceptive use among HIV-infected women in this study, which is comparable to contraception rates among the general population of Ugandan women, we suggest that strategies to improve contraception uptake target all women. We found that demographic and economic factors were important in the uptake of contraception; therefore, as countries plan improvement strategies to enhance contraception uptake among HIV-infected women, it may be important to reach women of lower socioeconomic and educational levels. The low use of certain long-term contraceptive methods available in Uganda [50], such as implants and IUDs, suggests that more resources and focus may be needed for long-term contraceptive methods. HIV clinics in public health facilities are ideal settings for reaching HIV-positive women; at the ISS Clinic studied here, regular health education on contraception is given to clients and some contraceptive methods are now offered free on site or by voluntary referral to a nearby Maternal Child Health (MCH) clinic as part of routine clinical care. Increased integration of contraceptive services with STI/HIV prevention services would serve the ultimate goal of primary prevention of HIV via unintended pregnancies.

Further work is needed to determine whether this strategy is effective in reducing unintended pregnancies among HIV-positive women in care and reducing transmission of HIV.

Conflict of Interests

The authors declare that they have no competing interests. The funding source had no influence on study design, data collection and analysis, interpretation of the data, paper preparation, or decision to submit for publication.

Acknowledgments

This paper was supported by a Grant from the National Institutes of Health, University of California San Francisco-Gladstone Institute of Virology and Immunology Center for AIDS Research (P30 AI027763) and by the National Institutes of Health Grant 5R25MH064712. The authors would like to thank the counselors, nurses, clinicians and data officers in the ISS Clinic for their contributions in collecting this patients' information.

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