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Long-acting reversible contraception knowledge, attitudes and use among HIV-infected and -uninfected women and their providers☆,☆☆

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ABSTRACT

Objective(s): To describe differences in contraceptive knowledge, attitudes and use among HIV-infected and HIV-uninfected women served by an academic medical center in New York City and to describe gaps in knowledge and practice of gynecologic and HIV clinicians providing care at the same clinic sites where patients completed surveys.
Study design: We conducted a survey comparing contraceptive knowledge, attitudes, reproductive histories and long-acting reversible contraception (LARC) use in HIV-infected and -uninfected women. We also conducted a survey to elicit clinician demographic characteristics and education, contraceptive practice patterns and their knowledge of current contraceptive guidelines. We surveyed clinicians and patients at five ambulatory sites.
Results: We screened 90% of patients approached. All 257 women who were eligible completed a survey. These included 107 (42%) HIV-infected women and 150 (58%) HIV-uninfected women. HIV-infected women were older, were more likely to be black/African-American, were less likely to be Latina, were more likely to receive public assistance and had lower educational attainment. HIV-infected women reported lower lifetime LARC use (12% vs. 28%) and higher recent condom use (58% vs. 25%) than HIV-uninfected women. Both groups reported similar attitudes toward intrauterine devices (IUDs) and implants. HIV clinicians were less likely to have had training in or discuss LARC methods with their patients.
Conclusions: HIV-infected women were less likely to be current (last 30 days) or ever LARC users, despite having similar attitudes toward IUDs and implants, compared to HIV-uninfected women. HIV providers had lower levels of knowledge of HIV-specific contraceptive guidelines compared with gynecology practitioners.
Implications: HIV-infected women and their providers share a knowledge gap regarding LARC. Increased interdisciplinary collaboration may help mitigate the resulting disparities in access to highly effective contraception in HIV-infected women. Knowledge of HIV-specific contraceptive guidelines and ability to place contraceptive implants were low among all surveyed providers, suggesting need for additional training.

1. Introduction

An estimated 260,000 women are living with HIV in the United States, a large proportion of whom are of reproductive age [1]. Integrating family planning services into primary care and HIV care ensures timely contraceptive access to HIV-infected women [2,3]. Despite a global rise in long-acting reversible contraception (LARC) use over the past 2 decades [4,5], LARC is underutilized in women at risk for or infected with HIV [6]. The multicenter Women's Interagency HIV Study (WIHS) demonstrated that reproductive-age women with HIV have low uptake of highly effective contraception and barrier methods [6]. Between 1998 and 2010, the WIHS study found a far greater increase in LARC use among risk-factor-matched seronegative women compared to seropositive women [7]. A cross-sectional study of 127 HIV-infected black/African-American women in Atlanta found low rates of LARC use and a 44% prevalence of permanent sterilization [8]. Few studies have evaluated contraception uptake among HIV-infected women, and fewer have addressed the implementation of family planning services into HIV primary care. Thus, exploration of possible barriers to LARC uptake among HIV-infected women is of interest.

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In this survey, we evaluated contraceptive knowledge, attitudes and use among HIV-infected and -uninfected women, with special focus on LARC use [copper intrauterine device (IUD), progestin IUD and implant]. We also sought to determine whether HIV-infected women used less effective tier 3 contraception methods (i.e., male and female condoms, spermicide, diaphragm, rhythm and withdrawal) more often than HIV-uninfected women. To further understand differences in care and access, we surveyed HIV primary care providers and general gynecology (GYN) clinicians regarding their contraceptive knowledge and practices.

2. Methods

We conducted a cross-sectional study comparing contraceptive knowledge, attitudes, reproductive histories and use of LARC methods in HIV-infected and -uninfected women. We also conducted a cross-sectional survey of clinician characteristics, contraceptive practice patterns and knowledge of current contraceptive guidelines. We recruited clinicians and reproductive-age patients receiving care at two HIV-focused and three general gynecology-focused ambulatory sites within an academic hospital center in New York City.

We studied the care provided at five sites from the Ambulatory Care Network (ACN), part of Columbia University Irving Medical Center' (CUIMC). Patients and providers were recruited from these five clinics. All sites are located in upper Manhattan, New York City. HIV care is provided at two sites: the Comprehensive Health Center and the Women and Children's Care Center, collectively referred to as the Comprehensive HIV Program (CHP). CHP uses a primary care medical home model for its practice, with primary care needs being met onsite. HIV-infected women receive primary gynecological care at CHP, which provides care to approximately 425 HIV-infected women aged 18–45 annually. A mix of internists, infectious disease specialists and advanced practice nurses provides care. We recruited HIV-uninfected women from three gynecology clinics within the ACN. These sites provide care to women from the same catchment area as CHP. The ACN recommends and offers HIV testing to all patients, resulting in high testing uptake at all ACN sites. Established patients are thus unlikely to have undiagnosed HIV infection. We recruited patients between March and June 2014.

Eligibility criteria included age 18–49, English or Spanish speaking, not pregnant by self-report and with no history of hysterectomy. After informed consent, survey participants completed a self-administered questionnaire about reproductive history, knowledge and attitudes about LARC methods, and past and present contraceptive use in their preferred language. To assess attitudes toward IUDs and contraceptive implants, each participant evaluated 10 method attributes using a visual analog scale (VAS), with 0 representing *disagree* and 10 representing *agree*.

We recruited all non-trainee-level clinicians including physicians, nurse practitioners, physician's assistants and midwives to participate in the provider survey. After informed consent, clinicians completed a 20-question survey. The clinician survey elicited demographic characteristics, practice patterns and scenarios with treatment choices to assess knowledge of current contraceptive guidelines. We compensated participants and providers with a US$15 gift card.

We analyzed patient and clinician data using SAS 9.4 software (SAS/STAT Version 14.2 of the SAS System for Windows, © 2002–2012 SAS Institute Inc., Cary, NC, USA). We used bivariate analysis with χ^2 tests to compare characteristics of HIV-infected and HIV-uninfected women. We performed multiple logistic regression to assess whether sociodemographic differences between HIV-infected and -uninfected women influenced their contraceptive knowledge or use. Variables of interest were those characteristics that differed between sample groups ($p<.05$). In determining the best models, we manually analyzed covariates in multiple functions to ensure we included all potential confounders. We tested each variable in a stepwise manner using the Akaike information criteria, likelihood ratios and change in test statistics. We included age, race, education and income level in the final models exploring contraceptive use. For the VAS questions, we used the Wilcoxon–Mann–Whitney test to evaluate the univariate relationships and analysis of covariance with generalized linear models to analyze the between-group differences in attitudes toward IUDs and implants in a similar manner. We handled the analyses of clinician data similarly. We considered a p value <.05 to be statistically significant. The CUIMC Institutional Review Board approved this study.

3. Results

We approached 1144 women to participate in the study: 284 (25%) HIV-infected and 860 (75%) HIV-uninfected women (Fig. 1). About 10% of women declined screening. Of those screened, 257 (25%) were found eligible for inclusion in the study and agreed to participate. Of these 257, 107 (42%) were HIV infected and 150 (58%) were HIV uninfected. We removed 14 participants with incomplete surveys from the analysis. The main reason for ineligibility was current pregnancy. The groups differed in age, race, education and income level (Table 1). HIV-infected women were older, were more likely to be black/African-American, were less likely to be Latina, were more likely to receive public assistance and had lower educational attainment.

Attitudes (VAS median scores) toward implants and intrauterine devices were similar among HIV-infected and -uninfected women (Table 1a). VAS results were not normally distributed. Including age, race, education and income level in the generalized linear model did not change the statistical significance. Survey respondents marked the 10-point VAS scale to indicate whether they would want to use an IUD, yielding median VAS scores of 0.8 for HIV-infected women and 0.9 for HIV-uninfected women. When asked the same question about wanting to use the contraceptive implant, the median VAS scores were 0.5 and 0.4, respectively (Table 1a). Attitudes to IUDs were generally more favorable than to implants. We found that the unfavorable attitudes and beliefs in categories such as “easy to use,” “my doctor thinks safe” and “save me time” correlated with a low preference for use (Table 1b). Women's perception of their ability to conceive differed by HIV status even after adjusting for age ($p<.01$): Among HIV-infected women who did not use sterilization as a form of contraception, 60% thought that they did not have the ability to conceive, compared to 7% of HIV-uninfected women. Perceptions of fertility did not correlate with a desire to use an IUD or implant ($p=.4$ and $p=.9$), as assessed by VAS.

Table 2 describes contraceptive use among the study participants. HIV-infected women were less likely to be current (last 30 days) or ever LARC users compared to HIV-uninfected women. Of those currently using a LARC method, 81% report either a hormonal or copper IUD. Of ever LARC users, 88% had used an IUD but never an implant. Only one participant reported using an implant and IUD in the past. Because HIV-infected women in our sample were older and thus had high rates of sterilization, the groups had similar overall rates of tier 1 contraceptive use. HIV-infected women were more likely to report recent condom use and other less effective tier 3 contraceptive methods compared with HIV-uninfected women (Table 2). Of the 28 HIV-infected women receiving an efavirenz-containing antiretroviral regimen, none reported implant use and three reported DMPA use.

We distributed surveys to all 51 clinicians in the study clinics: 21 HIV and 30 GYN. Of these, 20 HIV and 29 GYN clinicians responded, with one from each group declining. Clinician characteristics, including age, race, ethnicity, number of years in practice and clinician type, were similar overall, except that the proportion of women was higher among the GYN clinicians with 86% reporting to be female compared to 60% in HIV providers (Table 2a). Less than half of the gynecologists reported knowing how to place the contraceptive implant. Clinicians reported differences concerning LARC training and counseling patients about LARC. The number of birth control prescriptions given in the last year differed (Table 3).

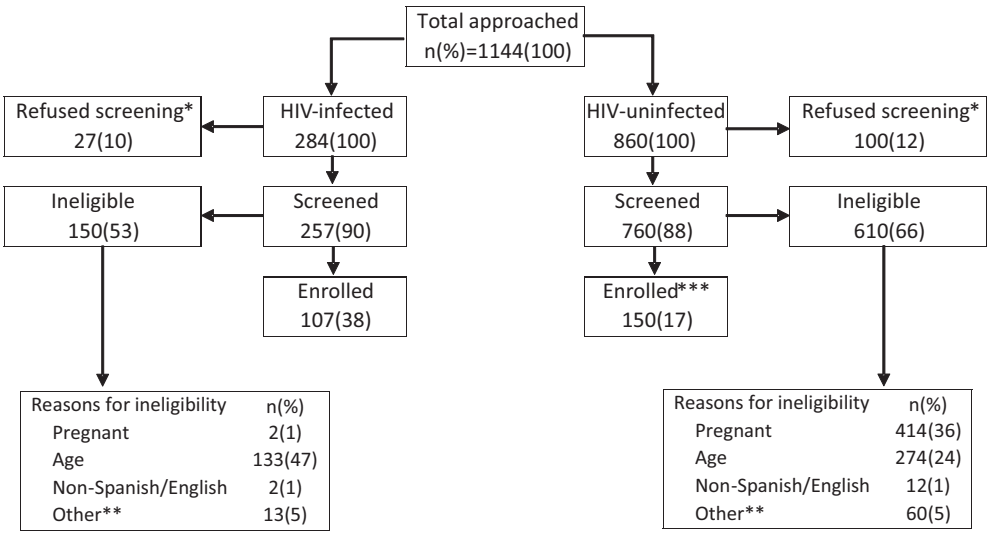

Fig. 1. Study flow at the ACN at CUIMC. We recruited participants from five ambulatory clinics within the ACN. We recruited HIV-infected women from two clinics that provide HIV and primary care to HIV-infected persons. We recruited HIV-uninfected women from three clinics that provide gynecologic and primary care to women regardless of HIV status. *Also includes individuals who reported having no time. **Other includes individuals who were not literate, not a patient, transgender, Spanish-speaking before the translated documents were IRB-approved and patients who had a hysterectomy. ***We excluded 14 from data analysis due to partial survey completion.

Clinician groups responded similarly to the clinical scenarios designed to evaluate familiarity with US Medical Eligibility Criteria (MEC) recommendations (Table 4) [4,10]. GYN clinicians tended to choose the "Don't Know" response option more frequently. Both groups chose incorrectly most frequently when the MEC guidelines were category 3 (risk>advantage), with clinicians often choosing category 2 instead. More GYN clinicians reported using MEC guidelines [9,10] compared to HIV clinicians (70% compared to 20%, p<.01), and more HIV clinicians reported using AIDSInfo/DHHS [11] (40% compared to 10%, p<.01).

Table 1
Characteristics of HIV-infected and HIV-uninfected women surveyed at CUIMC

	HIV+ (n=107)[a]		HIV− (n=136)[a]		
Category	n	(%)	n	(%)	p value
Age					<.01
Mean age (SD)	38 (9)[b]		30 (8)		
Race					<.01
Non-Latina black/African-American	48	(45)	15	(11)	
Latina	56	(52)	116	(85)	
Other[c]	0	(0)	2	(3)	
Education					<.01
<12th grade	36	(34)	20	(15)	
Finished high school/GED	25	(23)	20	(15)	
>HS, no degree	21	(20)	48	(35)	
Technical/Associates degrees	14	(13)	17	(13)	
Bachelor degree or higher	11	(10)	30	(22)	
Income					<.01
Full-time employment	17	(16)	80	(59)	
Part-time employment	12	(11)	24	(18)	
Public assistance	66	(62)	12	(9)	
Unemployment assistance	3	(3)	5	(4)	
Other	9	(8)	12	(9)	
Obstetric history					
One or more live births	83	(78)	108	(79)	.71
One or more abortions/miscarriage/other	73	(68)	71	(52)	.01

We recruited women from five clinics within the ACN at CUIMC.
[a] No more than four values missing in total from any category.
[b] One woman in the HIV-infected group was 50 years of age
[c] Other includes those who self-reported race as Asian

4. Discussion

This study demonstrated that HIV-infected women receiving care in the ACN at CUIMC were less likely to have used or currently use a LARC method despite having similar attitudes toward IUDs and implants as a group of HIV-uninfected women. Demographic differences only partly explained the low lifetime use of LARC among HIV-infected women. Despite a low proportion of implant-trained gynecologists, HIV- and GYN-clinician training and knowledge of LARC were notably different. We believe this may explain, at least in part, the observed discrepancy in their patients' LARC use. Practice disparities between HIV and GYN clinicians regarding highly effective contraceptive methods suggest a role for targeted training of primary care HIV clinicians regarding LARC methods.

Table 2
Contraceptive use characteristics, over the last 30 days and ever-used as reported by HIV-positive and HIV-negative women at CUIMC

	HIV+ (n=107)		HIV− (n=136)			
Variable	n	(%)	n	(%)	p value[b]	p value[c]
LARC use, past 30 days	7	(7)	20	(15)	.04	.53
Contraceptive use by tier,[a] 30 days						
Tier 1	31	(29)	38	(28)	.86	.51
Tier 2	12	(11)	44	(32)	<.01	.04
Tier 3	64	(60)	42	(31)	<.01	<.01
Condom use, 30 days	62	(58)	34	(25)	<.01	<.01
Dual method use, 30 days	36	(34)	25	(19)	<.01	.09
LARC use, ever	13	(12)	38	(28)	<.01	.09
Contraceptive use by tier, ever						
Tier 1	39	(36)	54	(40)	.60	.13
Tier 2	60	(56)	107	(79)	<.01	.01
Tier 3	92	(86)	108	(79)	.18	.28

[a] Tier 1 (tubal ligation, vasectomy, hormonal and copper IUD, implant); tier 2 (oral pill, patch, ring, DMPA injection); tier 3 (male and female condoms, spermicide, diaphragm, rhythm, withdrawal). Dual-method use comprises condoms plus another method. We also analyzed emergency contraception as part of Tier 2.
[b] Bivariate analysis test statistic.
[c] Adjusted (multiple) logistic regression model controlling for age, race, education and income level.

Table 3
Contraceptive training and clinical practice of HIV and primary GYN providers in the ACN and HIV Comprehensive Care clinics at CUIMC who completed the survey

Category	HIV (*n*=20) *n*	(%)	GYN (*n*=29) *n*	(%)	p value[b]	p value[c]
Providers trained to place implant	1	(5)	9	(31)	.03	.07
Providers trained to place IUD	2	(10)	26	(90)	<.01	<.01
Birth control methods mentioned by providers to their patients in the past year[a]						
Implant	3	(15)	21	(72)	<.01	<.01
IUD (copper)	8	(40)	21	(72)	.01	.03
IUD (Progestin)	9	(45)	22	(76)	.02	.04
Vasectomy	4	(20)	15	(52)	.02	.06
Tubal ligation	10	(50)	24	(83)	<.01	.05
Combined oral contraceptive Pill	14	(70)	19	(66)	.87	.58
Progestin-only pill	6	(30)	9	(31)	.87	.82
Depo-Provera injection	16	(80)	21	(72)	.68	.39
Male condom	19	(95)	24	(83)	.30	.28
Female condom	17	(85)	19	(66)	.18	.13
Mentioned at least one of the above	20	(100)	28	(97)	.40	.96
Birth control prescriptions in the past year					<.01	<.01
0	6	(30)	3	(10)		
1–15	11	(55)	1	(3)		
>15	3	(15)	25	(86)		

We recruited GYN providers from the primary care clinics (ACN) from which we surveyed HIV-uninfected women. We recruited HIV providers from the HIV Comprehensive Care clinics from which we surveyed HIV-infected women.

[a] Providers were asked whether they had mentioned a given birth control method to their female patients in the last year, recorded as mentioned or not mentioned.

[b] Bivariate analysis test statistic.

[c] Adjusted (multiple) logistic regression model controlling gender and age.

Table 4
Clinical scenarios involving potential contraindications to contraceptive methods for HIV-infected women (these scenarios are intended to evaluate familiarity with US MEC recommendations)[a, e]

Clinical scenario	HIV (*n*=20) *n*	(%)	GYN (*n*=29) *n*	(%)	p value[c]	p value[d]
A 26-year-old woman using ART with ritonavir-boosted protease inhibitor wants the combined oral contraceptive pill						
No restriction	0	(0)	6	(21)	<.01	.24
Advantage > risk	12	(60)	6	(21)		
Risk > advantage	5	(25)	0	(0)		
Unacceptable risk	0	(0)	1	(3)		
Don't Know	3	(15)	16	(55)		
A 26-year-old woman using ART with ritonavir-boosted protease inhibitor wants the contraceptive injection					.35	.21
No restriction	6	(30)	8	(28)		
Advantage > risk	8	(40)	6	(21)		
Risk > advantage	1	(5)	1	(3)		
Unacceptable risk	0	(0)	0	(0)		
Don't know	5	(25)	14	(48)		
A 36-year-old woman using efavirenz/emtricitabine/tenofovir (Atripla®) wants to use the contraceptive implant					.38	.28
No restriction	6	(30)	7	(24)		
Advantage > risk	6	(30)	4	(14)		
Risk > advantage	1	(5)	1	(3)		
Unacceptable risk	0	(0)	0	(0)		
Don't know	7	(35)	17	(59)		
A 36-year-old woman with AIDS wants to use the copper IUD.					.47	.20
No restriction	8	(40)	16	(55)		
Advantage > risk	5	(25)	4	(14)		
Risk > advantage	0	(0)	2	(7)		
Unacceptable risk	2	(10)	3	(10)		
Don't know	5	(25)	4	(14)		
A 36-year old woman who is clinically stable using efavirenz/ emtricitabine/ tenofovir (Atripla®) wants to use the LNG-IUS					.47	.16
No restriction	9	(45)	9	(31)		
Advantage > risk	6	(30)	7	(24)		
Risk > advantage[b]	1	(5)	1	(3)		
Unacceptable risk	0	(0)	0	(0)		
Don't know	4	(20)	12	(41)		
An HIV-infected woman using Atripla® is found to be 6 weeks pregnant. Do you change her ART regimen?					<.01	<.01
Discontinue Atripla®	8	(40)	2	(7)		
Continue Atripla®	8	(40)	5	(17)		
Don't know	1	(5)	22	(76)		

[a] Providers were asked to assess each scenario using MEC categories based on their knowledge. Bolded categories highlight the 2010 United States MEC categories for these scenarios [17]. Updated guidelines appeared in 2016 [18].

[b] The 2010 MEC recommendations are category 2/3 for initiation of an LNG-IUS for women on antiretroviral therapy.

[c] Unadjusted bivariate model.

[d] Adjusted (multiple) logistic regression model controlling for gender and age.

[e] MEC category 1: no restriction; MEC category 2: advantages outweigh the risks; MEC category 3: risks outweigh the advantages; MEC category 4: unacceptable risks.

HIV-infected women reported less LARC use and more tubal ligation than HIV-uninfected women, consistent with previous studies documenting high prevalence of sterilization in HIV-infected women [7,12]. HIV-infected women also reported using less effective tier 3 contraceptive methods more frequently. HIV-infected women often receive counseling to use condoms irrespective of current contraceptive use to prevent HIV transmission. Tote [13] recently reported a low rate of dual condom and highly effective contraception use and decreasing LARC use with increasing age. Adjusting for age and other demographic factors did not eliminate differences observed in contraceptive.

We noted that attitudes toward IUDs and implants were similar and somewhat unfavorable in both groups. Previous US studies found similarly unfavorable attitudes toward LARC methods [14,15]. Gomez [16] found that only 20% of a group of young women who had never used an IUD expressed interest in the method and that women's attitudes toward and knowledge of IUDs were predictive of interest in their use. Unfavorable attitudes may account for low overall LARC use but does not account for differences observed between HIV-infected and HIV-uninfected women.

The lower sociodemographic characteristics of our HIV-infected respondents raise the possibility of unequal health care access. Haddad et al. [17] found less LARC use among HIV-infected women compared to uninfected women with equal insurance access. CUIMC has a large Family Planning Clinic (FPC) that provides IUD and implant placement to all women receiving primary care through the ACN. The FPC reports LARC uptake of 19%, the second highest rate among publicly funded clinics in New York State and higher than the national average at that time [18]. The HIV primary care providers routinely refer HIV-infected women to the FPC for evaluation and placement of LARC, and all women are eligible for LARC placement at the FPC irrespective of insurance status.

A national American College of Obstetricians and Gynecologists survey of general obstetrician-gynecologists found that initial and continued training strongly predicted whether a clinician offers LARC [19]. In this study, we found that GYN clinicians were more likely than their HIV primary care counterparts to have been trained in both IUD and implant placement while also being more likely to discuss tier 1 methods with their patients. These findings are expected as most clinicians providing HIV care at our surveyed

sites are either primary care generalists or infectious disease specialists. HIV clinicians reported patient counseling regarding oral contraceptives, DMPA injection and condoms more often than LARC methods and sterilization. Of note, the DMPA injection is offered at CHP. Based on our observations, we believe that the low rates of counseling regarding LARC among HIV providers may result in the low uptake of LARC among HIV-infected women. Competing clinical priorities during primary care sessions may limit HIV-provider time to address LARC with eligible patients. Nevertheless, we believe that HIV primary care providers are well positioned to educate and refer women for highly effective contraceptive services. Educational sessions with HIV clinicians regarding IUDs and implants may improve HIV-infected women's attitudes and acceptance of LARC methods and increase referrals to the FPC at CUIMC.

A limitation of this study was that the groups were unexpectedly and poorly matched in terms of demographic characteristics despite recruitment from the same ambulatory clinical system at a single medical center with the same catchment area. Differences in mean age may explain some of the observed differences between HIV-infected and -uninfected women in rates of sterilization and attitudes about LARC use. Nevertheless, multivariate analysis controlling for age differences between the groups did not fully eliminate the observed differences in past and present LARC use. A large portion of women at the GYN sites were ineligible due to pregnancy and likely more actively engaged in family planning. A strength of this study was that 90% of the women we approached agreed to eligibility screening, and all of those who were eligible agreed to complete the survey; over 90% of these 270 women completed the survey in its entirety. Cross-departmental collaboration yielded a 96% response rate for the clinician survey.

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Appendix A

Table 1a
Attitudes of HIV-infected and HIV-uninfected women surveyed at Columbia University in 2014 towards implants and intrauterine devices as measured by a visual analogue score (VAS).*

	Implant**				IUD**			
Category	HIV+ (n=107)	HIV- (n=136)	p-value[1]	p-value[2]	HIV+ (n=107)	HIV- (n=136)	p-value[1]	p-value[2]
Easy to use	2.1 (0.5, 8.9)	1.8 (0.5, 8.7)	0.75	0.20	4.5 (0.8, 9.0)	5.6 (1.0,9.0)	0.68	0.66
Fear of having side effects	7.7 (1.5, 9.3)	8.6 (4.4, 9.5)	0.11	0.23	7.8 (1.8, 9.1)	7.8 (4.0, 9.1)	0.54	0.62
Not get pregnant	7.1 (0.6, 9.3)	4.9 (2.3, 9.2)	0.11	0.92	8.5 (4.2, 9.4)	6.5 (2.0, 8.7)	0.03	0.81
Know people w/ side effects	7.0 (0.4, 9.3)	4.3 (0.5, 9.3)	0.73	0.38	7.8 (0.7, 9.3)	7.4 (1.5, 9.3)	0.91	0.25
Doctor thinks safe	4.4 (0.4, 9.1)	4.6 (1.2, 8.4)	0.74	1.00	8.2 (0.6, 9.6)	8.2 (5.0, 9.4)	0.72	0.22
Save me time	7.3 (0.5, 9.4)	6.7 (2.4, 9.1)	0.84	0.49	8.7 (4.7, 9.4)	8.2 (4.5, 9.4)	0.69	0.28
Save me money	5.5 (0.6, 9.4)	6.8 (2.4, 9.2)	0.89	0.66	8.6 (0.9, 9.5)	8.5 (5.4, 9.5)	0.33	0.21
Too expensive	0.9 (0.5, 7.0)	2.2 (0.4, 5.7)	0.91	0.56	1.5 (0.5, 6.5)	1.3 (0.4, 4.5)	0.55	0.81
Easy to obtain	8.3 (0.9, 9.4)	8.0 (4.9, 9.5)	0.49	0.88	9.1 (6.9, 9.6)	8.9 (7.0, 9.5)	0.84	0.36
Would like to use	0.5 (0.2, 2.4)	0.4 (0.2, 1.9)	0.63	0.32	0.8 (0.3, 8.5)	0.9 (0.3, 8.2)	0.85	0.79

* Visual Analogue Score (VAS) is a measurement of 0-10, marked by participants, with 0 representing disagree and 10 representing agree.
** No more than 5 values missing from any category.
[1] VAS scores were not normally distributed and the median and interquartile ranges are presented. We used Wilcoxon-Mann-Whitney test statistics for univariate comparisons.
[2] We used Generalized Linear Modeling for analysis of covariance including age, education, income, and race.

Table 1b
Correlation between different attitudes as measured by Visual Analogue Scale (VAS)* compared to the desire to use an implant or IUD.

	Implant		IUD	
Category	*Spearman*	*p-value*	*Spearman*	*p-value*
Easy to use	0.44	<0.01	0.58	<0.01
Fear of having side effects	-0.17	0.078	-0.27	<0.01
Not get pregnant	0.11	0.28	0.19	0.023
Know people w/ side effects	0.13	0.19	-0.12	0.15
Doctor thinks safe	0.46	<0.01	0.47	<0.01
Save me time	0.30	<0.01	0.49	<0.01
Save me money	0.29	<0.01	0.29	<0.01
Too expensive	0.13	0.23	0.11	0.24
Easy to obtain	-0.03	0.77	0.16	0.061

1. VAS scores were not normally distributed. We used Spearman rank correlation coefficients to measure correlation between each category and the "would like to use" category.
* Visual Analogue Score (VAS) is a measurement of 0-10, marked by participants, with 0 representing disagree and 10 representing agree.

Table 2a
Characteristics of HIV and primary gynecology (GYN) providers in the Ambulatory Care Network and HIV Comprehensive Care clinics at Columbia University Irving Medical Center.

	HIV (N=20)[*]		*GYN (N=29)*[*]		
Category	n	(%)	n	(%)	p-value
Provider Type					0.14
Physician	14	(70)	25	(86)	
Advanced practice nurse[**]	6	(30)	4	(14)	
Age					
Mean age (SD)	45	(9)	46	(10)	0.68
Gender					0.04
Female	12	(60)	25	(86)	
Male	8	(40)	4	(14)	
Race					0.67
White	14	(70)	16	(55)	
Black/African-American	3	(15)	5	(17)	
Asian or Pacific Islander	2	(10)	5	(17)	
Biracial or Multiracial	1	(5)	1	(3)	
Other	0	(0)	2	(7)	
Latino or Latina	1	(5)	2	(7)	0.79
Number of years in practice					0.33
1-5 years	7	(35)	7	(24)	
6-10 years	2	(10)	4	(14)	
11-15 years	2	(10)	11	(38)	
16-20 years	3	(15)	1	(3)	
>20 years	5	(25)	6	(21)	
Women with HIV seen per year					<0.01
0	0	(0)	11	(38)	
1-5	3	(15)	16	(55)	
>5	17	(85)	2	(7)	

We recruited GYN providers from the same primary care clinics (Ambulatory Care Network) in which we surveyed HIV-negative women. We recruited HIV providers from the HIV Comprehensive Care Clinic from in which we surveyed HIV-infected women.

[*] No more than 1 value missing from any category.

[**] Advanced practice nurse includes nurse practitioners, physician's assistants, and midwives.

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