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Provision of long-acting reversible contraception in HIV-prevalent countries: results from nationally representative surveys in southern Africa

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Abstract

Objective—To analyse the current provision of long-acting reversible contraception (LARC) and clinician training needs in HIV-prevalent settings.

Design—Nationally representative survey of clinicians.

Setting—HIV-prevalent settings in South Africa and Zimbabwe.

Population—Clinicians in South Africa and Zimbabwe.

Methods—Nationally representative surveys of clinicians were conducted in South Africa and Zimbabwe ($n = 1444$) to assess current clinical practice in the provision of LARC in HIV-prevalent settings. Multivariable logistic regression was used to analyse contraceptive provision and clinician training needs.

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Disclosure of interests
None of the authors has any conflicts of interest to disclose.

Contribution to authorship
All authors reviewed the final version and approved the content. Jessica Morse performed the literature search, data interpretation and manuscript writing. Tsungai Chipato helped design the study and performed data collection. Kelly Blanchard helped design the study and performed data collection and data interpretation. Taazadza Nhemachena helped design the study and performed data collection. Gita Ramjee helped design the study and performed data collection. Charles McCulloch helped design the study and performed data analysis. Maya Blum helped design the study, performed data collection and produced the figures. Erin Saleeby performed the literature search and assisted in manuscript writing. Cynthia C. Harper helped design the study and performed data analysis, data interpretation and assisted in manuscript writing (overall guarantor of the study).

Details of ethics approval
As described in the Methods section, approval was sought and granted from all appropriate parties (The Medical Research Council of Zimbabwe, the University of KwaZul-u-Natal Biomedical Research Ethics Committee, the Western Institutional Review Board and the University of California, San Francisco Committee on Human Research).

Main outcome measure—Multivariable logistic regression of contraceptive provision and clinician training needs.

Results—Provision of the most effective reversible contraceptives is limited: only 14% of clinicians provide copper intrauterine devices (IUDs), 4% levonorgestrel-releasing IUDs and 16% contraceptive implants. Clinicians' perceptions of patient eligibility for IUD use were overly restrictive, especially related to HIV risks. Less than 5% reported that IUDs were appropriate for women at high risk of HIV or for HIV-positive women, contrary to evidence-based guidelines. Only 15% viewed implants as appropriate for women at risk of HIV. Most clinicians (82%), however, felt that IUDs were underused by patients, and over half desired additional training on LARC methods. Logistic regression analysis showed that LARC provision was largely restricted to physicians, hospital settings and urban areas. Results also showed that clinicians in rural areas and clinics, including nurses, were especially interested in training.

Conclusions—Clinician competency in LARC provision is important in southern Africa, given the low use of methods and high rates of unintended pregnancy among HIV-positive and at-risk women. Despite low provision, clinician interest is high, suggesting the need for increased evidence-based training in LARC to reduce unintended pregnancy and associated morbidities.

Keywords

HIV; implantable contraception; intrauterine device; long-acting reversible contraception; South Africa; Zimbabwe

Introduction

Long-acting reversible contraceptives (LARCs) have the potential to dramatically reduce unintended pregnancy and its associated morbidity and mortality, particularly in countries with high HIV prevalence. In sub-Saharan Africa, almost one-half of pregnancies are unintended,[1] yet women have limited access to the contraceptive methods deemed to be the most effective by the World Health Organization (WHO): intrauterine contraception and implants. LARC methods have few contraindications, high continuation rates and favourable cost–benefit profiles,[2,3] but their use is negligible at <1% in South Africa and Zimbabwe, despite the high acceptability of modern contraceptive methods.

Highly effective contraception to prevent unintended pregnancy is essential for women's health, especially in sub-Saharan Africa, where maternal mortality rates and HIV prevalence remain high. Research in subsets of this population shows high rates of unintended pregnancy,[4] reaffirming the cost-effectiveness of contraception as a way to prevent vertical transmission through the aversion of unintended HIV-positive births.[5]

LARC can serve as an effective prevention tool in decreasing these public health problems. The methods provide 3–10 years of protection, with a failure rate of <1% and high continuation rates. During the lifespan of the device, there is no need for re-supply or clinic visits, potentially conserving scarce healthcare resources. These methods do not require male partner co-operation, or even awareness of use, and do not interfere with lactation or infant growth.[3] The WHO recently updated its medical eligibility criteria for LARC methods, confirming their safety among high-risk and HIV-infected women.[3] These recommendations are supported by other professional bodies.[6–8]

Clinician training and clinical competency are fundamental health system considerations in the provision of LARC methods. Unlike pills and injectable contraception, which can be dispensed by lay health workers, both implants and intrauterine devices (IUDs) require skilled medical providers. Thus, the capacity and interest of clinicians in providing these

methods are essential elements of their uptake. This study's objectives were to evaluate clinician perceptions of these highly effective methods and their capacity to provide them. Guided by the Diffusion of Innovation Theory, which highlights the importance of understanding clinician characteristics associated with the practice of innovation adoption,[9] this study uses data from nationally representative surveys to analyse current provision of LARC methods to women, and clinician training needs, in HIV-prevalent settings.

Methods

We conducted a large multicountry pregnancy and HIV prevention study of clinician practices, based on national probability surveys of physicians and nurses. Surveys were informed by in-depth clinician interviews ($n = 60$), input from community advisory groups and the scientific literature on LARC provision, and were pilot tested prior to implementation for comprehension and validity of items. The methods have been described in detail previously.[10,11] Survey items covered clinicians' demographic and professional characteristics, practice setting, patient population and contraceptive knowledge, attitudes and practices. A series of patient vignettes, including a nulliparous adolescent (aged 16 years), a nulliparous unmarried young woman (aged 24 years), a nulliparous unmarried HIV-positive young woman (aged 24 years) and a parous (two children) married young woman (aged 24 years), were presented to clinicians for their contraceptive recommendations.[12] The survey assessed provider knowledge, preferences and provision of contraceptive methods, particularly for women with or at risk of HIV.

We selected a national probability sample using a multistage approach. The sample was facility based, with districts selected first, then facilities from districts and, finally, clinicians from facilities. Government facility listings were used in South Africa. In Zimbabwe, we constructed a national listing of facilities. In both countries, districts were randomly selected by probability proportional to size, based on the estimated number of clinicians in the district (15 districts were selected in South Africa, 12 in Zimbabwe). Within districts, facilities were stratified by type (clinic or hospital) and then randomly selected proportional to size. Clinics were eligible if they offered family planning or HIV/sexually transmitted infection (STI) services. The final sample of eligible facilities included 187 clinics (100 in South Africa, 87 in Zimbabwe) and 81 hospitals (30 in South Africa, 51 in Zimbabwe). Participating facilities included 171 clinics (87 or 87% in South Africa and 84 or 97% in Zimbabwe) and 75 hospitals (29 or 97% in South Africa and 46 or 90% in Zimbabwe). Main reasons for nonparticipation included inability to reach the facility or refusal. Approvals to recruit clinicians were secured, and all clinicians who provided family planning or HIV/STI services were invited to participate. The final sample included 1972 physicians and nurses (1019 from South Africa and 953 from Zimbabwe). A total of 1444 clinicians participated in the survey, 614 from South Africa and 830 from Zimbabwe, resulting in a response rate of 73.2%. An analysis of nonresponders in South Africa showed no difference between clinics and hospitals (60 vs 61%), but a higher response rate among nurses than physicians (66 vs 39%). In Zimbabwe, physicians were more likely to respond than nurses (100 vs 87%), and hospital-based providers were more likely to respond than those in clinics (92 vs 81%).

The questionnaire was self-administered in Zimbabwe and administered by telephone in South Africa, because of the wide geographical spread and associated costs, in 2008–2009. The study was approved by the Medical Research Council of Zimbabwe, the University of KwaZulu-Natal Biomedical Research Ethics Committee, the Western Institutional Review Board and the University of California, San Francisco Committee on Human Research.

We measured two primary outcomes to assess clinician practices and training needs: provision of LARC (yes, no) and desire for training in LARC methods (yes, no). LARC

methods included IUDs (copper and hormonal) and implants. We assessed differences between physicians and nurses. In addition, we included professional training and practice setting variables influential in contraceptive care, including training in family planning, training in HIV, hospital- or clinic-based practice, urban or rural, and proportion of female patients in need of contraception (none, some, half, most, all). To measure clinician inclination to provide LARC methods, we included measures of attitudes and perceptions of contraceptive care. We asked whether clinicians considered the IUD or implant to be appropriate for HIV-infected or high-risk women. We asked whether clinicians thought that IUDs were underused in their patient population (yes, no), how often they asked female patients about male support or opposition to contraception (never, sometimes, usually, always), and how important it was for women to have a contraceptive method they could use without their male sexual partner knowing (1–10, low to high). We constructed a nine-item scale of knowledge of patient selection for IUDs, based on the *WHO Medical Eligibility Criteria for Contraception*, and used in previous research on evidence-based IUD provision.[3,13,14] Clinicians were asked whether they would consider IUDs (yes, no, don't know) for these patients: nulliparous, adolescent, unmarried, immediately post-partum (prior to discharge), immediately post-abortion (before leaving clinic), history of ectopic pregnancy, history of STIs in the past 2 years, history of pelvic inflammatory disease (PID) and HIV infected. The clinician knowledge scale had a reliability coefficient of 0.71 estimated by Cronbach's alpha.

We presented frequencies by country, and estimated odds ratios through bivariate and multivariate analyses, with 95% confidence intervals. We conducted logistic regression analysis to estimate the variation in provision of LARC and the desire for training in LARC methods by demographic and professional factors (country, age, professional training), practice-related characteristics (type of facility, location, type of patient) and clinician attitudes and knowledge. We adjusted for the facility-based sampling scheme in analyses by accounting for clustering at the facility level. Analyses were conducted using Stata 11.0 (College Station, TX, USA). Significance was defined as $P \leq 0.05$.

Results

The sample included 9% physicians and 91% nurses, reflecting the predominance of nurses in healthcare provision in these countries. The majority of clinicians were trained in family planning (63%) and HIV prevention (80%) (Table 1). Virtually all clinicians reported that they served female patients needing contraception (99%). Seventy per cent reported that most or all of their female patients were in need of contraception and were at risk of HIV, and 42% reported that most or all of their patients were HIV positive. Findings showed that the current provision of LARC methods was low, but clinicians desired training (Table 2). Fourteen per cent of clinicians were providing copper IUDs and 5% the levonorgestrel-releasing IUD. Implant provision was only 3% in South Africa, where it is not widely available, but 26% in Zimbabwe, where the two-rod levonorgestrel implant (Jadelle®) is available in the public sector. Roughly one-third of providers said they would offer IUDs to patients if devices were more readily available and 43% would offer implants. In both countries, about one-half of providers desired additional training on IUDs and 60% on implants.

When asked about IUDs in HIV-positive or at-risk women, <5% said they would provide them for either group. Clinicians were more comfortable with implants in Zimbabwe, where 23% would offer them to women at risk of HIV, and 29% would offer them to HIV-positive women. The vast majority of providers (82%) felt that IUDs were underused by patients. Seventy per cent of clinicians felt they had sufficient time to counsel women on contraceptive options. Although the majority of clinicians in each country routinely (usually/

always) asked patients about male partner support or opposition to contraception, providers in Zimbabwe were more likely to ask (80%) than those in South Africa (65%). In South Africa, providers were more likely to note the importance of women having a contraceptive that they could use without the male partner knowing ('8' on a scale of 1–10, compared with '6' in Zimbabwe).

Provider knowledge of evidence-based patient selection criteria for IUD use was low, as was the willingness to offer LARC methods to medically eligible candidates (Figure 1). When asked about different patients, all eligible for IUD use, fewer than one-half of providers said they would consider the IUD for nulliparous women or for unmarried women, and less than one-quarter thought that it could be placed immediately post-partum or post-abortion. An extremely small proportion agreed that the IUD was appropriate for women with a history of ectopic pregnancy (under 10%) or a history of PID (under 5%). Importantly, only 16% would consider an IUD for an HIV-positive woman. For the patient vignettes, even fewer clinicians said they would offer the IUD as a contraceptive method, particularly for nulliparous or HIV-positive women. For the adolescent nulliparous patient, only 2% in South Africa and 7% in Zimbabwe said they would offer a copper IUD; 21% in Zimbabwe said they would offer an implant. For the young adult nulliparous patient, 5% in South Africa and 10% in Zimbabwe said they would offer a copper IUD, and 25% in Zimbabwe said they would offer an implant. For the young adult nulliparous HIV-positive woman, even fewer recommended the copper IUD (2% in South Africa and 5% in Zimbabwe). Clinicians recommended LARC most frequently for the married parous young adult: 15% in South Africa and 29% in Zimbabwe said they would offer a copper IUD, and 54% of clinicians in Zimbabwe said they would offer the implant.

We used multivariable logistic regression analysis to identify the characteristics of the few clinicians who were offering LARC methods to their patients (Table 3). Controlling for other variables, physicians were significantly more likely than nurses to provide LARC methods. Furthermore, clinicians in hospital settings and in urban areas, as well as those seeing a high proportion of contraceptive patients, were more likely to offer LARC methods. In Zimbabwe, where the implant is available, the provision of LARC was higher overall compared with South Africa. Notably, neither family planning nor HIV prevention training was associated with a greater provision of LARC methods. Clinicians' attitudes and knowledge about LARC methods and the perception of women's contraceptive needs were also not associated with provision, after controlling for professional and practice setting characteristics.

Although training interest was high among all clinicians, those in Zimbabwe showed significantly higher interest, controlling for other variables (Table 4). Nurses and clinicians working in clinics and in rural settings were particularly interested in training in LARC methods.

Discussion

Main findings

In South Africa and Zimbabwe, where unintended pregnancy, maternal mortality and HIV infection rates are high, the most effective contraceptives are infrequently offered to women seeking contraception. However, these results show the potential for increased provision of LARC methods. Clinicians themselves report that the IUD is underused, and many were interested in IUD and implant training. An emphasis on the *WHO Medical Eligibility Criteria for Contraception* could be an important evidence-based tool to help to educate clinicians on the wide range of women who are suitable candidates for LARC methods. Research from different country settings with high unintended pregnancy rates demonstrates

that clinicians typically have overly restrictive views of IUD candidates and unnecessarily limit access to the method.[12] Although clinicians in these sub-Saharan African countries reported that many of their patients were at risk of HIV, few saw the implant as an appropriate contraceptive for these women, and even fewer thought the IUD was appropriate, contrary to evidence-based guidelines. There is low awareness among clinicians in many countries that women at risk of HIV and HIV-infected women are candidates for LARC methods. In sub-Saharan Africa, where the AIDS epidemic has had its largest impact, appropriate contraception is an essential area for clinician education and training.

In patients at high risk of HIV, clinicians may be worried about heavier menses (and therefore a possible increase in female-to-male HIV transmission) or elevated risks of infection. However, international data have found that IUDs do not increase the risk of HIV acquisition or transmission, nor do they increase cervical shedding of HIV-1 DNA or other complications associated with IUDs (expulsions, removal for infection, pain or bleeding, and pregnancy).[15]

Despite the potential individual and public health impact, LARC provision is low, especially in rural areas and among nurses, who provide the vast majority of health care in South Africa and Zimbabwe. As provision has remained restricted to urban hospital settings, reaching few women, it is not surprising that its use is minimal. Family planning training, reported by a majority of the providers, was not associated with LARC provision. To increase access to LARC methods, IUD- and implant-specific training should be a priority for family planning training for nurses as well as physicians. To reach the women most in need, contraceptive information including these methods should also be offered in HIV prevention training. South African clinicians may require more extensive training because of less familiarity with the methods. However, the importance of methods that can be used by women autonomously, without the permission of the male partner, was particularly noted in the South African context.

Over one- half of clinicians in both countries, including nurses, desired training in LARC methods. This finding suggests a substantial unmet need at the provider level for training to competency in these methods in appropriate counselling and hands-on insertion and removal techniques. When providers are not fully trained, and counselling of women is infrequent, use remains low.[16,17] The minimal literature that exists on intrauterine contraception and providers in Africa demonstrates the positive impact of training, among both physicians and nurses.[18,19]

Health systems issues – including sufficient contraceptive supplies and workforce skills – complicate the ability of clinicians to offer LARC methods. Almost one-third of providers reported that they would offer LARC methods if they were more easily available. Access to contraceptive implants and levonorgestrel-releasing IUDs is limited in South Africa, as in many African countries, and not available at public clinics. If unmet need for contraception and, most specifically, LARC methods is to be met, affordable supplies and trained clinicians are essential.

Strengths and limitations

The main strength of this study is that the findings are nationally representative and generalisable, and are the first to show clinicians' attitudes, knowledge and practices for LARC methods. A limitation is that clinicians self-reported their knowledge and clinical practice, and social desirability bias could have affected their responses. Such bias would be expected to inflate estimates of provision, suggesting that actual LARC provision may be even lower than we found, strengthening our recommendations. Patient vignettes, which were also used to measure provision, are considered to have high validity as a measure of

clinician practice.[12] Results may not be generalisable to other parts of Africa, given some of the country-specific needs that are reflected in the surveys. However, many of the factors affecting the importance of providing effective contraception to high-risk populations in South Africa and Zimbabwe are found throughout sub-Saharan Africa, where the health and social costs of HIV and unintended pregnancy remain high.

Interpretation

In much of sub-Saharan Africa, unintended pregnancy, maternal mortality and HIV exact high health and social costs. Our nationally representative data from South Africa and Zimbabwe suggest that LARC methods – although the most effective and economical family planning methods –are underutilised. Access to skilled contraceptive care can improve significantly women's health and can prevent maternal mortality. It is important to note the benefits of LARC methods, including the hormone-free copper IUD, and to support the integration of LARC methods into clinical practice. Interventions to train providers and to address healthcare delivery issues, so that LARC methods become more widely available, have the potential for broad public health impact.

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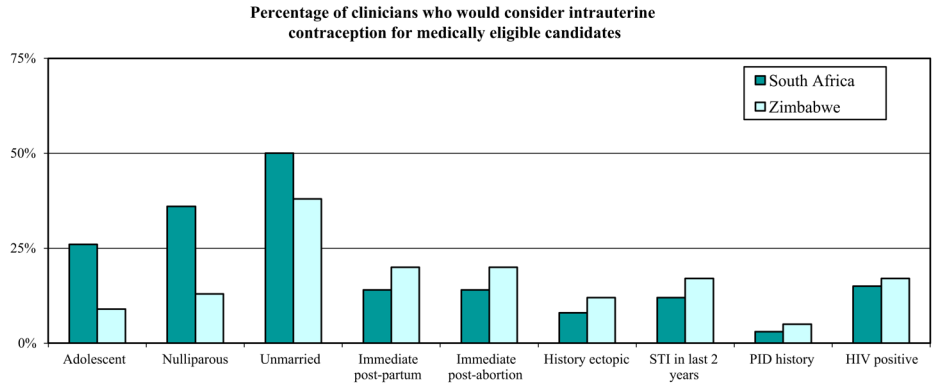

Figure 1.

Clinicians' willingness to offer long-acting reversible contraception (LARC) methods to medically eligible candidates. PID, pelvic inflammatory disease; STD, sexually transmitted disease.

Table 1

Clinician, practice and patient-related characteristics of participants (n = 1444)

	South Africa (n = 614)	Zimbabwe (n = 830)	Total (n = 1444)
Gender, *n* (%)			
Female	547 (89.8)	674 (82.3)	1221 (85.5)
Male	62 (10.2)	145 (17.7)	207 (14.5)
Age, median years (range)	43 (23–69)	40 (20–74)	41 (20–74)
Clinician type, *n* (%)			
Nurse	528 (86.0)	792 (95.4)	1320 (91.4)
Physician	86 (14.0)	38 (4.6)	124 (8.6)
Training in family planning, *n* (%)	399 (66.0)	503 (61.3)	902 (63.3)
Training in HIV prevention, *n* (%)	510 (84.4)	629 (77.1)	1139 (80.2)
Type of facility, *n* (%)			
Hospital	309 (50.3)	484 (58.6)	793 (55.1)
Clinic	305 (49.7)	342 (41.4)	647 (44.9)
Location, *n* (%)			
Urban	315 (51.3)	375 (45.4)	690 (47.9)
Rural	299 (48.7)	451 (54.6)	750 (52.1)
Proportion of female patients needing contraception, *n* (%)			
Some	108 (17.8)	126 (15.7)	234 (16.6)
Half	79 (13.0)	105 (13.0)	184 (13.0)
Most/all	419 (69.1)	574 (71.3)	993 (70.4)
Proportion of patients at risk of STI, *n* (%)			
Some	100 (16.4)	239 (29.5)	339 (23.9)
Half	112 (18.4)	139 (17.2)	251 (17.7)
Most/all	397 (65.2)	432 (53.3)	829 (58.4)
Proportion of patients at risk of HIV, *n* (%)			
Some	46 (7.6)	175 (21.5)	221 (15.6)
Half	92 (15.1)	112 (13.8)	204 (14.4)
Most/all	470 (77.3)	524 (64.6)	994 (70.0)
Proportion of patients HIV positive, *n* (%)			
Some	148 (24.7)	367 (46.1)	515 (36.9)
Half	132 (22.0)	160 (20.1)	292 (20.9)
Most/all	320 (53.3)	269 (33.8)	589 (42.2)
Routine counseling of condoms with female patients, *n* (%)	542 (89.9)	652 (80.1)	1,194 (84.3)

STI, sexually transmitted infection.

Table 2

Clinician practices and beliefs about long-acting reversible contraception (LARC) (*n* = 1444)

	South Africa (*n* = 614)	Zimbabwe (*n* = 830)	Total (*n* = 1444)
Provision of LARC methods			
Currently offer method to patients, *n* (%)			
Copper intrauterine device (IUD)	95 (15.7)	106 (13.1)	201 (14.2)
Levonorgestrel-releasing IUD ***	14 (2.3)	49 (6.1)	63 (4.5)
Implant ***	17 (2.8)	207 (25.6)	224 (15.8)
Would offer method if more easily available, *n* (%)			
Copper IUD **	191 (31.9)	296 (39.5)	487 (36.1)
Levonorgestrel-releasing IUD	199 (33.2)	216 (28.9)	415 (30.8)
Implant ***	192 (32.1)	387 (51.7)	579 (43.0)
Desire training, *n* (%)			
Copper IUD	300 (50.3)	430 (55.1)	730 (53.1)
Levonorgestrel-releasing IUD	314 (52.7)	390 (50.0)	704 (51.1)
Implant	344 (57.7)	474 (60.8)	818 (59.5)
Attitudes and knowledge			
Contraceptives appropriate for women at high risk of HIV, *n* (%)			
Copper IUD	27 (4.5)	30 (3.7)	57 (4.0)
Levonorgestrel-releasing IUD	19 (3.2)	24 (2.9)	43 (3.0)
Implant ***	25 (4.2)	186 (22.8)	211 (14.9)
Contraceptives appropriate for HIV-positive women, *n* (%)			
Copper IUD	24 (4.0)	44 (5.4)	68 (4.8)
Levonorgestrel-releasing IUD	18 (3.0)	30 (3.7)	48 (3.4)
Implant ***	29 (4.9)	235 (28.8)	264 (18.7)
Consider IUD to be underused by patients, *n* (%)	498 (84.1)	642 (80.4)	1140 (82.0)
Sufficient time to counsel on contraceptive options *, *n* (%)**	362 (60.4)	625 (76.7)	987 (69.8)
Clinician knowledge scale: IUD patient selection criteria *, mean (SD)	0.08 (0.60)	30.02 (0.53)	0.005 (0.6)
Routinely ask about male partner support or opposition when discussing contraception (usually/always) *, *n* (%)**	388 (65.2)	657 (80.5)	1045 (74.1)
Importance of women having a contraceptive they can use without male partner knowing (scale 1–10), mean (SD) * **	8.1 (2.4)	5.9 (2.8)	6.8 (2.8)

Numbers vary for some variables because of small numbers of missing data.

* $P \leq 0.05$;

** $P \leq 0.01$;

*** $P \leq 0.001$.

Table 3

Provision of long-acting reversible contraception (LARC) methods: multivariable logistic regression

Provision of LARC methods	Unadjusted odds ratio, OR [95% CI]	Adjusted odds ratio, OR [95% CI]
Clinician		
Country		
Zimbabwe (reference)	–	–
South Africa	0.26 * [0.32–1.0]	0.52 * [0.31–0.86]
Age (years)	0.99 [0.96–1.01]	1.00 [0.98–1.01]
Professional training		
Physician (reference)	–	–
Nurse	0.57 ** [0.38–0.85]	0.56 * [0.33–0.96]
Trained in HIV prevention	1.02 [0.63–1.65]	1.05 [0.75–1.48]
Trained in family planning	1.16 [0.79–1.71]	1.26 [0.94–1.70]
Practice		
Type of facility		
Hospital (reference)	–	–
Clinic	0.63 [0.35–1.12]	0.44 * [0.23–0.84]
Urban location	1.74 [0.92–3.27]	2.54 * [1.20–5.40]
Contraceptive patients		
None/some (reference)	–	–
Half	1.45 [0.92–2.28]	1.62 [1.00–2.63]
Most/all	1.42 * [1.02–1.96]	1.47 * [1.03–2.09]
Attitudes and knowledge		
Believe IUDs underused	1.07 [0.76–1.50]	0.99 [0.66–1.49]
Ask about male support or opposition for contraception	1.00 [0.85–1.20]	0.97 [0.80–1.18]
Think women need discreet contraceptive method	0.95 [0.89–1.02]	0.97 [0.92–1.03]
Evidence-based knowledge of patient selection for IUDs	0.94 [75–1.17]	0.93 [72–1.20]
n		1246

CI, confidence interval; IUD, intrauterine device.

* $P \leq 0.05$;

** $P \leq 0.01$;

*** $P \leq 0.001$.

Table 4

Clinician desire for training in long-acting reversible contraception (LARC) methods: multivariable logistic regression

Provision of LARC methods	Unadjusted odds ratio, OR [95% CI]	Adjusted odds ratio, OR [95% CI]
Clinician		
Country		
Zimbabwe (reference)	–	–
South Africa	0.60 ** [0.42–0.85]	0.67 * [0.47–0.95]
Age (years)	1.00 [0.991.01]	0.99 [0.98–1.01]
Professional training		
Physician (reference)	–	–
Nurse	2.13 ** [1.22–3.73]	1.86 * [1.02–3.43]
Trained in HIV prevention	0.84 [0.60–1.17]	0.72 [0.51–1.02]
Trained in family planning	0.99 [0.76–1.28]	1.06 [0.51–1.02]
Practice		
Type of facility		
Hospital (reference)	–	–
Clinic	1.26 [0.89–1.79]	1.51 * [1.06–2.17]
Urban location	0.69 * [0.48–0.99]	0.63 * [0.44–0.91]
Contraceptive patients		
None/some (reference)	–	–
Half	0.83 [0.54–1.28]	0.83 [0.51–1.33]
Most/all	0.94 [0.67–1.32]	0.94 [0.66–1.34]
Attitudes and knowledge		
Believe IUDs underused	1.31 [0.91–1.89]	1.24 [0.82–1.88]
Ask about male support or opposition for contraception	1.12 [0.97–1.30]	1.10 [0.94–1.29]
Think women need discreet contraceptive method	1.00 [0.95–1.05]	1.05 [0.94–1.28]
Evidence-based knowledge of patient selection for IUDs	1.11 [0.85–1.44]	1.18 [0.91–1.55]
n	1217	

CI, confidence interval; IUD, intrauterine device.

* $P \leq 0.05$;

** $P \leq 0.01$;

*** $P \leq 0.0$.