ORIGINAL RESEARCH ARTICLE

Use of HIV-Related Services and Modern Contraception among Women of Reproductive Age, Rakai Uganda

Fredrick Makumbi,[1] Gertrude Nakigozi,[2] Tom Lutalo,[2] Joseph Kagayi,[2] Joseph Sekasanvu,[2] Absalom Settuba,[2] David Serwada,[1] Maria Wawer[2] and Ronald Gray[2]*

[1]Makerere University, College of Health Sciences, School of Public Health; [2]Johns Hopkins University, School of Public Health; [3] Rakai Health Sciences Program, Uganda.

***For Correspondence:** E-mail: fmakumbi@yahoo.com

Abstract

Voluntary counseling and testing (VCT) and HIV care (HIVC) can be an opportunity for reproductive health messages and services integration. The objective of this study is to assess the association between uptake of HIV-related services and use of modern contraception among reproductive-age women. Data are derived from community cohort data, where HIV+ respondents were referred to the Rakai Health Sciences program's HIVC clinic. Use of modern contraceptive and VCT receipt were by self-report. Multinomial logistic regression was used to estimate relative risk ratios (RRR) of contraception use by HIVC and VCT. Receipt of VCT was significantly associated with higher use of condoms for FP, adj.RRR 1.78 (1.07, 2.95), and other modern contraceptives, adj.RRR=1.56(1.15, 2.11). Increasing level of HIVC was associated with decreasing level of unmet need for contraception. Use of condoms for family planning is common among HIV-related services attendees. Utilization of other modern contraceptive methods needs to be increased (*Afr J Reprod Health 2010; 14[4]: 91-101).*

Résumé

Emploi des services liés au VIH et à la contraception moderne chez les femmes en âge de procréer, Rakai, Uganda. Le Conseil et le Test Volontaire (CTV) et le soin du VIH (SVIH) peuvent constituer une opportunité pour des messages de santé de reproduction et d'intégration des services. Cette étude a pour objectif d'évaluer l'association entre l'intérêt aux services liés aux VIH et l'emploi de la contraception chez les femmes en âge de procréer. Les données ont été recueillies à partir des données de la cohorte de la communauté, là où les répondantes séropositives ont été orientées vers la clinique du SVIH du programme des Sciences de Santé de Rakai. L'emploi du contraceptif et du CTV était à travers l'auto-déclaration. On s'est servi de la régression logistique multinomiale pour évaluer le rapport du risque relatif (RRR) de l'utilisation de la contraception par le SVIH et le CTV. La réception du CTV est lié à l'emploi élevé des préservatifs pour la PF, l'adj.RRR=1,78, 2,95) et d'autres contraceptifs modernes, adj. RRR=1,56(1,15, 2,11). Le niveau croissant du SVIH était lié au niveau diminuant des besoins non satisfait de la contraception. L'emploi des contraceptifs pour la planification familiale est commun chez les gens qui profitent des services liés au VIH. Il faut augmenter l'emploi des autres méthodes contraceptives modernes (*Afr J Reprod Health 2010; 14[4]: 91-101).*

Keywords: VCT, ART, modern contraceptives, condoms-only, HIV status

Introduction

The use of modern contraceptives is an important factor in controlling fertility through prevention of unintended and unwanted pregnancies[1]. However, contraceptive use is still very low in sub-Saharan Africa (SSA), where the levels of fertility and unmet need for family planning continue to be high. In Uganda, knowledge of modern contraceptives is almost universal, but current contraceptive use is comparatively very low; the contraceptive prevalence rate of married women is only 24% (modern methods are only 18%; traditional use, 6%). Among unmarried sexually active women, the use of contraceptives is about two times higher, 54% (UDHS, 2006).

In SSA, the lifetime risk of dying due to pregnancy complications is 1 in 22 compared to 1 in 73, 000 in the developed world[2], suggesting a need to prevent unintended and unwanted pregnancies especially among HIV-infected women who tend to have worse birth outcomes compared to the uninfected women[3]. Previous studies have shown that if contraceptives are consistently provided and utilized, they can improve the quality of life for both

HIV-infected and HIV-uninfected women and their families[4]. The use of contraceptives by HIV-infected women can subsequently avert the birth of a significant number of HIV-positive infants and cut the costs associated with preventing mother-to-child transmission (PMTCT). Contraception can also help in ensuring spacing of pregnancies, which may result in healthier babies, irrespective of the mother's HIV status[4]. Unfortunately, the use of modern contraceptives among HIV-infected women who do not want a pregnancy soon is still low, suggesting a high unmet need for contraceptives. For example, in Kenya and Malawi only 26% and 19% of the HIV+ women were using contraceptives respectively, yet about half (54%) of the women in Kenya and 40% in Malawi reported that their last child was either unplanned or unwanted. In the same study, nearly three-quarters did not want more children within the next two years or ever, but only one in three women in Kenya and one in five women in Malawi were using contraceptives[5].

The continued high rates of unwanted and unintended pregnancies, especially among HIV-infected women, may be attributed to a number of barriers, including fear of side effects, availability, accessibility, affordability and lack of male involvement[6]. This has led to strong advocacy for innovative approaches such as the integration of FP activities into voluntary HIV counseling and testing (VCT)[7], the strengthening of reproductive health services in the HIV care programs[5,8-10], with the hope of increasing uptake of contraceptives and male involvement.

In this study, we compare the association between the use of HIV-related services (VCT uptake or enrollment in HIV care programs), the utilization of condoms for family planning and other modern contraceptives in Rakai District, southwestern Uganda. These findings will be used to effect the integration of reproductive health messages and, potentially services into VCT and HIV care programs.

Methods

Study Setting and Population

The Rakai Health Sciences Program (RHSP) has followed a population-based cohort in 50 rural villages since 1994 through the Rakai Community Cohort Study (RCCS), with annual follow-up of all persons aged 15-49 years. The community cohort annually collects census and survey data from 14,000 consenting resident adults aged 15-49 years through same-sex interviewer-administered questionnaires and draws blood samples for HIV testing. The questionnaires collected information on contraceptive use and details of their type and source, fertility desires, number of children born and surviving, current pregnancy and marital status, current sexual activity, and receipt of voluntary counseling and testing (VCT) in the previous 12 months prior to the survey visit. HIV status was determined from blood samples by using two different enzyme immunoassays (Vironostika HIV-1, Organon Teknika, Charlotte, North Carolina, USA, and Cambridge Biotech, Worcester, Massachusetts, USA), with Western blot confirmation of all discordant tests and of all HIV sero-converters (HIV-1 WB Bio-Merieux–Vitek, St Louis, Missouri, USA).

HIV Testing and Counseling in Rakai

All HIV test results were provided to participants who requested and were willing to receive them either as individuals or couples. Couple counseling was strongly encouraged, and enhanced couple counseling was provided by resident HIV counselors if a consenting HIV+ participant was willing but unable to share their HIV+ results with their partner without the help of a counselor. Well-trained community resident HIV counselors provided test results either at home or at a local government health facility where the counselor's offices were based. For the HIV+ participants with no prior receipt of HIV test results from the RHSP, counselors did a door-to-door delivery of this service, but in a confidential and secure place to avoid potential stigma. All participants in the cohort found to be HIV-positive were referred for HIV care, including evaluation for anti-retroviral therapy eligibility (CD4≤250 cells/mm^3 or WHO Stage IV), at any of the Rakai Health Sciences Program's (RHSP) 17 HIV care clinics nearest to them.

VCT and HIV Care Services

VCT services in Rakai have been previously explained[11] but briefly: VCT is provided only to participants who are willing to receive their results either as a couple or an individual. Community resident HIV counselors use a checklist of priority issues such as abstinence, condom use, couple counseling, partner notification, HIV results interpretation, family planning, proper and prompt medication, mother-to-child transmission of HIV, and nutrition, during the counseling sessions. Although the VCT program in RHSP was initially designed to re-enforce and promote HIV/STI prevention messages, other messages, including reproductive health, were integrated over time, given their importance especially among the more vulnerable HIV+ clients. Free condoms were made available to those who needed them irrespective of their HIV sero status. Modern contraceptives were not provided during VCT, but clients were counseled about their use and advised on where to procure them, for example, from government clinics, private

pharmacies and drug shops, and Non governmental organizations operating in Rakai District. HIV counseling services have been integrated within the existing local government health framework, and most of the community-based counseling offices are located at health units. HIV care services provided at the HIV care clinics included health status evaluation (clinical and immunological), treatment for opportunistic infections, a basic HIV care package consisting of cotrimoxazole for opportunistic infection prophylaxis, a clean water vessel and hypochlorite solution for water disinfection, two insecticide-treated bed nets for malaria prevention, condoms, and health, reproductive health, and HIV prevention education as well as antiretroviral therapy for those eligible for treatment.

In this cross-sectional study, data for the analysis were drawn from one of the survey rounds conducted in 2007-2008 (Survey round 12). Data on VCT receipt were obtained from questions asked about receipt of VCT in the past 12 months or from the HIV counseling records. Survey round 12 was chosen for this analysis because HIV care service opportunities had been made fully available to the cohort members. (PEPFAR activities started in June 2004, but it took time for all cohort participants to access the services.)

The dataset used for this analysis had a total of 5,469 women aged 15-49 years after excluding women with permanent FP methods (tubal ligation). However the final analytical sample used to assess the unmet need and factors associated had a total of 3, 234 women in the following categories: unmarried HIV-negative, 574; unmarried HIV+, 280; married HIV-negative, 2,078; and married HIV+, 302, based on the inclusion criteria of sexually active (had sex in past 12 months), HIV-positive or HIV-negative, no permanent FP method (tubal ligation), and desire either to stop or postpone child bearing for at least two years.

The outcome variable, *use of modern contraception,* was based on whether a woman used or did not use condoms for family planning or other modern contraceptives. The three levels of the outcome variable were 1*) Condoms-only (CFP)* if a woman used condoms-only for FP and no other modern contraceptive, 2*) Modern contraceptive methods (MFP)* if a woman used pills, injections, IUD or Norplant, with/without condoms, and 3*) None* if a woman did not use condoms for FP or any other modern contraceptive method.

The primary exposure variable was receipt of VCT categorized as 1) Received as couple or as individual but shared HIV test results with spouse, 2) Received as individual but did not discuss results with spouse, and 3) None if a woman did not report VCT receipt. For the HIV+ women, HIV care was categorized as 1) Care and on ART if HIV+ woman was in HIV care and already initiated on ART, 2) Care but no ART, if HIV+ woman was in care but had not yet started ART, and 3) No care if HIV+ woman was not yet enrolled in HIV care.

Variables for assessing woman's socio-economic status and access to health services were defined as follows. Social economic status (SES) was based on the structure of the dwelling. The structure of the woman's dwelling was categorized as high, middle or low based on materials used to construct the residential houses. Modern construction materials such as cement, iron sheets or roofing tiles are expensive and their use in this rural setting is a potential indicator of wealth. Therefore, the structure of dwelling was categorized as high SES if its roofing material was iron/tiles, both the walls and floor were cement. Structure categorized as low SES had only one or none of the parts (roof, walls and floor) constructed with modern materials; while the middle SES had two of its parts (roof, walls and floor) constructed using modern materials. Materials most commonly used by low SES households were grass thatch for the roof, mud and wattle for the walls or floor.

We constructed a variable to ascertain women's access to health services, using items that indicate availability of transport and communication. Possession of motor cars or bike, or bicycle indicated presence of transport, while availability of radio was suggestive of access to communication.

Occupation was based on a question regarding the type of work where they spent most of their day. The variable was categorized into three levels; agriculture/home if respondents were mainly engaged in agriculture for subsistence or spent most of their time doing household chores, students, or trader / government if such jobs involved earning a wage/salary. Sexually active was defined as reporting sexual intercourse in the past 12 months from the time of the interview. Women's fertility intentions and desires were obtained through questions asking women about their desired lifetime family size, desire for a child (if they have never had a birth) or another child if they have ever given birth. All women not currently pregnant were asked when they wished to have another pregnancy. Women who received their HIV sero status results (VCT) were asked if they discussed or did not discuss their results with their partners.

This analysis was stratified by another key variable, *current marital status* (married or unmarried) because contraceptive use, especially the method chosen is known to differ by this factor. Therefore, we had analysis for the married and unmarried non-pregnant sexually active women by HIV sero status. A sub-analysis for the HIV+ women only, stratified by marital status, was conducted because only the HIV+ women would qualify to be in HIV care.

Statistical Analysis

We obtained the proportion of women using condoms-only for FP or any modern contraceptives and assessed the method mix in this population. VCT uptake was estimated as the proportion of non-pregnant women who accepted to receive VCT either as individuals or with their partners (couple counseling) in the past 12 months. Enrollment into care by HIV+ women was obtained as the proportion of HIV+ women linked into HIV care at the time of the R12 survey divided by total number of HIV+ women. Use of contraceptives in the past 12 months was the main outcome variable with three levels; we used multinomial logistic regression to estimate relative risk ratios (RRR) of use *(condoms-only and modern methods with or without condoms)* versus non-use of contraception with their 95% confidence intervals (CI). The main factors (exposures of interest) were VCT uptake and being in HIV care (for the HIV+ participants). Potential confounders and other factors included in the analysis, stratified by marital status, were age, HIV status, level of schooling, faith/religion, principal occupation, and desired number of lifetime children. Statistical analyses used STATA software package version 9.2 (College Station, Texas, USA).

Results

Socio-Demographic Characteristics of Non-Pregnant Women in the Analysis

Table 1 shows the socio-demographic characteristics of all women aged 15-49 years in this study, stratified by HIV and marital status.

HIV-Uninfected Women

Comparing the unmarried to the married women, a higher proportion of the unmarried were younger (15-24 years), 36.3% versus 21.3% had higher level of education (secondary or above), 37.1% versus 28.4% were less involved in agricultural work (or work at house), 49.0% versus 75.8% and were less sexually active in the past 12 months, 43.1% versus 2.3%. In this HIV category, the unmarried also desired smaller family size (0-5 children), 71.4% versus 52.6 % and a higher proportion desired a (next) pregnancy after at least two years, 63.4% versus 51.4% ($p<0.0001$). Desire for a (another) child was lower among the unmarried compared to the married, 55.4% versus 58.4% ($p=0.0627$). Use of condoms-only for FP was higher among the unmarried compared to the married (18.7% versus 7.8%) but not the use of modern contraceptive methods.

HIV-Infected Women

Comparing the unmarried to the married women, a lower proportion of the unmarried were younger (15-24 years), 7.3% versus 15.8% and less educated (secondary or above), 22.6% versus 29.1% ($p=0.0203$). No differences were observed in desire for family size or desire for a (next) pregnancy, but desire for a (another) child was significantly lower among the unmarried compared to the married, 19.9 percent versus 37.5 percent ($p<0.0001$). Use of condoms-only did not differ by marital status, but modern methods were higher among the married compared to the unmarried, 28.1%versus 14.2%. The main source of VCT was from the RHSP, and a higher proportion of the unmarried tended to report receipt of VCT compared to the married women.

Fertility Desires and Estimated Unmet Need for Contraceptives by Marital Status, HIV Status, and Enrollment in HIV Care

Table 2 shows contraceptive use and fertility desires for non-pregnant sexually active women stratified by marital and HIV status, who want either to stop or postpone their next birth. Among the HIV-uninfected women, the proportion wishing to postpone or stop childbearing but not using condoms-only for family planning or another modern contraceptive to prevent pregnancies was significantly higher among the married, 54.6% compared to the unmarried 45.6% ($p<0.0001$), suggesting a significantly higher level of unmet need among the married compared to the unmarried. No significant differences in estimated unmet need for contraceptive/condoms were observed among the HIV+ married (37.5%) and unmarried (31.8%) women ($p= 0.1469$). Desire for large (6+ children) family size was higher among the married relative to the unmarried, irrespective of their HIV status. Among the HIV-uninfected women, desire for a (another) child was significantly higher for the unmarried, 51.4% compared to the married 41.9% ($p<0.0001$); among the HIV-infected, desire for a (another) child was higher for the married 18.1%compared to the unmarried, 11.8% ($p= 0.0330$).

Table 3 shows contraceptive use and fertility desires among non-pregnant sexually active HIV+ women, stratified by HIV-care status, who desire either to stop or postpone their next birth. The estimated unmet need for modern contraceptives/condoms for FP is higher among HIV+ women not yet in HIV care. Unmet need for contraceptive/condoms for FP (proportion not using any method) decreased with increasing level of HIV care for both the unmarried and married women: Among the unmarried, *No care* (37.1%), *Care but no ART* (35.7%), and *Care and on ART* (19.5%; χ^2 for trend 5.868, $p= 0.0154$); and among the married,

Table 1: Characteristics of all non-pregnant women aged 15-49 years irrespective of their fertility desires and intentions

Variable	Total		HIV-uninfected				HIV-infected			
			Unmarried		Married		Unmarried		Married	
	N	%	N	%	N	%	N	%	N	%
Age group (years)	5,358	100	1,373	100	2,987	100	593	100	405	100
15-24	1,242	23.2	499	36.3	636	21.3	43	7.3	64	15.8
29-39	3,056	57.0	529	38.5	1,869	62.6	375	63.2	283	69.9
40-49	1,060	19.8	345	25.1	482	16.1	175	29.5	58	14.3
Level of schooling										
None	399	7.4	80	5.8	235	7.9	52	8.8	32	7.9
Primary	3,350	62.5	783	57.0	1,905	63.8	407	68.6	255	63.0
Secondary+	1,609	30.0	510	37.1	847	28.4	134	22.6	118	29.1
Faith/Religion										
Christians	4,507	84.1	1,173	85.4	2,454	82.2	529	89.2	351	86.7
Non-Christians	851	15.9	200	14.6	533	17.8	64	10.8	54	13.3
Main occupation										
Agriculture/Home	3565	66.5	673	49.0	2,265	75.8	352	59.4	275	67.9
Trader/government (monetary)	1563	29.2	475	34.6	722	24.2	236	39.8	130	32.1
Student	230	4.3	225	16.4		0.0	5	0.8		0.0
Transport/communication										
Household asset possessions										
None	677	12.6	273	19.9	213	7.1	147	24.8	44	10.9
Bicycle/Radio	3,884	72.5	1,019	74.2	2,135	71.5	425	71.7	305	75.3
At least motorized transport	796	14.9	81	5.9	639	21.4	20	3.4	56	13.8
Women's SES										
Structure of dwelling										
High	2,363	44.2	609	44.5	1,336	44.8	240	40.5	178	44.1
Middle	1,668	31.2	423	30.9	925	31.0	195	32.9	125	30.9
Low	1,319	24.7	338	24.7	723	24.2	157	26.5	101	25.0
Sexually active past 12 months										
No, did not	915	17.1	592	43.1	68	2.3	246	41.5	9	2.2
Yes, had sex	4,443	82.9	781	56.9	2,919	97.7	347	58.5	396	97.8
Desired lifetime family size										
0-5	3,238	60.4	980	71.4	1,572	52.6	405	68.3	281	69.4
6+	2,120	39.6	393	28.6	1,415	47.4	188	31.7	124	30.6
Desire for a (another) child										
No/No more children	2,583	48.2	613	44.6	1,242	41.6	475	80.1	253	62.5
Yes, need a (another) child	2,775	51.8	760	55.4	1,745	58.4	118	19.9	152	37.5
Desire for next pregnancy										
Within two or less years	1,299	46.8	278	36.6	848	48.6	77	65.3	96	63.2
More than two years	1,476	53.2	482	63.4	897	51.4	41	34.7	56	36.8
Current use of contraceptives										
Not using	3,312	61.8	951	69.3	1,811	60.6	363	61.2	187	46.2
Condom-only	741	13.8	257	18.7	234	7.8	146	24.6	104	25.7
Pills/IUD/Norplant/Injection	1,305	24.4	165	12.0	942	31.5	84	14.2	114	28.1
Ever receipt of VCT										
No receipt	697	13.0	239	17.4	359	12.0	47	7.9	52	12.8
Ever receipt	4,661	87.0	1,134	82.6	2,628	88.0	546	92.1	353	87.2
Result receipt past 12m										
Did not receive	2,691	50.2	686	50.0	1,596	53.4	230	38.8	179	44.2
Received	2,667	49.8	687	50.0	1,391	46.6	363	61.2	226	55.8

Table 1: Characteristics of all non-pregnant women aged 15-49 years irrespective of their fertility desires and intentions **(continued)**

Variable	Total		HIV-uninfected				HIV-infected			
			Unmarried		Married		Unmarried		Married	
	N	%	N	N	%	N	%		N	%
Source of VCT results in past 12m										
Did not receive results	2,691	50.2	686	50.0	1,596	53.4	230	38.8	179	44.2
Rakai Health Sciences Program	2,462	45.9	624	45.4	1,272	42.6	348	58.7	218	53.8
Other sources	205	3.8	63	4.6	119	4.0	15	2.5	8	2.0
Result receipt (VCT) and discussion with partner										
Did not receive results	2,691	50.2	686	50.0	1,596	53.4	230	38.8	179	44.2
Received, did not discuss	1,478	27.6	664	48.4	377	12.6	358	60.4	79	19.5
Received, did discuss	1,189	22.2	23	1.7	1,014	33.9	5	0.8	147	36.3

Table 2: Contraceptive use and fertility desires for sexually active women who want either to stop or postpone their next birth

Variable	Total		HIV-uninfected				HIV-infected			
			Unmarried		Married		Unmarried		Married	
	N	%	N	%	N	%	N	%	N	%
Current use of contraceptives	3,302	100.0	574	100.0	2,139	100.0	280	100.0	309	100.0
Not using	1,635	49.5	262	45.6	1,168	54.6	89	31.8	116	37.5
Condom-only	592	17.9	192	33.4	181	8.5	125	44.6	94	30.4
Pills/IUD/Norplant/Injection	1,075	32.6	120	20.9	790	36.9	66	23.6	99	32.0
Desired lifetime family size										
0-5	1,925	58.3	430	74.9	1,082	50.6	206	73.6	207	67.0
6+	1,377	41.7	144	25.1	1,057	49.4	74	26.4	102	33.0
Desire for a (another) child										
No/No more children	2,021	61.2	279	48.6	1,242	58.1	247	88.2	253	81.9
Need more	1,281	38.8	295	51.4	897	41.9	33	11.8	56	18.1
Result receipt past 12m										
Did not receive	1,692	51.2	297	51.7	1,164	54.4	102	36.4	129	41.7
Received	1,610	48.8	277	48.3	975	45.6	178	63.6	180	58.3

*No care (*48.4%); *Care but no ART* (35.8%) *Care and on ART* (21.6% χ^2 for trend 14.48, p= 0.0001). Use of condoms-only for FP increased with increasing level of care for both the married and unmarried women, although such use was higher among the unmarried compared to the married at all levels of HIV care. Use of modern contraceptives (pills/IUD/Norplant/injection) decreased with increasing level of HIV care but was significantly higher among the married compared to the unmarried women at all levels of care.

Factors Associated with Contraceptive Use

Tables 4 and 5 show adjusted relative risk ratios of contraceptive use among non-pregnant, sexually active, HIV-negative and HIV-positive married and unmarried women who want to stop or postpone childbearing. Among the HIV-negative women (Table 4), factors significantly associated with higher use of condoms-only compared to non-use of any contraceptive were: working in a wage occupation (trader/shopkeeper, government worker), adj.RRR=1.72 (1.17, 2.52), compared to agriculture; having primary education, adj.RRR=2.44(1.10, 5.40), and secondary or higher, adj.RRR=3.66 (1.57, 8.53), relative to no education; and receiving VCT with or without discussing results with the partner. Desire for large family size (6+ children) was associated with lower use of condoms for FP, adj.RRR=0.69 (0.48, 0.97). Factors significantly associated with higher use of other modern contraceptive methods (pills, injectables, IUD, Norplant) were: a monetary occupation (trader/

Table 3: Contraceptive use and fertility desires among sexually active HIV+ women who want either to stop or postpone childbearing by HIV care status

Variable	HIV care status					
	No CARE		CARE, no ART		CARE and on ART	
	N	%	N	%	N	%
Unmarried	105	100.0	98	100.0	77	100.0
Current use of contraceptives						
Not using	39	37.1	35	35.7	15	19.5
Condom-only	35	33.3	44	44.9	46	59.7
Pills/IUD/Norplant/Injection	31	29.5	19	19.4	16	20.8
Desired lifetime family size						
0-5	84	80.0	92	93.9	71	92.2
6+	21	20.0	6	6.1	6	7.8
Desire for a (another) child						
No/No more children	81	77.1	71	72.4	54	70.1
Need more	24	22.9	27	27.6	23	29.9
Married	126	100.0	109	100.0	74	100.0
Current use of contraceptives						
Not using	61	48.4	39	35.8	16	21.6
Condom-only	15	11.9	38	34.9	41	55.4
Pills/IUD/Norplant/Injection	50	39.7	32	29.4	17	23.0
Desired lifetime family size						
0-5	91	72.2	93	85.3	69	93.2
6+	35	27.8	16	14.7	5	6.8
Desire for a (another) child						
No/No more children	89	70.6	67	61.5	51	68.9
Need more	37	29.4	42	38.5	23	31.1

shopkeeper), education at the primary level or above, and receipt of VCT but without discussing results with spouse, adj.RRR=1.56 (1.15, 2.11). The use of modern contraceptive methods was significantly lower among older women, aged 40-49 years; those who desired large family size (6+), adj.RRR=0.81(0.65, 0.99); and those with household structures ranked as middle or low compared to those ranked as high (indicating higher SES).

Among the HIV-negative unmarried women, use of condoms-only was significantly higher among students, adj.RRR=2.55; (1.28, 5.09), those with education level of secondary or higher, adj.RRR=3.70 (1.12, 12.20), and women who received HIV results but did not discuss with partner. Factors significantly associated with higher use of other modern contraceptives were having a primary level of education compared to no education; on the other hand being older 40-49 years compared to 15-24 years was associated with lower use of modern contraceptive methods, adj.RRR=0.37 (0.14, 0.96).

Among the HIV+ married women (Table 5), being enrolled in HIV care was a factor associated with higher use of condoms-only for FP. The only factors associated with higher use of other modern methods of contraceptive was secondary or higher level of education, adj.RRR=3.80 (1.00, 14.45). However, receiving VCT was not significantly associated with either condom use for FP or other modern contraceptive methods.

Among the HIV+ unmarried women, being in *HIV Care and on ART* compared to those not yet enrolled in care and receiving VCT with discussion with partner was significantly associated with higher use of condoms for FP. Desire for large family size (6+) was associated with reduced use of condoms-only or other modern contraceptives.

Discussion

In this study, VCT uptake is associated with higher use of contraceptives among the married HIV-uninfected women, which may be attributed to the integration of reproductive health education messages in VCT and both reproductive health education messages and services in the HIV care program in this setting. This finding is consistent with that of a previous study, which indicated an

Table 4: Adjusted relative risk ratio of contraceptive use among non-pregnant sexually active HIV-negative married and unmarried women who want to stop or postpone childbearing

	HIV-negative married Adj.RRR (95%CI)		HIV-negative unmarried Adj.RRR (95%CI)	
	Condoms-only versus Non-users	Modern Contraceptives versus Non-user	Condoms-only versus Non-users	Modern Contraceptives versus Non-users
Overall				
Age group **(years)**				
15-24	1.0	1.0	1.0	1.0
25-39	1.15 (0.71, 1.86)	1.25 (0.95, 1.66)	1.03 (0.56, 1.90)	1.08 (0.56, 2.07)
40-49	1.05 (0.55, 1.99)	0.62 (0.41, 0.92)	0.74 (0.31, 1.75)	0.37 (0.14, 0.96)
Occupation				
Agriculture/home	1.0	1.0	1.0	1.0
Trader/shopkeeper	1.72 (1.17, 2.52)	1.28 (1.01, 1.63)	1.20 (0.74, 1.92)	1.24 (0.75, 2.06)
Student	--	--	2.55 (1.28,5.09)	0.54 (0.20,1.43)
Woman' SES				
Structure of dwelling				
High	1.0	1.0	1.0	1.0
Middle	1.06 (0.72, 1.57)	0.79 (0.63,0.99)	0.84 (0.52, 1.35)	1.10 (0.64, 1.88)
Low	1.04 (0.68, 1.60)	0.56 (0.43,0.72)	0.71 (0.41, 1.22)	0.92 (0.50, 1.71)
Highest education				
None	1.0	1.0	1.0	1.0
Primary	2.44 (1.10, 5.40)	1.99 (1.32, 2.98)	2.57 (0.84, 7.91)	10.76 (1.38, 83.64)
Secondary+	3.66 (1.57, 8.53)	3.64 (2.34, 5.66)	3.70 (1.12, 12.20)	13.83 (1.69, 113.41)
Faith/Religion				
Christians	1.0	1.0	1.0	1.0
Non-Christians	0.70 (0.44, 1.12)	1.07 (0.84, 1.37)	0.76 (0.41, 1.38)	1.19 (0.63, 2.25)
Number of children, lifetime				
0-5	1.0	1.0	1.0	1.0
6+	0.69 (0,48,0.97)	0.81 (0.65, 0.99)	0.69 (0.41, 1.18)	0.57 (0.31, 1.05)
Need children and spacing				
None/No more	1.0	1.0	1.0	1.0
More than 2 years	0.74 (0.51, 1.09)	1.00 (0.80, 1.24)	1.06 (0.59, 1.90)	0.61(0.33, 1.12)
Result receipt (VCT) and discussion with partner				
No receipt	1.0	1.0	1.0	1.0
Received, had no discussion	1.78 (1.07, 2.95)	1.56 (1.15, 2.11)	1.52 (1.01, 2.28)	1.54 (0.97, 2.46)
Received, and had discussion	1.67 (1.19, 2.36)	0.98 (0.80, 1.21)	0.14 (0.02, 1.11)	0.51 (0.13, 1.99)

Note: * *The unmarried women VCT receipt is either "No receipt" or "Received"*

effective synergy between HIV VCT and primary health care services, including reproductive health services[7]. The higher use of condoms for family planning associated with discussing VCT results with the sexual partner is a good indicator of the benefits of partner HIV sero status disclosure, which could benefit the health of females who do not wish to become pregnant. Disclosure of HIV status to the partner has been identified as an important factor in determining the use of condoms and enhancing male partner involvement in making crucial decisions pertaining to family planning use and safe sex practices[12]. However, the HIV-uninfected married women were significantly more likely to use condoms-only and any other modern contraceptive if they received but did not discuss their results with the partner.

Table 5: Adjusted relative risk ratio of contraceptive use among non-pregnant sexually active HIV-positive married and unmarried women who want to stop or postpone childbearing

	HIV- Positive married Adj.RRR (95%CI)		HIV-Positive unmarried Adj.RRR (95%CI)	
	Condoms-only versus Non-users	Modern Contraceptives versus Non-users	Condoms-only versus Non-users	Modern Contraceptives versus Non-users
Overall				
Age group **(years)**				
15-24	1.0	1.0	1.0	1.0
25-39	1.76 (0.51, 6.02)	0.88 (0.35, 2.21)	1.34 (0.29, 6.20)	1.14 (0.22, 5.82)
40-49	0.64 (0.15, 2.78)	0.24 (0.07, 0.82)	1.14 (0.21, 6.14)	0.21 (0.03, 1.56)
Woman' SES				
Structure of dwelling				
High	1.0	1.0	1.0	1.0
Middle	0.80 (0.38, 1.71)	1.54 (0.77, 3.07)	0.79 (0.39, 1.56)	1.74 (0.76, 3.99)
Low	0.87 (0.39, 1.92)	1.49 (0.71, 3.15)	0.58 (0.27, 1.27)	1.84 (0.75, 4.55)
Highest education				
None	1.0	1.0	1.0	1.0
Primary	1.55 (0.45, 5.33)	2.17 (0.62, 7.55)	0.47 (0.15, 1.50)	1.14 (0.24, 5.32)
Secondary+	3.19 (0.84, 12.17)	3.80 (1.00, 14.45)	0.51 (0.14, 1.92)	0.93 (0.17, 5.19)
Number of children, lifetime				
0-5	1.0	1.0	1.0	1.0
6+	1.33 (0.68, 2.63)	1.25 (0.66, 2.39)	0.37 (0.19, 0.72)	0.45 (0.21, 0.98)
Need children and spacing				
None/No more	1.0	1.0	1.0	1.0
More than 2 years	1.30 (0.54, 3.09)	0.68 (0.31, 1.47)	0.87 (0.26, 2.89)	0.71 (0.20, 2.58)
Enroll in HIV care				
Not in care	1.0	1.0	1.0	1.0
Care, No ART	4.17 (1.83, 9.51)	0.99 (0.49, 2.00)	1.06 (0.51, 2.19)	0.53 (0.23, 1.22)
Care, & on ART	13.91 (5.31, 36.41)	1.73 (0.69.4.35)	3.14 (1.39, 7.08)	1.13 (0.44, 2.90)
Result receipt (VCT) and discussion with partner				
No receipt	1.0	1.0	1.0	1.0
Received, had no discussion	1.76 (0.72, 4.28)	1.68 (0.78, 3.64)	1.98 (1.05, 3.74)	1.60 (0.78, 3.28)
Received, and had discussion	1.73 (0.82, 3.62)	1.26 (0.62, 2.57)	-	0.50 (0.04, 6.28)
Age group (years)				
15-24	1.0	1.0	1.0	1.0

Note: * *The unmarried women VCT receipt is either "No receipt" or "Received"*

The increasing reported use of condom-only as a family planning method as the level of HIV care increases may be a reflection of continued exposure to health education about condom use and family planning given to HIV+ persons attending HIV care clinics. In this program, HIV+ patients on ART visit the clinics more frequently than their pre-ART colleagues and are therefore exposed to more frequent reproductive health education messages compared to their colleagues in pre-ART care or those not yet in care; hence the observed increasing gradient in condom use.

These results clearly suggest that HIV care programs can be used as an avenue to address family planning needs for HIV+ persons. Although the use of condoms-only for FP is increasing with the level of HIV care, the use of modern contraceptive methods is decreasing. This may be explained by the use of condoms being promoted over modern methods as both a family planning method and protection against transmission or

acquisition of sexually transmitted infections. Also, condoms and not modern methods are the main family planning methods distributed to the HIV+ patients at the HIV clinics. This differential in distribution, coupled with the dual purpose of the condom, could be responsible for the observed higher use of condoms for family planning. However, if the increasing use of condoms is not matched with their proper use, including consistent use, an increase in the incidence of unwanted pregnancies may occur. This may partially explain the current observed increases in the incidence of pregnancies in many HIV care/ART programs[13].

The higher use of condoms-only relative to modern methods for family planning method among the unmarried and not the married may reflect or suggest that the unmarried may perceive themselves to be at increased risk of HIV infection, and may opt for a method that can both help them avoid unwanted pregnancies and protect against sexually transmitted diseases. Lutalo et al. (2000)[14] observed that women with self-perception of increased risk of HIV infection were likely to use condoms for family planning, as opposed to modern methods, because they wanted to obtain both benefits. Our findings that married women used modern methods more than condoms-only for family planning is consistent with a study by Pranitha et al. (2005) in Kwazulu[15], South Africa, which showed that the majority, 94% used modern methods, suggesting that use of both modern methods and condoms for family planning by some married women was associated with the self-perception of being at increased risk of HIV.

Although the unmarried women would be expected to desire a (another) child compared to the married women, our findings show that among the HIV-infected women, desire for a (another) child was significantly higher for the married 18.1% compared to the unmarried, 11.8% (p= 0.0330). This finding suggests that the married HIV+ may wish to fulfill their ideal family size or replace children who may have died due to increased mortality among infants of HIV+ women, or decreased fertility/conception in HIV+ women.

Our findings further show that the level of unmet need in this population is quite high; about half of the married women and 41%of the unmarried who did not want a child in the next two years were not using condoms or any other modern contraceptive method for family planning. Overall, just about a third of the HIV+ women were estimated to have unmet need for contraceptives, a proportion that decreased with increasing level of HIV care and suggests that among these women, being in HIV care can partly address unmet need for contraceptives.

These observations are important for policy and programs because increased uptake of contraceptives while receiving HIV-related services may result in the reduction of unintended pregnancies, which can reduce the need for such services as PMTCT and bring improvements in health and well-being. Avoidance of unwanted pregnancies, especially among HIV-infected women, can also be an HIV prevention strategy because fewer children from infected mothers will be born. Therefore the continued provision of reproductive health messages and integration of such services into HIV-related services can increase the women's choice and potential uptake of contraceptives, thus reducing unmet need for FP.

Limitations of this study are that consistency in the use of condoms for FP was not assessed, which may lead to underestimating the level of unmet need. Also, some HIV-infected women receiving HIV services may report higher use of condoms or other modern contraceptives as a result of social desirability. Our results show, however, an increasing use of contraceptives as the level of HIV care increases, suggesting that the potential effect of social desirability could be minimal.

Conclusion

The significantly high use of condoms for family planning among VCT clients and HIV care attendees compared to those not receiving these services clearly suggests that HIV programs can be used as an avenue for increasing uptake of family planning services in these resources-limited settings. More needs to be done, however, to increase utilization of other modern contraceptive methods.

References

1. Brou H, Viho I, Djohan G, Ekouévi DK, Zanou B, Leroy V, Desgrées-du-Loû A. Contraceptive use and incidence of pregnancy among women after HIV testing in Abidjan, Ivory Coast. Rev Epidemiol Sante Publique 2009;57(2):77-86.
2. World Health Organization (WHO). Maternal mortality in 2005: estimates developed by WHO, UNICEF, UNFPA and the World Bank. Geneva: WHO, 2007.
3. Naniche D, Bardají A, Lahuerta M, Berenguera A, Mandomando I, Sanz S, Aponte JJ, Sigauque B, Alonso PL, Menéndez C. Impact of maternal human immunodeficiency virus infection on birth outcomes and infant survival in rural Mozambique. Am. J. Trop. Med. Hyg 2009; 80(5):870-876.
4. Reynolds WH, Janowitz B, Wilcher R, Cates W. PEPFAR countries current contribution and potential cost savings in contraception to prevent HIV-positive births. Sex Transm Infect 2008;84(Suppl II):ii49–ii53.
5. Anand A, Shiraishi RW, Bunnell RE, Jacobs K, Solehdin N, Abdul-Quader AS, Marum LH, Muttunga JN, Kamoto K, Aberle-Grasse JM, Diaz T. Knowledge of HIV status, sexual risk behaviors and contraceptive need among people living with HIV in Kenya and Malawi. AIDS 2009; 23:1565–1573.

6. Salter ML, Go VF, Celentano DD, Diener-West M, Nkhoma CM, Kumwenda N, Taha TE. The role of men in women's acceptance of an intravaginal gel in a randomized clinical trial in Blantyre, Malawi: a qualitative and quantitative analysis. AIDS Care 2008; 20 (7):853-862.
7. Peck R, Fitzgerald DW, Liautaud B, Deschamps MM, Verdier RI, Beaulieu ME, GrandPierre R, Joseph P, Severe P, Noel F, Wright P, Johnson Jr WD, Pape JW. The feasibility, demand, and effect of integrating primary care services with HIV voluntary counseling and testing: evaluation of a 15-year experience in Haiti, 1985–2000. J Acquir Immune Defic Syndr 2003;33(4):470-475.
8. Grabbe K, Stephenson R, Vwalika B, Ahmed Y, Vwalika C, Chomba E, Karita E, Kayitenkore K, Tichacek A, Allen S. Knowledge, use, and concerns about contraceptive methods among sero-discordant couples in Rwanda and Zambia. Journal of Women's Health 2009;18 (9):1449-1456.
9. Andia I, Kaida A, Maier M, Guzman D, Emenyonu N, Pepper L, Bangsberg DR, Hogg RS. Highly active antiretroviral therapy and increased use of contraceptives among HIV-positive women during expanding access to antiretroviral therapy in Mbarara, Uganda. Am J Public Health 2009;99:340–347.
10. McCarraher D, Cuthbertson C, Kung'u D, Otterness C, Johnson L, Magiri G. Sexual behavior, fertility desires and unmet need for family planning among home-based care clients and caregivers in Kenya. AIDS Care 2008;20 (9):1057-1065.
11. Matovu JK, Kigozi G, Nalugoda F, Wabwire-Mangen F, Gray RH. The Rakai Project counselling programme experience. Trop Med Int Health 2002;7(12):1064-7.
12. Bii SC, Otieno-Nyunya B, Siika A, Rotich JK. Family planning and safer sex practices among HIV infected women receiving prevention of mother-to-child transmission services at Kitale District Hospital. East Afr Med J. 2008;85(1):46-50.
13. Myer L, Carter RJ, Katyal M, Toro P, El-Sadr WM, Abrams EJ. Impact of antiretroviral therapy on incidence of pregnancy among HIV-infected women in sub-Saharan Africa: a cohort study. PLoS Med. 2010;7(2):e1000229.
14. Lutalo T, Kidugavu M, Wawer MJ, Serwadda D, Zabin LS and Gray RH.Trends and determinants of contraceptive use in Rakai District, Uganda, 1995-98. Stud Fam Plann. 2000 Sep;31(3):217-27
15. Pranitha M, Cleland J. Risk perception and condom use among married or cohabiting couples in KwaZulu-Natal, South Africa. Intl Fam Plann Perspectives 2005;31(1).