AIDS and Behavior, Vol. 9, No. 4, December 2005 (© 2005)
DOI: 10.1007/s10461-005-9018-x

HIV Voluntary Counseling and Testing Service Preferences in a Rural Malawi Population

Joseph deGraft-Johnson,[1,4] Valerie Paz-Soldan,[2] Antonio Kasote,[1] and Amy Tsui[3]

Published online: Oct. 27, 2005

Voluntary counseling and testing (VCT) services have become an integral component of HIV prevention efforts in sub-Saharan Africa. This study of a rural Malawi district population examined variation in past and desired use of VCT services among 868 women aged 15 to 34 and 648 men aged 20 to 44 aware of HIV/AIDS. Only 11% of men and 7% of women had been tested, but of those untested, 76% of men and 61% of women desired testing. Ninety percent of respondents willing to know their results preferred to hear them from a test site counselor and on the same day of the test. However, 27% of women wanting to be tested did not want to know their test results, a finding significantly associated with knowing someone affected by AIDS and perceiving oneself at HIV infection risk. Knowledge of the behaviors of HIV prevention, knowing someone with AIDS, knowing the locations of a test site, and perceived risk of HIV infection all had a consistently significant association with past and future VCT use for men and women.

KEY WORDS: HIV; VCT; population-based; Malawi.

INTRODUCTION

Voluntary counseling and testing (VCT) is increasingly recognized as a key intervention for both HIV care and prevention, including the prevention of mother to child transmission of the virus (Painter, 2001; Sangiwa *et al.*, 2000). Studies have also shown that pregnant women who test positive to the virus and receive short courses of zidovudine or nevirapine, reduce their risk of transmitting HIV to their babies (McIntyre and Gray, 2002). Studies have also demonstrated VCT to be a highly cost-effective intervention, even given its high start-up costs (Hollander, 2001; Sweat *et al.*, 2000).

Despite the potential role of VCT services in HIV/AIDS care and prevention, such services are not readily available in many areas of affected region of sub-Saharan Africa. In most African countries, available HIV testing centers are used primarily to confirm diagnosis of HIV/AIDS in symptomatic persons referred to the center by clinicians (Coovadia, 2000; van de Perre, 2000). In the few places that offer testing on a voluntary basis for walk-in clients, the utilization of the testing services is usually low. Many factors have been cited for the lack of demand for VCT services. Perceived stigma associated with a person testing positive to the virus or just getting tested irrespective of the results, potential negative consequences, especially for women, and lack of supportive services for post-test clients are some of the factors reported to affect the utilization of VCT services (Erbelding *et al.*, 2004; Mbwambo *et al.*, 2001; Pool *et al.*, 2001).

The effectiveness of VCT in reducing the risk of HIV infection was not widely recognized until recently (Painter, 2001; The Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000). Most of the existing published VCT service acceptability and utilization studies have focused on clients receiving services at existing VCT centers or other health

[1]Save the Children Federation USA, Malawi.
[2]Tulane School of Public Health and Tropical Medicine, New Orleans, Louisiana, USA.
[3]Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA.
[4]Correspondence should be directed to Joseph deGraft-Johnson, 1615 Thames Street (Suite 205), Baltimore, Maryland 21231; e-mail: jjohnson@savechildren.org.

facilities. Studies tend to focus on counseling conditions pre- and post-test (Kalichman and Simbayi, 2003), rates of client return for test results (Kawichai *et al.*, 2004), sero-status disclosure to partners (Maman *et al.*, 2001), post-VCT behavioral change, such as with couples (Allen *et al.*, 2003).

Studies of HIV testing preparedness and acceptance have identified a number of knowledge and behavioral risk correlates, such as perceptions of the disease (Castle, 2003; Tharawan *et al.*, 2003), attitudes toward testing (Kalichman and Simbayi, 2003), perceived risk (Fylkesnes and Siziya, 2004), presence of STI symptoms and absence of condom use (Gresenguet *et al.*, 2002). The relative importance of HIV knowledge, attitudes and risk behaviors for HIV test acceptability is not well known. A UN review (2002) of HIV/AIDS awareness and behavior across national populations sampled in 20 Demographic and Health Surveys conducted globally showed considerable variation in levels of awareness by education and place of residence and in perception of infection risk by gender and culture. To understand better the barriers affecting VCT service demand and utilization, it is important to include persons who are both users and non-users of VCT in study samples, i.e., to employ population-based research designs more frequently. Our study aims to address this gap by examining the relative associations of HIV knowledge and behavioral risk factors on preferences for and use of VCT services in a rural Malawian district population.

Malawi, with an estimated population of 10 million, like most countries in Southern Africa has high HIV prevalence, estimated at 15% among the adult population 15 years and older (UNAIDS, 2002). In 1999, the Government of Malawi developed a national HIV/AIDS strategic framework to guide its fight against the pandemic, with VCT as one of the key interventions selected for implementation to help reduce the high HIV prevalence in the country (Malawi National AIDS Control Program, 1999). The current study was conducted to examine people's attitudes towards and their preferences for VCT services.

METHODS

Participants and Sampling Procedures

This study took place in a rural district in the southern region of Malawi, populated primarily by people of the Yao tribe and of Moslem faith. Three sub-district regions, called Traditional Authorities (TAs), were selected from a total of nine, using probability proportional to size (PPS) sampling. Within each TA, four enumeration areas (EA) were selected also with PPS. All households within the EAs were listed and mapped; then with a random start, a sample of 125 households was systematically selected from the list. Individual selection into the study was based on whether any of the enumerated household members met the age criteria for women (15 to 34 years) and men (20 to 44 years) and consented to participate in the study. Age criteria for men were older than for women in order to capture each gender's years of highest sexual activity.

Multiple rounds of data were collected between May 2000 and June 2002 on a baseline cohort of 1,013 women and 737 men, representing 94.0% and 90.5% of eligible household occupants, as part of the Pregnancy and STI Risk Perception and Avoidance (PSRPA) Study. In the first round in 2000, six weekly interviews were carried out with the same respondents to track sexual behavioral risk prospectively. HIV/AIDS-related information was gathered in the first two weeks. The interviews, conducted by trained research assistants in the languages of Yao and Chichewa, also collected social, economic and demographic information about the participants; information about their reproductive health knowledge and behaviors; and information about their knowledge, attitudes, preferences and practices regarding reproductive health services, including HIV testing. Questions on HIV testing focused on ever being tested and if not, wanting to be tested; knowledge of testing facilities and preferences for location of VCT services; and preferred approaches for receiving test results. At the time of the second weekly contact, a total of 943 women (93.2%) and 659 men (89.4%) were successfully re-interviewed. Those who had never heard about HIV/AIDS (75 women and 11 men) were excluded from the study, resulting in sample sizes of 648 men and 868 women

Measures

Testing Preferences

This study examined variation in several HIV testing outcomes. We first examined factors associated with whether the individual has ever been tested for the AIDS virus. Next we examined factors

associated with his or her desire to be tested for HIV, obtained from the question asked of those not previously tested, "Would you like to be tested for the AIDS virus?" We also examined these same factors' influence on the respondents' preferred approaches for notification of HIV results, obtained from the question, "How would you prefer to be informed of the test results?" with "yes/no" responses allowed for each of the following options: (1) "Directly from a counselor at the test site"; (2) "On the same day as the test"; (3) "By posting using an anonymous patient number"; (4) "With my partner present"; (5) "Directly at home by a community counselor"; and (6) "Do not want to know result". Last we examined associated influences on this final response option. In bivariate tabulations, gender differences in response levels were statistically significant for all but a few outcomes; thus, results have been reported separately by gender, except for notification approaches.

Correlates of HIV Testing

Guided by the research literature on VCT acceptability, we examined two sets of factors that motivate testing, one based on personal HIV knowledge factors and the other on risk behaviors. For the former group, we assessed the respondent's knowledge of a place to be tested, of someone who was infected with or had died from HIV/AIDS, and of five key measures by which to avoid HIV infection. Respondents were categorized as knowledgeable about avoidance behaviors if they spontaneously mentioned any of the five following behaviors: (1) using condoms; (2) having only one sexual partner; (3) limiting the number of sexual partners; (4) avoiding sex with those who have many sexual partners; and (5) avoiding commercial sex. A second set of covariates related to behavioral risk factors, including perception of one's risk of HIV/AIDS infection (none, small, moderate or great), currently being pregnant or having a pregnant female partner (yes/no), having ever being informed about having an STI (yes/no), and ever paying (if male) or being paid (if female) for sex (yes/no). We also examined risk from multiple concurrent partnerships: we asked men if they had more than one sexual partner or wife and women if their husbands/partners had more than one wife/partner or if they had another partner in addition to their husband/partner (yes/no).

We included as controls respondent's age (using 5 year age groupings for both men and women), education (no education, 1–4 years of education, or 5 or more years), household income in quartiles, marital status (married, divorced/separated, or single), and parity (0, 1–2 and 3 or more children).

DATA ANALYSES

Bivariate analyses by gender of background characteristics on the sample were conducted separately for men and women. Multivariate logistic regression models were estimated for the various outcomes with HIV-related knowledge and behavioral risk factors, controlling for individual background characteristics. The exceptions were models of preferred notification approaches where the data for male and female respondents were pooled. For ease of interpretation, we retained use of the adjusted odds ratios from the logistic regression results. In all models for notification options, other than not wanting to receive one's results, the gender variable was not statistically significant. After examining factors associated with ever being tested, the remaining results were based on the sample of HIV-aware but untested respondents (808 women and 576 men). When notification options were examined, a sub-sample of 771 men (423) and women (354), who desired to be tested and expressed willingness to be notified of results, was used. To examine covariate associations with *not* wanting to know results after testing, the sub-sample of 442 men and 489 women, or 931 in total, was used. The standard errors of the estimated regression coefficients in all estimated models have been adjusted for potential bias from clustered responses due to complex survey design. Adjustment was done for sample clustering at the Traditional Area level (strata) and at the Enumeration Area level (primary sampling unit).

Results

By design, the female respondents in this study were younger than men; however, consistent with the country's age structure, there were more men and women in the younger than older age groups (see Table I). About half of the women (48%) and slightly less than one third of the men (29%) were uneducated. More men had never been married–68% were married or had a regular partner and another 5% were divorced or separated, as compared to 77% and

Table I. Percent Distribution for Sample Characteristics: Rural Malawi Women Aged 15–34 and Men Aged 20–44 Aware of and Untested for HIV/AIDS

	Men		Women		
Characteristic	$N = 576$	%	$N = 808$	%	Chi-square
Socio-demographic					
Age					
15–19	na		191	23.6	125.08**
20–24	200	34.7	236	29.2	
25–29	143	24.8	232	28.7	
30–34	88	15.3	149	18.4	
35–39	88	15.3	na		
40–44	57	9.9	na		
Education					
No education	169	29.3	395	48.9	60.60**
1–4 yrs	174	30.2	215	26.6	
≥ 5yrs	233	40.5	198	24.5	
Income quartiles					
0–24	92	16.0	177	21.9	13.59**
25–49	139	24.1	224	27.7	
50–74	167	29.0	205	25.4	
75–100	178	30.9	202	25.0	
Marital status					
Married/regular partner	393	68.2	628	77.7	40.29**
Divorce/separated	33	5.7	74	9.2	
No regular partner	150	26.0	106	13.1	
Parity					
0	248	43.1	160	19.9	87.82**
1 or 2	175	30.4	359	44.5	
3 or more	153	26.6	287	35.6	
Knowledge					
Knows test place	503	87.3	625	77.4	22.26**
Knows no test place	73	12.7	183	22.6	
Knows someone with/died from AIDS	444	77.1	558	69.1	10.58**
Does not know someone with/died from AIDS	132	22.9	250	30.9	
Knows up to 5 means to avoid HIV infection[a]	494	85.8	568	70.3	45.18**
Does not know any of 5 means to avoid HIV Infection	82	14.2	240	29.7	
Behavioral risk					
Risk perception					
No risk	299	51.9	418	(51.7)	13.45**
Small risk	167	29.0	179	(22.2)	
Moderate/great risk	110	19.1	211	(26.1)	
Female/partner now pregnant	82	14.2	94	(11.6)	2.04
Female/partner not now pregnant	494	85.8	714	(88.4)	
Ever told had STI	67	11.6	30	(3.7)	32.32**
Never told had STI	509	88.4	778	(96.3)	
More than one current partner	93	16.2	188	(23.3)	10.59**
Only one current partner	483	83.8	620	(76.7)	
Have paid/been paid for sex	204	35.4	107	(13.2)	94.81**
Have not paid/been paid for sex	372	64.6	701	(86.8)	

[a]Five means include using condoms, having only one sexual partner, limiting the number of sexual partners, avoiding sex with those who have many sexual partners, and avoiding commercial sex.

*$p < .05$; **$p < .01$.

9.2% for women in the same categories. Concomitantly women in the sample reported more children than men: only 19% of the women compared to 43% of men reported no children.

Although untested, more men (87%) than women (77%) knew of a location for obtaining an HIV test. Similarly more than three-quarters of men (77%) knew someone with or who had died from AIDS, as compared to 69% of women. A large majority of men (85%) knew at least one of five behaviors for avoiding HIV infection, versus 70% of women. About half of men and women perceived themselves to be at no risk for getting infected with HIV. However, slightly more women than men (26% versus 19% respectively) perceived themselves to be at moderate or great risk of becoming infected. This was interesting in light of the accompanying result that more men than women had ever been told that they had an STI (11% versus 3%), that more men (35%) reported ever paying for sex than women (13%) reported being paid for sex. On the other hand, fewer men (16%) than women (23%) reported having more than one concurrent sexual partner. Slightly more men (14%) reported having a pregnant female partner; 11% of women reported themselves as pregnant. All covariate levels showed statistically significant differences by gender, with the exception of the current pregnancy status of females or female partners.

With regards to the outcomes of interest (see Table II), 11% of men and 7% of women had ever been tested for HIV. Among those never tested, most respondents reported wanting to be tested, 76% and 60% for men and women respectively. Although the findings are not shown, the vast majority of men (84%) and women (71%) preferred to be tested at a hospital as opposed to a private facility or local health center. This is likely due to the fact that only the district hospital offers HIV/AIDS testing. Asked about their preference for different approaches of test result notification, a large majority of male and female respondents who desired to be tested were willing to learn their results from a counselor at the test site and on the same day of the test (90% or more, with levels slightly higher for men than women). About three fifths of men and women (61% and 59% respectively) favored obtaining their results from an anonymous posting using a patient number. More than two thirds of men (68%) were favorable to hearing their test results in the presence of their partner but more women (74%) favored this option. About half of women (54.6%) and somewhat fewer men (44%) were willing to learn their results from a community counselor at their homes. Interestingly, although 60% of untested females desired to be tested, more than one quarter of them (27%) reported not wanting to obtain their test results, compared to only 4% of men. Again, except for anonymous posting of results, gender differences in preferred notification approaches were statistically significant.

Multivariate Analysis

Logistic models were estimated to assess the relationships between the first two outcomes of interest, (ever having been and wanting to be tested)

Table II. HIV Testing Preferences Among Sample Respondents

Outcome	Men		Women		Chi-square
N	648		868		
Ever tested	72	11.1	60	6.9	8.20**
Never tested	576	88.9	808	93.1	
Wants to be tested	442	76.4	489	60.5	39.75**
Do not want to be tested	134	23.6	319	39.5	
Among untested and who want to be tested, preferred notification means					
Receive results from counselor at test site	420	95.0	440	90.0	8.38**
Receive results on same day as test	412	93.2	438	89.6	3.87*
Receive results through anonymous posting	270	61.1	291	59.5	0.18
Receive results with partner present	302	68.3	366	74.9	4.56*
Receive results from community counselor at home	197	44.6	267	54.6	9.77**
Do not want to know results	19	4.3	135	27.6	91.38**
Willing to know results	423	95.7	354	72.4	

*$p < .05$; **$p < .01$.

Table III. Adjusted Odds Ratios from Logistic Regression of Selected Covariates on Ever and Desire to be Tested for HIV by Respondent Gender

	Ever tested				Want to be tested (and never tested)			
	Men (648)		Women (868)		Men (576)		Women (808)	
Covariate[a]	Adj OR	95% CI	Adj OR	95% CI	Adj OR	95% CI	Adj OR	95% CI
Knowledge								
Knows test place		na		na	2.69	(1.78–4.09)	1.98	(1.05,3.72)
Knows someone with/died from AIDS	1.77	(0.64–4.90)	1.95	(1.01–3.75)	2.14	(1.08–4.26)	1.08	(0.69–1.67)
Knows up to 5 means to avoid HIV infection	0.50	(0.27–0.91)	2.43	(0.98–5.98)	1.23	(0.73–2.08)	1.34	(0.87–2.06)
Behavioral risk								
HIV infection risk perception								
Small risk	0.94	(0.56–1.56)	1.17	(0.63–2.16)	1.63	(0.80–3.35)	1.57	(1.01–2.46)
Moderate/great risk	1.25	(0.55–2.86)	0.80	(0.31–2.05)	2.40	(1.00–5.78)	1.57	(0.91–2.70)
Female/partner now pregnant	1.13	(0.44–2.92)	1.75	(0.69–4.45)	0.58	(0.31–1.11)	0.87	(0.51–1.47)
Ever told had STI	1.18	(0.41–3.37)	1.56	(0.70–3.49)	0.70	(0.45–1.11)	0.72	(0.25–2.05)
More than one current partner	1.12	(0.52–2.41)	0.72	(0.31–1.70)	0.72	(0.50–1.03)	1.14	(0.92–1.40)
Have paid/been paid for sex	1.01	(0.58–1.77)	0.86	(0.37–2.02)	1.28	(0.69–2.37)	0.92	(0.51–1.65)

[a]Reference categories: Knows no place; knows no one with or who died from AIDS; knows none of 5 means for avoiding HIV infection; perceives no risk; female/partner not now pregnant; never told had STI; has only one current sexual partner; has not paid or been paid for sex. Odds ratios adjusted for respondent age, education, household income, parity and marital status, as well as other covariates shown.

for both men and women (see Table III). Odds ratios were adjusted for all covariates in the models, including background factors of respondent age, education, household income, parity and marital status. Among men, the only significant association with ever having been tested was knowledge of up to five behaviors for avoiding HIV infection, OR = 0.50, 95%CI = 0.27–0.91; better knowledge lowered the likelihood of having been tested. For women, personal knowledge of someone infected with or deceased due to HIV/AIDS raised the likelihood of having been tested, OR = 1.95, 95%CI = 1.10–3.75. None of the hypothesized behavioral risk factors were observed to be significantly associated with ever having been tested for either men or women.

Among untested men, the desire to be tested for HIV was significantly associated with both knowledge of a test location and behaviors to avoid HIV infection. Those aware of a testing location were 2.69 (95%CI = 1.78–4.09) times as likely to want to be tested as compared to men who did not know and 2.14 (95%CI = 1.08–4.26) times as likely if they knew someone with or who died from AIDS as those without such acquaintance. In addition, reporting a moderate to great risk for HIV infection also increased the likelihood of men wanting to be tested by 2.4 (95%CI = 1.00–5.78) times, while having a pregnant female partner or having more than one concurrent sexual partner significantly lowered the probability of desiring to be tested, versus those without pregnant partners or with only one sexual partner. Among women, none of the HIV knowledge factors was associated with desire to be tested; however, perceiving small infection risk increased the likelihood of wanting to be tested, by 1.57, (95%CI = 1.01–2.46).

Table IV shows the results from the multivariate regression models that assessed factors associated with different approaches for HIV test result notification. These approaches were not mutually exclusive: respondents could indicate a preference for more than one. The sample used in these models included only untested men and women who reported wanting to be tested for HIV and to know their results (423 men and 354 women). No factors were significantly associated with the preference for anonymous posting of results using patient identification numbers or learning from a home visit by a community counselor. Two HIV knowledge factors were significantly associated with learning results in the presence of one's partner: know-

Table IV. Adjusted Odds Ratios from Logistic Regressions of Selected Covariates on Preferred Means for HIV Test Result Notification among Never Tested Sample Respondents Wanting to be Tested and Willing to Know Their Results ($N = 777$, 423 Men and 354 Women)

	Counselor at test site		Same day as test		Anonymous posting		With partner present		Community counselor at home	
Covariate[a]	Adj OR	95% CI	Adj OR	95% CI	Adj OR	95% CI	Adj OR	95% CI	Adj OR	95% CI
Knowledge										
Knows test place	1.34	(0.58–3.08)	1.48	(0.56–3.90)	0.98	(0.47–2.04)	1.45	(0.80–2.62)	0.89	(0.45–1.75)
Knows someone with/died from AIDS	0.39	(0.13–1.15)	0.93	(0.42–2.05)	0.68	(0.40–1.14)	0.74	(0.52–1.06)	1.12	(0.67–1.88)
Knows up to 5 means to avoid HIV infection	1.58	(0.89–2.82)	1.56	(0.94–2.60)	0.89	(0.58–1.38)	1.58	(1.04–2.39)	0.71	(0.46–1.09)
Behavioral risk										
HIV infection risk perception										
Small risk	1.95	(0.63–6.06)	0.94	(0.55–1.62)	0.85	(0.54–1.35)	1.19	(0.72–1.97)	0.79	(0.48–1.30)
Moderate/great risk	1.36	(0.87–2.13)	0.87	(0.52–1.49)	1.07	(0.60–1.89)	1.12	(0.70–1.77)	0.78	(0.48–1.27)
Female/partner now pregnant	0.73	(0.35–1.53)	0.58	(0.23–1.47)	0.84	(0.51–1.37)	0.75	(0.44–1.27)	1.16	(0.76–1.78)
Ever told had STI	0.65	(0.16–2.64)	0.42	(0.24–0.74)	0.82	(0.35–1.89)	0.72	(0.42–1.23)	0.91	(0.51–1.63)
More than one current partner	1.28	(0.63–2.60)	1.09	(0.47–2.50)	1.32	(0.78–2.23)	1.11	(0.62–1.99)	1.21	(0.88–1.66)
Have paid/been paid for sex	1.80	(0.96–3.37)	1.38	(0.60–3.18)	1.14	(0.68–1.92)	1.18	(0.77–1.79)	1.25	(0.85–1.83)

[a]Reference categories: Knows no place; knows no one with or who died from AIDS; knows none of 5 means for avoiding HIV infection; perceives no risk; female/partner not now pregnant; never told had STI; has only one current sexual partner; has not paid or been paid for sex Odds ratios adjusted for respondent gender, age, education, household income, parity and marital status, as well as other covariates shown.

ing behaviors for preventing HIV infection, which raised the likelihood of preferring this option by 1.58 (95%CI = 1.04–2.39) times over those without knowledge. Behavioral risk factors also had limited association with the notification options. Wanting to learn HIV test results on the same day as the test was negatively and significantly associated with having ever been told about an STI, OR = 0.42, 95%CI = 0.24–0.74. Overall, the knowledge and behavioral risk factors did not differentiate the preferred options. Examination of the adjusted ORs for the individual background covariates, such as age, education, and income, also did not reveal noteworthy patterns of association.

The earlier finding of 27% of untested women, compared to 4% of untested men, who did not want to know their results compelled a further examination of possible factors of influence, particularly for women. Table V presents the results separately for the untested 489 women and 442 men who desired to be tested for HIV. This model included only three background factors from those controlled in models in Tables III and IV—age, education, and household income—to focus on their specific patterns of association. When included in the model, the excluded factors—marital status and parity—did not show any strong associations. In Table V, only two factors, both related to individual background, appeared to be significantly and negatively associated with men's desires not to learn of test results. Given the low percentage of men who reported not wanting to know their results, the absence of strong covariates is not surprising. Being more educated had a lower likelihood of not wanting results relative to being uneducated, OR = 0.36, 95%CI = 0.15–0.86.

Among women, where the prevalence of not wanting results was higher, more education was again significantly associated with a lower probability of not wanting test results, OR = 0.47, 95%CI = 0.25–0.87. Knowing someone with or who died from AIDS showed a high and statistically significant association with not wanting test results, OR = 5.26, 95%CI = 1.66–16.65, although again small numbers may have affected the reliability of this estimate. On the other hand, a woman who perceived herself at some infection risk (small to great) had a lower likelihood of not wanting test results for small risk, OR = 0.30, 95%CI = 0.17–0.55 and for moderate to great risk, OR = 0.26, 95%CI = 0.09–0.78. Women with some level of education and those who perceive themselves to be at risk of HIV infection were more likely to want to know test results, while pregnant

Table V. Adjusted Odds Ratios from Logistic Regression of Selected Covariates on Not Wanting to Know Test Results among Untested Men and Women Who Desire to be Tested

	Do not want to know results			
	Men (442)		Women (489)	
Covariate[a]	Adj OR	95% CI	Adj OR	95% CI
Background				
Age				
20–24			1.19	(0.75–1.89)
25–29	0.45	(0.90–2.22)	0.94	(0.36–2.46)
30–34	0.15	(0.02–1.38)	0.95	(0.50–1.81)
35–39	0.35	(0.10–1.28)	na	na
40–44	0.28	(0.03–2.64)	na	na
Education				
1–4 years	0.49	(0.13–1.86)	0.66	(0.31–1.42)
5 or more years	0.36	(0.15–0.86)	0.47	(0.25–0.87)
Household income quartile				
25–49	0.55	(0.08–3.70)	0.73	(0.33–1.63)
50–74	0.51	(0.20–1.29)	1.25	(0.44–3.58)
75–100	0.99	(0.26–3.79)	0.64	(0.23–1.77)
Knowledge and behavioral risk				
Knows test place	0.49	(0.83–2.89)	1.14	(0.40–3.26)
Knows someone with/died from AIDS	1.81	(0.30–10.83)	5.26	(1.66–16.65)
Knows up to 5 means to avoid HIV infection	3.96	(0.16–97.68)	1.98	(0.77–5.09)
HIV risk perception				
Small risk	0.69	(0.13–3.72)	0.30	(0.17–0.55)
Moderate/great risk	1.71	(0.36–8.18)	0.26	(0.09–0.78)
Female/partner now pregnant	0.74	(0.12–4.65)	1.51	(0.92–2.49)
Ever told had STI	0.35	(0.02–6.30)	0.37	(0.04–3.51)
More than one current partner	1.23	(0.39–3.89)	1.52	(0.74–3.14)
Have paid/been paid for sex	1.64	(0.68–3.98)	1.07	(0.40–2.85)

[a]Reference categories: Age 20–24 (men) and 15–19 (women); no education; income quartile 0–24; knows no place; knows no one with or who died from AIDS; knows none of 5 means for avoiding HIV infection; perceives no risk; female/partner not now pregnant; never told had STI; has only one current sexual partner; has not paid or been paid for sex. Odds ratios adjusted for other covariates shown.

women and those personally acquainted with HIV-infected persons were less likely to want to know their test results.

DISCUSSION

This study showed that many people in the community would like to know their HIV status, with more men wanting to be tested than women. This finding was consistent with results from other VCT acceptability studies, largely health facility-based, which have shown most participants willing to be tested. Two qualitative studies with pregnant women attending maternity clinics, and with men and women living in rural areas in Uganda, found that most study participants were willing in principle to take an HIV test (Kipp *et al.*, 2002; Pool *et al.*, 2001).

The study has also shown that, net of background covariates in the model, men with knowledge of behaviors to prevent HIV infection were half as likely to have ever been tested compared to men with no such knowledge. In contrast, women with knowledge of prevention behaviors or of someone who had AIDS or had died from AIDS were twice as likely to have ever been tested, compared to those without such familiarity. The reason for this gender difference is not apparent and difficult to establish with cross-sectional data. Women may have acquired knowledge of HIV prevention behaviors from a VCT center, while men reluctant to be tested may have sought out information from informal sources. The gender difference does suggest

there may be different informational and motivating factors influencing men's and women's decisions to be tested. For those never tested, men who knew a test place or someone affected by AIDS or who reported themselves to be at moderate to great risk of infection, were more likely as their counterparts to desire to be tested. Women who perceived themselves at risk were more likely as those who perceived no risk to want to be tested. These findings were consistent with other studies that have found perception of personal risk for HIV infection to be a major motivation for people to be tested (Maman *et al.*, 2001). VCT programs may want to develop strategies enabling individuals to assess correctly their perception of risk for contracting HIV and thereby increase the number of persons utilizing VCT services.

The majority of respondents wanting to be tested and willing to learn of test results preferred to know the same day of testing and from counselors at the test site. The availability of same-day rapid HIV test kits have made it possible for VCT programs to satisfy this desire among clients. Programs that have shifted to same-day HIV testing and result provision report greater client satisfaction and reduced fear (McKenna *et al.*, 1997). Another service provision issue currently under discussion among policy makers and program managers is couple-focused VCT services (Allen *et al.*, 2003; Painter, 2001). In support of this, our study found that two thirds of men and three quarters of women preferred to learn of their test results with their partners present. This finding encourages policy makers and program managers to develop strategies to promote good communication between couples on HIV transmission risk and prevention issues, especially through community mobilization efforts.

Despite the high acceptability of HIV tests, less than a tenth of study participants had been tested. The availability of and access to VCT services was limited to two hospitals in this district with a population of more than half a million. A higher proportion of men than women had ever been tested, and more untested men than women wanted to be tested. On the other hand, more women than men did not want to learn of their test results. Significant gender differences appeared in modeling influences on the desire for test results. A review of VCT intervention trials in developing countries reported that only about 60% of women tested for HIV actually return for their results (Coovadia, 2000). In many African countries, women lack the personal control to make decisions about seeking health services, a situation that extends to HIV testing (Maman *et al.*, 2001). Fear of male partner reaction, especially physical or verbal abuse, has been found to be a major deterrent to HIV testing and results notification among women (Maman *et al.*, 2002; Pool *et al.*, 2001).

Participation in this study was limited to women aged 15–34 years and men aged 20–44 years in the rural areas of a single district. The age limitations affect the broad generalizability of the study findings. Nevertheless, the findings carry implications for program managers, policy makers and service providers as they consider the design of VCT services for resource-constrained communities. Malawi is predominantly rural and poor. HIV transmission here and in other African countries is mostly through the heterosexual pathway, and the age eligibility criteria corresponds to the period when women and men are most sexually active and therefore most at risk of becoming infected.

The key factors under the control of VCT program managers include raising community awareness of HIV testing sites, assessing personal risk for HIV infection, and educating individuals about HIV infection prevention. Testing program managers can locate their services conveniently to increase utilization, implement appropriate community mobilization strategies to enable individuals to assess their risk for HIV infection and provide support and care and services after testing. Because men and women preferred same-day test, program managers may want to expedite adoption of this testing model. Couple-focused counseling was also an approach of choice for many study participants, especially women. However, before adopting this counseling approach on a wide scale, VCT programs should pilot test strategies, such as improving couple communication, to avoid increasing the risk of partner violence.

ACKNOWLEDGMENTS

The authors gratefully acknowledge helpful comments from two anonymous reviewers on an earlier version of this paper. The Pregnancy and STI Risk Perception and Avoidance Study received financial support from the MEASURE Evaluation Project at the University of North Carolina at Chapel Hill, under a USAID Cooperative Agreement HRN-A-00-97-00018-00. The opinions expressed are those

of the authors and do not necessarily reflect the views of MEASURE Evaluation or USAID.

REFERENCES

Allen, S., Meinzen-Derr, J., Kautzman, M., Zulu, I., Trask, S., Fideli, U., Musonda, R., Kasolo, F., Gao, F., and Haworth, A. (2003). Sexual behavior of HIV discordant couples after HIV counseling and testing. *AIDS*, *17,* 733–740.

Castle, S. (2003). Doubting the existence of AIDS: A barrier to voluntary HIV testing and counseling in urban Mali. *Health Policy and Planning*, *18,* 146–155.

Coovadia, H. M. (2000). Access to voluntary counseling and testing for HIV in developing countries. *Annals of New York Academy of Sciences*, *918,* 57–63.

Erbelding, E. J., Chung, S., and Zenilman, J. M. (2004). Following-up for HIV test results: What limits return in an STD clinic population? *International Journal of STD and AIDS*, *15,* 29–32.

Fylkesnes, K., and Siziya, S. (2004). A randomized trial on acceptability of voluntary HIV counseling and testing. *Tropical Medicine and International Health*, *9,* 566–572.

Gresenguet, G., Sehonou, J., Bassirou, B., Longo Jde, D., Malkin, J. E., Brogan, T., and Belec, L. (2002). Voluntary HIV counseling and testing: Experiences among the sexually active population in Bangui, Central African Republic. *Journal of Acquired Immune Deficiency Syndrome*, *31,* 106–114.

Hollander, D. (2001). Personalized HIV counseling and testing show promise in reducing risk behaviors. *International Family Planning Perspectives*, *27,* 49–50.

Kalichman, S. C., and Simbayi, L. C. (2003). HIV testing attitudes, AIDS stigma and voluntary HIV counseling and testing in a black township in Cape Town, South Africa. *Sexually Transmitted Infections*, *79,* 442–447.

Kawichai, S., Beyrer, C., Khamboonruang, C., Celentano, D. D., Natpratan, C., Rungruengthanakit, K., and Nelson, K. E. (2004). HIV incidence and risk behaviors after voluntary counseling and testing (VCT) among adults aged 19–35 years living in peri-urban communities around Chiang Mai city in northern Thailand, 1999. *AIDS Care*, *16,* 21–35.

Kipp, W., Kabagambe, G., and Konde-Lule, J. (2002). HIV counseling and testing in rural Uganda: Communities' attitudes and perceptions towards an HIV counseling and testing programme. *AIDS Care*, *14,* 699–706.

Malawi National AIDS Control Programme. (1999). *Malawi National HIV/AIDS Strategic Framework 2000-2004*. Lilongwe, Malawi: Ministry of Health and Population.

Maman, S., Mbwambo, J. K., Hogan, N. M., Kilonzo, G. P., Campbell, J. C., Weiss, E., and Sweat, M. D. (2002). HIV-positive women report more lifetime partner violence: Findings from a voluntary counseling and testing clinic in Dar es Salaam, Tanzania. *American Journal of Public Health*, *92,* 1331–1337.

Maman, S., Mbwambo, J., Hogan, N. M., Kilonzo, G. P., and Sweat, M. (2001). Women's barriers to HIV-1 testing and disclosure: challenges for HIV-1 voluntary counseling and testing. *AIDS Care*, *13,* 595–603.

McIntyre, J., and Gray, G. (2002). What can we do to reduce mother to child transmission of HIV? *British Medical Journal*, *324,* 218–221.

McKenna, S. L., Muyinda, G. K., Roth, D., Mwali, M., Ng'andu, N., Myrick, A., Luo, C., Priddy, F. H., Hall, V. M., von Lieven, A. A., Sabatino, J. R., Mark, K., and Allen, S. A. (1997). Rapid HIV testing and counseling for voluntary testing centers. *AIDS*, *11*(Suppl), S103–S110.

Mbwambo, J., Hogan, N. M., Kilonzo, G. P., and Sweat, M. (2001). Women's barriers to HIV-1 testing and disclosure: Challenges for HIV-1 voluntary counseling and testing. *AIDS Care*, *13,* 595–603.

Painter, T. M. (2001). Voluntary counseling and testing for couples: A high-leverage intervention for HIV/AIDS prevention in sub-Saharan Africa. *Social Science and Medicine*, *53,* 1397–1411.

Pool, R., Nyanzi, S., and Whitworth, J. A. (2001). Attitudes to voluntary counseling and testing for HIV among pregnant women in rural southwest Uganda. *AIDS Care*, *13,* 605–615.

Sangiwa, M. G., van der Straten, A., Grinstead, O. A. (2000). Clients' perspective of the role of voluntary counseling and testing in HIV/AIDS prevention and care in Dar es Salaam, Tanzania: The Voluntary Counseling and Testing Efficacy Study. *AIDS and Behavior*, *4,* 35–48.

Sweat, M., Gregorich, S., Sangiwa, G., Furlonge, C., Balmer, D., Kamenga, C., Grinstead, O., and Coates, T. (2000). Cost-effectiveness of voluntary HIV-1 counseling and testing in reducing sexual transmission of HIV in Kenya and Tanzana. *The Lancet*, *356,* 113–121.

Tharawan, K., Manopaiboon, C., Ellertson, C. E., Limpakarnjanarat, K., Kilmarx, P. H., Coggins, C., Chaikummao, S., Mastro, T. D., and Elias, C. J. (2003). Knowledge and perceptions of HIV among peripartum women and among men whose wives are of reproductive age, northern Thailand. *Contraception*, *68,* 47–53.

The Voluntary HIV-1 Counseling and Testing Efficacy Study Group. (2000). Efficacy of voluntary HIV-1 counseling and testing in individuals and couples in Kenya, Tanzania and Trinidad: A randomized trial. *The Lancet*, *356,* 103–112.

UNAIDS. (2002). *AIDS Epidemic Update*. Geneva: UNAIDS/WHO.

United Nations. (2002) *HIV/AIDS Awareness and Behavior*. ST/ESA/SER.A/209. New York: Population Division, Department of Economic and Social Affairs, United Nations.

Van de Perre, P. (2000). HIV voluntary counseling and testing in community health services. *The Lancet*, *356,* 86–87.