Desire for HIV testing and counseling in Kenya: the individual-level HIV factors

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Abstract

The global demand for HIV testing and counseling (HTC) is growing dramatically due to the intensified international effort to scale up antiretroviral treatment. In Kenya, an unprecedented expansion of HTC programs is ongoing. What is the magnitude of desire for HTC and what factors influence this desire are questions that need to be answered immediately. To do so, we analyzed 2003 Kenya Demographic and Health Survey, hereafter referred to as KDHS, using descriptive and analytical methods considering the complex survey design. 67% and 70% women and men expressed desire for HTC, respectively. The desire among HIV infected individuals were even higher (80%). After controlling for the individual level socio-demographics, a number of HIV factors were found to be associated with desire for HTC among individual women and men, including HIV anxiety, knowledge and stigma. In addition, women's history or symptoms of STI and self-perceived risk of HIV, as well as men's knowledge of a testing site were also significant variables. These findings could serve as evidence for prioritizing resources to scale up HTC in Kenya. Gender-specific interventions are called for as an essential component of HTC programs.

Key words: Desire for HIV testing and counseling, Kenya, individual-level factors

Introduction

HIV testing and counseling (HTC) has been shown to be an effective and cost-effective intervention for HIV prevention, treatment and care. Its significance is further aggravated by the increasing availability of HIV treatment regimes globally. Scaling up of HTC programs has become one of the essential steps to tackle HIV/AIDS at the current stage of the epidemic. To increase access to HTC, WHO recommended "setting priorities among efforts in terms of populations served and the objectives to be reached" [1]. Population with stronger desire for HTC would be a reasonable priority target to be reached and served by HTC programs. To further examine how to prioritize scarce resources in scaling up HTC, we conducted this study on desire for HTC in Kenya, where HTC is being extensively scaled up [2]. The aims of this study are: 1) to estimate the level of desire for HTC among individual women and men in the general and HIV infected populations; and 2) to examine the association between desire for HTC and HIV related individual factors in Kenya.

HIV Testing and Counseling

HIV Testing and Counseling (HTC) is the primary strategy to control the generalized epidemic. It serves as the entry point for HIV prevention, treatment and care. Knowledge of one's status is crucial for individuals to receive HIV related health care. In general, HTC is conducted in three steps: pre-counseling, testing and post-counseling. In pre-counseling sessions, the testing process, implications of testing, risk assessment and prevention, and coping strategies are delivered to clients. Then clients make decisions on whether to take the test or not. If they opt to receive the test, the testing results are to be delivered in the post-counseling sessions, together with information on risk-reduction plans and discussion on possible disclosure of their HIV status. Moreover, for sero-positive individuals, referral for treatment, care and support will be provided [3]. During this process, knowledge and information provided will be beneficial to help HIV-free individuals stay negative. For those infected, knowing their status is the route to access care and treatment, and to learn means to prevent transmission to others.

HTC includes mainly two complementary components: client-initiated testing and provider-initiated testing. The former component refers to the well-known voluntary counseling and testing (VCT), while the latter further includes testing in prevention of mother-to-child

transmission and testing in other health care settings[1]. VCT is the primary HTC component which evolved originally from the US[4]. It allows individuals to voluntarily pursue HTC confidentially. Recently, with the rising availability of antiretroviral treatment, provider-initiated testing is increasingly demanded and practiced in health facilities[5, 6].

VCT has been shown to be an effective and cost-effective strategy to change risk behaviors in developing countries [7-11]. Allen and colleagues found significant increase in condom use among childbearing women and decreased seroconversion rate of their partners who utilized VCT in Rwanda [11]. In a randomized controlled trial implemented in Kenya, Tanzania and Trinidad, VCT was effective to reduce HIV risk behavior in both individuals and couples [9]. Proportion of individuals having unprotected sex with non-primary partners declined significantly more for the VCT group than the health information only group. VCT couples reduced significantly more unprotected sex with their enrollment partners than the reference group. VCT was also found to be cost-effective in preventing HIV infection [8]. When VCT services are targeted toward couples or HIV infected population, the cost-effectiveness improved even more. It competes favorably with cost-effective HIV and other public health interventions.

Scaling up HIV testing and counseling as an response to the expansion of antiretroviral treatment program

The demand for HTC is growing dramatically due to the intensified international effort to scale up antiretroviral treatment (ART). In 2003, WHO and UNAIDS initiated the "3 by 5" program, i.e., treating 3 million people living in poor countries with ART by the end of 2005 [12]. In the same year, US government embarked the President's Emergency Plan for AIDS Relief (PEPFAR), claiming to treat 2 million with ART in the "most afflicted countries in Africa and the Caribbean" [13]. Meanwhile, the establishment of Global Fund for HIV/AIDS, Tuberculosis and Malaria helps devote much needed resource to treat AIDS (Global Fund: http://www.theglobalfund.org/en/). Most recently, the Group of Eight major industrial countries (G8) also pledged to contribute to the universal access to prevention, care and treatment of HIV/AIDS by 2010[14].

Prior to any ART, knowledge of one's HIV status is a necessity. Because of limited HIV testing, most asymptomatic positive individuals in sub-Saharan Africa don't know their status, and are hence not motivated to seek help. For those who attend ART clinics, they show up at a late stage of AIDS, when the treatment is not as effective. To achieve the greatest benefit from available ART, scaling up HTC programs is imperative [15, 16], and a greater expansion of HTC programs in Africa is urgently called for[14]. Universally HTC has also been increasingly promoted recently in several settings[2, 5, 14, 17].

Desire for HTC

$1.8 billion dollars were needed to cover the annual cost of HTC in 2005 globally [1]. Given the extremely high cost, WHO recommended being strategic to implement HTC programs, especially "setting priorities among efforts in terms of populations served and the objectives to be reached[1]". Setting program priority among population with desire for HTC would be a theoretically reasonable approach. The theory of reasoned action states that a person's intentions are the best guide to his or her behavior. The intentions are further determined by his/her attitude towards the behavior and the subjective norm [18]. In order to study the behavior of HTC uptake, it is therefore necessary to study the intention of pursuing HTC, or desire for HTC. Understanding the level of desire for HTC provides the basis for future planning of such services. Furthermore, with knowledge of distribution of desire for HTC, efforts could be devoted to populations in great need of such services; and with information on determinants of desire for HTC, strategies could be further developed and applied to influence the determinants of HTC, and to consequently promote HTC.

A number of studies examined factors associated with desire for HTC and behavior of seeking HTC in various settings. Three population based surveys, conducted in Uganda, Tanzania, and Malawi, have been analyzed on desire for HTC [19-21]. In Uganda, knowledge of HIV, spousal communication on HIV, and younger age were associated with increased likelihood of willing to be tested among men[19]. In Tanzania, more than 60% of women and men were found to have desire for HTC [20]. Age, education, residence, religion, knowledge of some who died of AIDS, and knowledge of HIV were found to be significant factors associated with desire. The Malawi study documented that age, urban residence and wish to keep the testing result confidential were

factors positively associated with willingness to take premarital HTC [21]. However, knowledge of an infected person, place to get tested, other sexually transmitted infections, and belief that abstinence prevents HIV were negative factors.

A few studies have been conducted in communities to examine desire for HTC. Fylkesnes and collaborators studied the readiness for HTC in Zambia [17]. 37% of the survey participants initially expressed willingness for HTC. Self-perceived risk and high-risk behavior were positively associated with readiness for HTC. In a follow-up study, the readiness for VCT was 49% among 20-24 age group and 23% among older age group [22]. Age was found negatively associated with readiness. Self-perceived risk, on the other hand, was observed to be positive associated with desire among youths. Another study conducted by Denison [23] among Zambian youth found that future self-perceived risk, ever having had sex and having discussed HIV testing with friends and families were all positive associated with desire for HTC. Literature on factors associated with the actual uptake of HTC also accumulates. HIV knowledge, self-perceived risk, younger age, low education and income were the significant factors [24, 25]. Stigma has been identified to be a strong barrier against people receiving HIV tests in the US [26].

Despite of the increasing evidence on level and determinants of desire for HTC, many gaps are to be bridged in this area. For example, some of the previous studies were based on community surveys, which have limited generalizability [17, 23]. For those using nationally representative surveys, the design of these surveys were rarely considered [20]. A handful of studies only included certain population, e.g. youth [23] or men [19]. To our knowledge, similar studies are not yet available in Kenya. This paper seeks fill some of the gaps by studying the level of desire for HTC in Kenya and HIV related factors associated with it among women and men using nationally representative survey KDHS 2003 while considering the complex survey design.

Scaling up HTC in Kenya

Kenya is undergoing an unprecedented expansion of HTC services nation wide [2]. In 2001, Kenya Ministry of Health published VCT guidelines [27], claiming that "(t)he government of Kenya is fully committed to encouraging the provision of VCT services throughout Kenya, so that all Kenyans who wish to know their HIV serostatus have access to these services". As one of the 15

focus PEPFAR recipient countries, Kenya is also provided with the support to implement programs "that encourage testing and knowledge of HIV status in a broad range of both clinical and non-clinical settings" [28].

"Diagnosis: know your status" has become the fourth prong of HIV prevention strategy in Kenya, complementing the "ABC" approaches [29]. VCT services have increased dramatically during the past 5 years. 400,000 individuals utilized VCT in 2004, compared to only 1,000 individuals in 2000. The number of VCT sites jumped from 3 in 2000 to 555 by the middle of 2005 (Figure 1). Mass media campaign has been conducted to reduce fears and discriminations against HTC between 2002 and 2005 [2]. In the meantime, HIV care and treatment are being scaled up. More than 36,000 people are currently on ART, and more on the waiting list. To meet the need of ART scaling up, HTC is being expanded in the medical facilities, in addition to VCT. In late 2004, the guideline for HIV testing in clinical settings were published [28], which demonstrated Kenyan government's attention on provider initiated HTC services.

[Figure 1 about here]

However, according to the KDHS 1998 and 2003, people who reported being tested didn't increase between the 5-year period, staying around 15%. Scaling up HTC is hence an urgent yet challenging issue. Considering the fact that people who desire to be tested are a reasonable target population of HTC programs, understanding their level of desire for HTC and their characteristics helps to pinpoint the populations with high acceptance of HTC and to tailor HTC programs meeting specific needs of their clients.

Conceptual framework, aims and hypotheses

The conceptual framework of this paper is influenced by a set of behavioral theories, including the Health Belief Model [30], the Theory of Reasoned Action [31] and previously reviewed literature.

In the Health Belief Model (HBM), the likelihood for someone to adopt a preventive behavior is mainly affected by two factors: the perceived risk of a disease, and the benefits of adopting the behavior outweigh the costs of doing so [30, 31]. Applied to HIV/AIDS, self-perceived risk of HIV

infection and knowledge of someone who died of AIDS can be used to measure perceived risk, which were included in our conceptual framework. In addition, two constructs have been added to the HBM later in its development – cues to action and self-efficacy [32]. The former concept refers to the external influence on adoption of the behavior, whereas the latter one indicates individuals' belief of their ability to adopt the behavior successfully. Ideally, the availability of antiretroviral treatment (ART) would be a good indicator of cues to action for adoption of HTC. However, this variable is not readily available in our dataset.

The Theory of Reasoned Action further states that a person's intentions are the best guide to behavior. The intentions are further determined by his/her attitude towards the behavior and the subjective norm [18]. In this study, we consider people's intention or desire to take HTC as the outcome. The dataset we use do not have data on individuals' attitude toward HTC. However, the subjective norm can be surrogated by stigma toward people living with HIV/AIDS (PLWHA).

In addition, there are some established socio-demographic covariates that may confound the association between HIV related factors and individuals' desire for HTC. In this paper, the individual level HIV related factors were studied, adjusting for these socio-demographic variables, in relationship to desire for HTC. Two aims and two hypotheses were specifically examined.

[Figure 2 about here]

Aim 1: To estimate the level of desire for HTC among individual women and men in the general and HIV infected populations.

Aim 2: To examine the association between desire for HTC and HIV related individual factors.
H1: HIV risk behaviors are positively associated with individual's desire for HTC.

H1-1: Individuals with history or symptoms of STIs are more likely to desire HTC.

H1-2: Individuals' number of partners in the past year is positively associated with their desire for HTC.

H1-3: Individuals who used alcohol in the last month are more likely to desire HTC.

H1-4: Uncircumcised men are more likely to desire HTC.

H2: HIV knowledge and attitude are associated with couple's desire for HTC.

H2-1: Individuals' knowledge for an HIV testing site is positively associated with their desire HTC.

H2-2: Individuals' self-perceived risk of HIV infection is positively associated with their desire HTC.

H2-3: Individuals having HIV anxiety are more likely to desire HTC

H2-4: Individuals' HIV knowledge is positively associated with their desire HTC.

H2-5: Individuals' stigma toward HIV is negatively associated with their desire for HTC.

Dataset and analytical sample

KDHS 2003 was analyzed for this study. It is the first DHS to anonymously link individuals' HIV status with their social, demographic and behavioral factors. The survey includes complete interviews from 8,195 women and 3,578 men. It has a complex survey design with two-stage cluster sampling. The country was first stratified into urban and rural areas, where urban areas were over-sampled. 400 clusters were then selected from the master frame of enumeration areas [33].

Since HIV is primarily transmitted through heterosexual relationship in sub-Saharan Africa, we limited our analytical sample to sexually experienced individuals who had ever heard of AIDS, a total of 6679 women and 2988 men. The question on desire for HTC was only asked among participants who had not been tested before the survey, we hence further excluded those who were tested previously.

Limited missingness presented in the dataset. For most of the variables with missing values, missingness contributed to less than 1% of the sample, we hence simply dropped the missing cases[a]. For age at first sex, where there were 11 cases missing for men and women, respectively,

[a] 3 missing cases were dropped for alcohol use in the last month. 10 and 34 "don't know or missing" cases were dropped for STI history or symptoms for men and women, respectively. 3 and 15 missing cases were dropped for number of partners in the past year for men and women, respectively. 3 missing cases were dropped for male circumcision. 2 and 1 missing cases were dropped for knowledge of a place for HIV testing for men and women,

we replaced the missing values with the medians of all numeric values (16 years for men and 17 years for women). After cleaning the dataset, 5451 women and 2408 men formed the final analytical sample.

Study variables

The definition of each variable is presented in Table 1. Variable inclusion was based on the conceptual framework. The dependent variable is desire for HTC among sexually experienced individuals who had heard of AIDS but never tested. The independent variables fall into two broad categories: socio-demographics and HIV related individual covariates.

[Table 1 about here]

Desire for HIV testing and counseling

Desire for HTC was operationalized based on answers to the question – "(w)ould you want to be tested for the AIDS virus?" – yes, no, unsure, don't know, or missing. The answers other than "yes" were combined to generate a minimum estimate of desire for HTC. The wantedness of HTC has been referred to as "desire for test" [20], "readiness for HIV related VCT" [17], or "willingness to be tested" [19, 21] in the literature. We chose to use "desire for HTC" to emphasize the strong needs of HTC among individuals.

Socio-demographic covariates

Social variables include education, wealth, residence, province and religion. Most of the social variables were according to the KDHS 2003. For religion, the categories of "no religion", "other religion" or "missing" were collapsed.

Demographic variables included age, age at first sex, union status, parity, whether currently pregnant (for women), and history of child death. Except those who reported having sex at their first union, the rest population was dichotomized by the median age at first sex, which was 16 and 17 years old for women and men respectively. Considering that 10% and 16% of currently

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respectively. 16 cases were dropped for women's perceived risk of HIV infection. 23 missing cases were dropped for women who knew someone died of AIDS. And 1 missing case was dropped for women on whether she had been tested for HIV.

married men and women were in polygynous unions in Kenya [33], union status instead of marital status was used to measure respondents' intimate relationships, which included: (1) had sex but never in union, (2) in union but don't know whether monogamous (for women only), (3) monogamous union, (4) polygynous union, (5) widowed, and (6) divorced or separated.

HIV related covariates

Two sets of HIV-related individual level variables were included in the analysis. The first set was HIV risk factors, including history or symptoms of sexually transmitted infections (STIs), number of partners in the past year, alcohol use in the past month, and male circumcision. The other set of HIV related variables was HIV knowledge and attitude. Specifically, it included knowledge of a place to get test, self-perceived risk of HIV infection, HIV anxiety, HIV knowledge and stigma toward PLWHA.

Knowledge of a testing site was a binary variable. Self-perceived risk of HIV infection was constructed based on the answers to the question "(d)o you think your chance of getting AIDS is not at all, small, moderate, great or has AIDS?" Only few individuals thought they had AIDS, so this category was combined with those perceived at "great" risk. HIV anxiety was measured by whether individuals knew someone who had died of AIDS.

To measure HIV knowledge, principle component analysis (PCA) was applied to abstract information from 6 binary variables constructed based on the answers to the following 6 questions: (1) "Can people reduce their chances of getting the AIDS virus by having just one sex partner who has no other partners?" (2) "Can people get the AIDS virus from mosquito or other insect bites?" (3) "Can people reduce their chances of getting the AIDS virus by using a condom every time they have sex?" (4) "Can people get the AIDS virus by sharing utensils with a person who has AIDS?" (5) "Can people reduce their chances of getting the AIDS virus by not having sex at all?" (6) "Is it possible for a healthy-looking person to have the AIDS virus?"

PCA is a statistical technique to reduce number of variables while maintaining most relevant information. It is based on a weighted linear combination of the variables with the greatest variance [34]. In STATA, when correlation matrix (the default) is used, variables are scaled to have

equal standard deviation (also called "standardization", with mean 0 and variance 1) before further calculation is undertaken. The estimate of principle component is the weighted sum of the standardized contributing variables, with the weight being the factor loading. As a result, for binary variables, the estimate of principle component is possible to be less than 0.

There are usually two ways to treat the estimates of principle component. First, categorize the estimates, such as in the case of wealth index, where estimates of principle component are grouped based on quintiles [35]. Second, treat the estimates as continuous variables. Since categorizing variables needs subjective cutoff points, which were not obvious in our case of HIV knowledge, we decided to treat principle components of HIV knowledge as continuous, where higher value means more knowledge. Though this decision made the interpretation of the regression coefficients less straightforward, it avoided unnecessary arbitrariness in the analysis.

HIV knowledge score was constructed using PCA for women and men separately. Results were shown in Table 2. For women, the first component had an eigenvalue of 3.2, explaining about 53% of the variance of the 6 binary variables. The second component had an eigenvalue of less than 1. The resulting score has mean 0 with standard deviation of 1.8, and ranges from -4.1 to 1.5. For men, the resulting score has mean 0 with standard deviation of 1.7, and ranges from -5.8 to 1.1.

Stigma toward PLWHA was also operationalized using PCA based on the following five questions: (1) "Would you buy fresh vegetables from a vendor who has the AIDS virus?" (2) "If a member of your family got infected with the virus that causes AIDS, would you want it to remain a secret or not?" (3) "If a relative of yours became sick with the virus that causes AIDS, would you be wiling to care for her or him in your own household?" (4) "If a female teacher has the AIDS virus, should she be allowed to continue teaching in school?" (5) "Should children aged 12-14 be taught about using a condom to avoid AIDS?"

Table 3 presented the PCA results for the stigma score. The eigenvalue of the first component for women is 1.81, explaining 36% of the variance of the 5 binary variables. The second component is only a little more than 1. We decided to keep only one principle component to simplify the

analysis. The stigma score for women ranged from -1.5 to 2.7, with mean of 0 and standard deviation of 1.3. For men, the stigma score ranged from -1.4 to 3.7, with the same mean and standard deviation as women. Similar to the knowledge score, lower value of the stigma score means less stigma.

[Table 2 and 3 about here]

Analytical methods

KDHS 2003 had a complex survey design with a two-stage clustering sampling. It is critical to consider the complex design when analyzing such a survey to either generate population estimates or draw inferences. Since urban areas were over-sampled in the KDHS 2003, weighting needs to be considered to generate accurate point estimates and standard errors (SEs) accounting for the different probability of being sampled between urban and rural clusters. Stratification also needs to be considered in this case since it may contribute to smaller SEs compared to the simple random sampling (SRS) as a result of homogeneity within strata. Lastly, due to the cluster sampling, SEs of the resulting estimator is usually greater than that obtained from SRS. Therefore, clustering has to be treated properly to draw correct inferences. In sum, it is essential to take into consideration the three aspects, sample weighting, stratification and clustering, when analyzing a survey like KDHS 2003 with complex design. Specifically, the estimator $\hat{Y}$ for the population parameter Y is

$$\hat{Y} = \sum_{h=1}^{H} \sum_{i=1}^{n_h} \sum_{j=1}^{m_{hi}} w_{hij} y_{hij}$$

where $h = 1,...,H$ represent the strata, $i = 1,...,n_h$ enumerate the clusters in the h^{th} stratum, and $j = 1,...,m_{hi}$ are the elements in the i^{th} cluster in the h^{th} stratum. y_{hij} is the sample statistic in the j^{th} element in the i^{th} cluster and h^{th} stratum and w_{hij} is the corresponding weight [36].

We applied the series of survey command using Stata 8 [36] with the prefix of "svy-", which could simultaneously taking account of all the three aspects of complex survey design. Specifically, descriptive analyses for survey data ("svyprop" or "svymean") were performed to examine the general characteristics of the sample. Two-way tabulation using "svytab" were applied for the

binary analysis between desire for HTC and each independent variable. To examine the significance of the bivariate association, the Pearson chi-square statistic was corrected using the second-order correction of Rao and Scott [37] to take account of the survey design, and it was converted to an F statistic [36]. For the continuous independent variables, means of the variables by desire were first obtained. Then adjusted Wald-tests were carried out to test for the significance of the association. The adjusted Wald test is specified by

$$W = (Rb - r)'(RVR)^{-1}(Rb - r)$$

where W is the Wald test statistic, b is the estimated coefficient vector, V is the variance-covariance matrix, $Rb = r$ is the set of linear hypotheses to be tested. When using the "svy-" command, the adjustment uses an approximate F statistic, $(d - k + 1)W/(kd)$, where k is the dimension of the hypothesis test, d is the total number of sampled clusters minus the total number of strata. Under the null hypothesis, $(d - k + 1)W/(kd) \sim F(k, d - k + 1)$, where $F(k, d - k + 1)$ is an F distribution with k numerator degrees of freedom and $d - k + 1$ denominator degrees of freedom[36].

Multivariate logistic regressions ("svylogit") were performed to examine the independent association between the individual level HIV related covariates and desire for HTC, after controlling for socio-demographics. Specifically,

$$Logit[\Pr(Y_{\text{desire\_HTC}} = 1)] = \beta_0 + \beta_1 \mathrm{X}_1 + \beta_2 \mathrm{X}_2$$

Where $Y_{\text{desire\_HTC}}$ is the binary outcome of having desire for HTC ($Y_{\text{desire\_HTC}} = 1$) or otherwise ($Y_{\text{desire\_HTC}} = 0$). X_1 and X_2 denoted the vector of socio-demographic variables and individual-level HIV related covariates. β_0, β_1, and β_2 were the corresponding vector of regression coefficients.

The SE and hence the 95% confidence interval for each coefficient were calculated based on the Taylor linearization method. Taylor expansion was used to reduce the nonlinear quantity to an approximate linear format so that an estimator of the corresponding variance can be constructed. Specifically, for an estimate $R = Y/X$, where Y and X are the population parameters. Using the delta method based on Taylor expansion, we can get the variance of the estimator for *R*,

$$\hat{V}(\hat{R}) = \sum_{h=1}^{H}(1-f_h)\frac{n_h}{n_h-1}\sum_{i=1}^{n_h}(z_{yhi}-\bar{z}_{yh})^2$$

where $1-f_h$ is the finite population correction, equaling 1 minus the sampling fraction, i.e. the number of sampled clusters over the total number of clusters in strata *h*. f_h is so small that it is often ignored. In addition, $z_{yhi}=\sum_{j=1}^{m_{hi}} w_{hij}y_{hij}$, and $\bar{z}_{yh}=\frac{1}{n_h}\sum_{i=1}^{n_h} z_{yhi}$ [36]. If population proportion is to be estimated, y_{hij} is just a binary variable and x_{hij} is the total number of cases in the j^{th} element in the i^{th} cluster and h^{th} stratum item.

To test a hypothesis, the adjusted Wald test as described above was conducted. All the analyses were done for women and men separately. Odds ratio (OR), 95% confidence interval (95% CI), and p-values were reported from the logistic regression results. All the reported population sizes (N) were estimated considering the complex survey design. As a result, they were not consistent with the analytical sample size presented in the previous section.

Results

Sample characteristics

Owing to not asking the question on desire for HTC among individuals who had been tested, our analyses could only be conducted among those who had never been tested before KDHS 2003. To understand the difference between individuals who had been tested and those who had not, a descriptive comparison of characteristics between the two groups were first conducted. As shown in table 4, individuals who had been tested were different from those who hadn't in many ways. Almost all the socio-demographic characteristics were significantly different between the two groups among women and men, demonstrating dramatic difference in their socio-economic status. HIV related covariates, on the other hand, had mixed relationship with whether had been tested previously. All the HIV risk factors distributed similarly between those had been tested those hadn't. However, all the HIV knowledge and attitude, except self-perceived risk, were significantly different between the two groups.

Table 4 also presented the characteristics of our analytical sample – those who had ever heard of AIDS, had sex but hadn't been tested before KDHS 2003. Majority of the sample had primary or

higher education, resided in rural areas. More individuals were from the Rift Valley Province than any other places. Almost 90% were either Catholics or Christians. Over half were between 15 and 29 years old and were in monogamous unions, though more than one-third of men had sex but were never married. On average, people had 3 living children, though women reported having more than men. One out of four women experienced child deaths, whereas fewer men had such experience. About 3% and 5% of men and women respectively reported having history or symptoms of STIs. 14% of men had more than 1 sexual partner in the past year, compared to only 2% reported by women. Similarly, one-third of men drunk alcohol in the past month compared to 6% of women. Only a small proportion (14%) of men were not circumcised in this population. Women had less HIV knowledge yet less stigma than men. Most of the study population perceived themselves at either no or small risk of HIV infection. About three quarters knew someone who had died of AIDS. In addition to the results presented in table 4, we also found that 60% of women and almost 70% of men knew a place to get HIV tests. Among the studied population, 67% and 70% of women and men wanted to be tested for HIV, respectively. The desire was even higher (80%) among HIV infected individuals.

[Table 4 about here]

Bivariate analysis results

The results of bivariate analysis between desire for HTC and categorical covariates were presented in Table 5. All the categorical covariates were associated with desire for HTC in at least one sex, based on the marginally significant criterion ($p<0.1$), except for three variables: history of child death, drinking alcohol in the last month and male circumcision. These variables were hence excluded from the multivariate analyses. As a result, hypotheses 1-3 and 1-4 were rejected. For the three continuous variables – parity, HIV knowledge and stigma – significant differences were observed between those who desired HTC and those who didn't. Specifically, women who desired HTC had on average 3.3 living children, compared to 3.8 of women who didn't desire HTC ($P<0.001$). For men, those desired had 2.6 living children vs. 3.1 of those didn't ($p<0.01$). Women and men who desired HTC had significantly more knowledge and less stigma than those who didn't ($p<0.001$) (not shown).

[Table 5 about here]

Multivariate analysis results

After controlling for the socio-demographics, each of the HIV related covariates was first included in the multivariate logistic regressions individually, then all of them were included in the model together. The results didn't differ meaningfully between the individual inclusion and all inclusion, hence only the results of the one-time inclusion were presented here (Table 6).

Women, but not men, with history or symptoms of STIs were 1.58 times more likely to desire HTC (95% CI: [1.11, 2.23]). Therefore, hypothesis 1-1 was only supported among women. Number of partners in the past year was not significantly associated with desire for HTC for both women and men, so hypothesis 1-2 was rejected. Women were equally likely to desire HTC whether they knew a place for HIV testing or not. But men who knew a testing place were 31% less likely to desire HTC (p=0.001). Hence H2-1 was rejected both among women and men. Compared to women who perceived no risk of being infected, those at moderate or great risk were 1.35 (95% CI: [1.09, 1.68]) and 1.62 (95% CI: [1.22, 2.14]) times more likely to desire HTC, respectively. Though a similar positive relationship was observed among men, it wasn't significant. So hypothesis 2-2 was partially supported among women. Men with HIV anxiety were 30% more likely to desire HTC (p=0.039), whereas similar women were 15% more likely to do so (p=0.082), both of which supported hypothesis 2-3. Increased HIV knowledge score was strongly associated with desire for HTC among both women and men (OR: 1.10, 95% CI: [1.05, 1.15] for women; and OR: 1.14, 95% CI: [1.05, 1.24] for men). Lastly, more stigma were associated with weaker desire for HTC, which was highly significant among men (OR: 0.85, 95% CI: [0.78, 0.92]), and marginally significant among women (OR: 0.94, 95% CI: [0.88, 1.01]). Therefore, hypotheses 2-4 and 2-5 were strongly supported by KDHS 2003.

In addition to the hypothesized relationship between HIV related covariates and desire for HTC, other interesting associations were observed from the multiple regressions. Women with either higher education or higher wealth status were significantly less likely to desire HTC. Considering that individuals with higher socio-economic status were more likely to have been tested, this was probably a selection effect. Women and men from Central, Coast and Rift Valley Provinces were less likely to desire HTC than those residing in Nairobi. In addition, men from Eastern Province and women from North Eastern Province were also less likely to do so. Compared to Roman Catholics, Muslim women, and individuals without religion were less likely to desire HTC. Compared to

women aged 15 to 19, those 25 or older had significantly weaker desire for HTC. Relative to people in monogamous union, those sexually experienced singles were significantly more likely to desire HTC (OR: 1.36 for women, and OR: 2.34 for men). Compared to women who first had sex at an age earlier than the median, those had sex at first union were significantly less likely to desire HTC.

[Table 6 about here]

Discussion

Our analyses quantified women and men's desire for HIV testing and counseling in Kenya, and elucidated their association with HIV related factors after controlling for socio-demographic covariates, using a nationally representative sample. The outstanding results are, first, despite of strong efforts to scale up HTC programs [4, 5], only a small group had been tested by 2003 in Kenya. The desire for HTC stayed high, and that among infected individuals was even higher. Second, a series of HIV related factors were shown to be associated with desire for HTC, including HIV anxiety, knowledge and stigma among women and men, as well as women' STI history and self-perceived risk of HIV, and men's knowledge of a testing site. In addition, several socio-demographic variables were also found to be significant factors, such as province, religion, and union status. The results depicted a general picture of factors associated with desire for HTC in Kenya, which was absent from the previous literature.

The level of desire for HTC observed in this study is consistent with findings from other sub-Saharan African countries, e.g. 65% among Ugandan men [19] and 62% among Tanzanians [20]. However, the level is lower than that observed in the developed countries [38], but higher than those from community-based studies in Africa [17, 22]. Our estimates of desire for HTC are likely to be conservative ones since the question used to measure desire was only asked among individuals who were not tested before the survey. It has been shown that those tested before were more likely to be ready for VCT in the future [22], and women who were tested negatively were likely to have high rates of sero-conversion[39]. Therefore, previous testers who were seronegative are likely to have desire, probably even strong desire, for future testing. Therefore, we suggest that the question – "(w)ould you want to be tested for the AIDS virus?" – should be asked among all respondents in the future DHS.

Given our results of higher desire among women with STI history or symptoms and a demonstrated high acceptance of HIV testing in STI clinics [40], HTC programs targeting STI patients, especially women, are likely to reach individuals with high acceptance. STI clinics serve as a good place to motivate and recruit VCT clients. VCT programs designed to reach high risk populations have been shown to be highly cost-effective [8]. Since STI is an established risk factor for HIV infection, HTC programs implemented in STI clinics are hence likely to be both effective and cost-effective. In places where possible, integration of HTC and STI services are encouraged.

The relationship between desire for HTC and HIV knowledge and attitude has been repeatedly documented. The association of self-perceived risk with desire for HTC has been observed among both adults [17] and youths [22, 23] in Zambia. Corroborating studies in Tanzania [20] and Uganda [19], HIV anxiety was positively associated with desire for HTC. These findings of the positive relationship between personal risk and desire for HTC supports the Health Belief Model, which considers personal risk as one of the two key factors determining the likelihood of adopting a preventive behavior. HIV related knowledge and stigma were found strongly associated with desire for HTC in this study. Both knowledge and stigma are modifiable, which grants these factors the potential to work as leverages to increase desire for HTC. Mass media campaigns and legal services have been suggested to be effective means to increase knowledge and decrease stigma [41].

The significant associations between desire for HTC and some socio-demographic variables are worth discussing. The first one is the geographic disparity of desire for HTC. Strikingly, women in Nairobi were 10 times more likely than their North Eastern peers to desire HTC. It wouldn't be of much surprise considering 0% HIV prevalence in North Eastern Province, compared to 12% among Nairobi women. However, despite of the same 0% prevalence in North Eastern Province, men were as likely to desire HTC in Nairobi. Furthermore, women and men were generally comparable on their desire for HTC in other provinces relative to Nairobi. Therefore, the gender discrepancy on desire for HTC recorded in North-Eastern Province merits further investigation.

Special efforts are needed to meet the desire for HTC in provinces where the demand for HTC was high, yet the supply of services was low. Table 7 presents the average population size per VCT site served in each province of Kenya in 2004 (second column). Assuming the desire for HTC by province observed in this study is applicable to the entire province, we estimated population having desire for HTC per VCT site by province. Eastern and Nyanza province stood out as areas needing more HTC resources based on these criteria. Increased investment in HTC programs in Nyanza and Eastern provinces, either through increasing external funding, or through resource re-allocation within HTC programs is justified.

[Table 7 about here]

The negative association between age and desire for HTC among women has been widely documented [19, 20, 22]. Fylkesnes and Siziya found 47% of pregnant women aged 20 to 24 desired testing, compared to 18% among 40 to 49 years old in Zambia [22]. The underlying reason of such an association could be that youths are more susceptible to new ideations, whereas older people are less willing to change. In addition, this may also be a cohort effect, since those aged 15-24 grew up with the HIV epidemic evolving in Africa. They may hence have more exposure to HIV messages than their older peers. Based on this finding, HTC programs should be tailored to meet the special need of youths, especially young women. Activities involving role models of youths would help promote HTC. Reach-out projects targeting places that young people hanging out, such as bars and night clubs are likely to have a better coverage. The confidentiality has to be guaranteed for youths when seeking testing and results. Extra protection measures need to be in place to assure the benefits of HTC outweigh the side effects. Lastly, the decision of obtaining consent from either youths or their guardians should follow the national guideline [27]. Specifically, "mature minors", including those younger than 18 who are "married, pregnant, parents, engaged in behavior that puts them at risk, or are child sex workers" may not need parental consent, but "mature minors" are encouraged to share testing results with their parents.

The long duration between first sex and marriage has recently been raised as a risk factor of HIV infection [42]. Consistent with this finding, we documented that sexually experienced single women had higher HIV prevalence than monogamous women in Kenya (8.97% vs. 7.22%, not

shown). However, men in this group had a much lower prevalence than their monogamous counterparts (1.91% vs. 6.81%). This pre-marital sexually experienced population was more likely than their monogamous peers to desire HTC. It is encouraging news for both women and men. For women, given that high desire leads to more uptake of HTC, the high prevalence in this group would likely to be better controlled. For men, this group contributed to over one-third of the entire population. They were at relatively low risk of infection, yet had already realized the importance of being tested. Providing timely HTC services to this male population would help at least maintain the low prevalence in this group. Majority of sexually experienced single population are youngsters. Programs with components attracting young people as described above are hence likely to work better.

Factors associated with desire for HTC were often different between Kenyan women and men. Across all the significant factors ($p<0.05$), only three variables – HIV knowledge, province and religion – were significant for both women and men. It implies different decision-making process for the two sexes on whether to pursue HTC. Sherr and colleagues found different predictors of taking HIV test for women and men [25]. These findings suggest that program promoting HTC need to have gender-specific components. In addition, women and men have different opportunities to access health care. Women may have the chance to access HTC during antenatal and delivery care which is offered for the purpose of prevention of mother-to-child transmission (PMTCT). Men, however, don't have such opportunities. Nevertheless, male involvement should be encouraged in HTC for PTMCT purposes to benefit both sexes. It is also of great interest to understand the interaction between women and men, and the dynamics within couples when making decisions on HTC.

There are a number of limitations in this study. Given the cross-sectional feature of the KDHS survey, we are unable to draw any causal inference on the results. Future prospective studies examining the predictors of desire for HTC and the consequent behaviors are warranted. Information on the sensitive questions, such as history or symptoms of STI, was obtained through self-reporting, which is subject to bias. More accurate data collection procedure with biomarkers would be ideal, though its practical application in the field for population-based surveys still needs further operational research. More qualitative information on the contextual

and cultural background would be helpful to interpret the study results, which were not readily available through this secondary data analyses.

The outcome measure, desire for HTC, is not always a good predictor of the actual behavior of taking HTC. Fylkesnes and colleagues demonstrated that only 9.3% of those initially willing to be tested actually did so in a community-based study in Zambia [17]. However, those expressed the wish to be tested were not offered VCT right away, but were referred to other VCT centers where testing results could only be offered after at least two weeks. The follow up study showed the acceptance increased to 12% to 56% when the former group was allocated to local VCT clinics, while the latter was assigned to home [22] to be tested. The high acceptance of the "home" group was considered a result of both better confidentiality and "ease of access". Comparison of these two studies highlighted the importance of the modality of HTC services and its effect on the acceptance of HTC among those who expressed the desire to do so.

Those who express the desire but fail to pursue HTC may have encountered different barriers for testing, which can be grouped into three categories: (1) fear of knowing positive results and subsequent stigma; (2) confidentiality; and (3) quality of services. Prevalent misconceptions that knowing one's positive status will hasten the disease progress has been documented as one barrier [24]. Discrimination and stigmatization toward PLWHA is another major obstacle for obtaining HIV testing [22, 26, 43]. To remove misconceptions and stigma, mass media campaign and legal services may prove effective [41]. In order to ensure confidentiality, a number of approaches appear to be effective, such as bringing in personnel outside of the communities [17] and using confidential code to represent the results [44]. To increase quality of services, rapid testing should be applied to reduce waiting time and the associated stress [45, 46]. Mobile VCT significantly reduces clients' traveling time, which is particularly favorable in rural areas [47]. Delivering VCT to homes are also proved to be highly acceptable in rural Uganda [44].

Our goal of this paper is to provide evidence for prioritizing resources for scaling up HIV testing and counseling services in Kenya. Given the national effort to promote such services, HIV testing and counseling programs reaching population with desire for testing are likely to work better. Though we are still far from universal access of antiretroviral treatment, HIV testing and

counseling has benefits of its own, which goes above and beyond those of treatment. Even in places where antiretroviral treatment is limited, scaling up of HIV testing and counseling programs would still be beneficial to prevent those positive from infecting others and help those negative stay virus free. The goal of scaling up HIV testing and counseling programs in Kenya is likely to be reached more efficiently given proper consideration of the present results.

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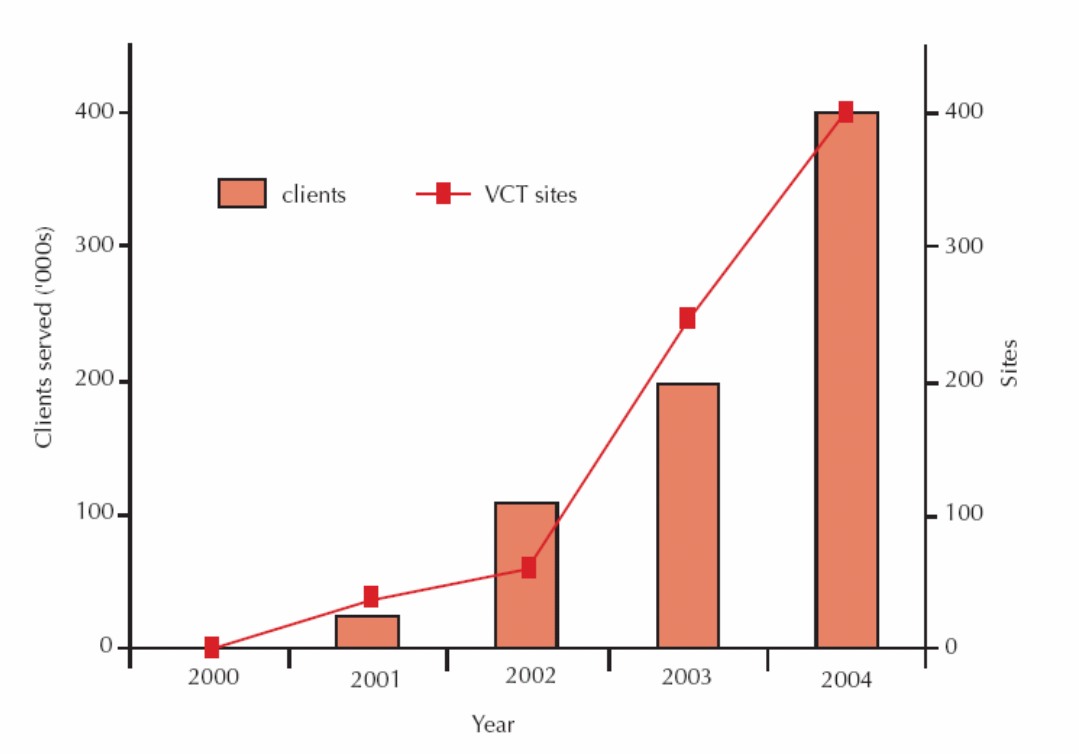
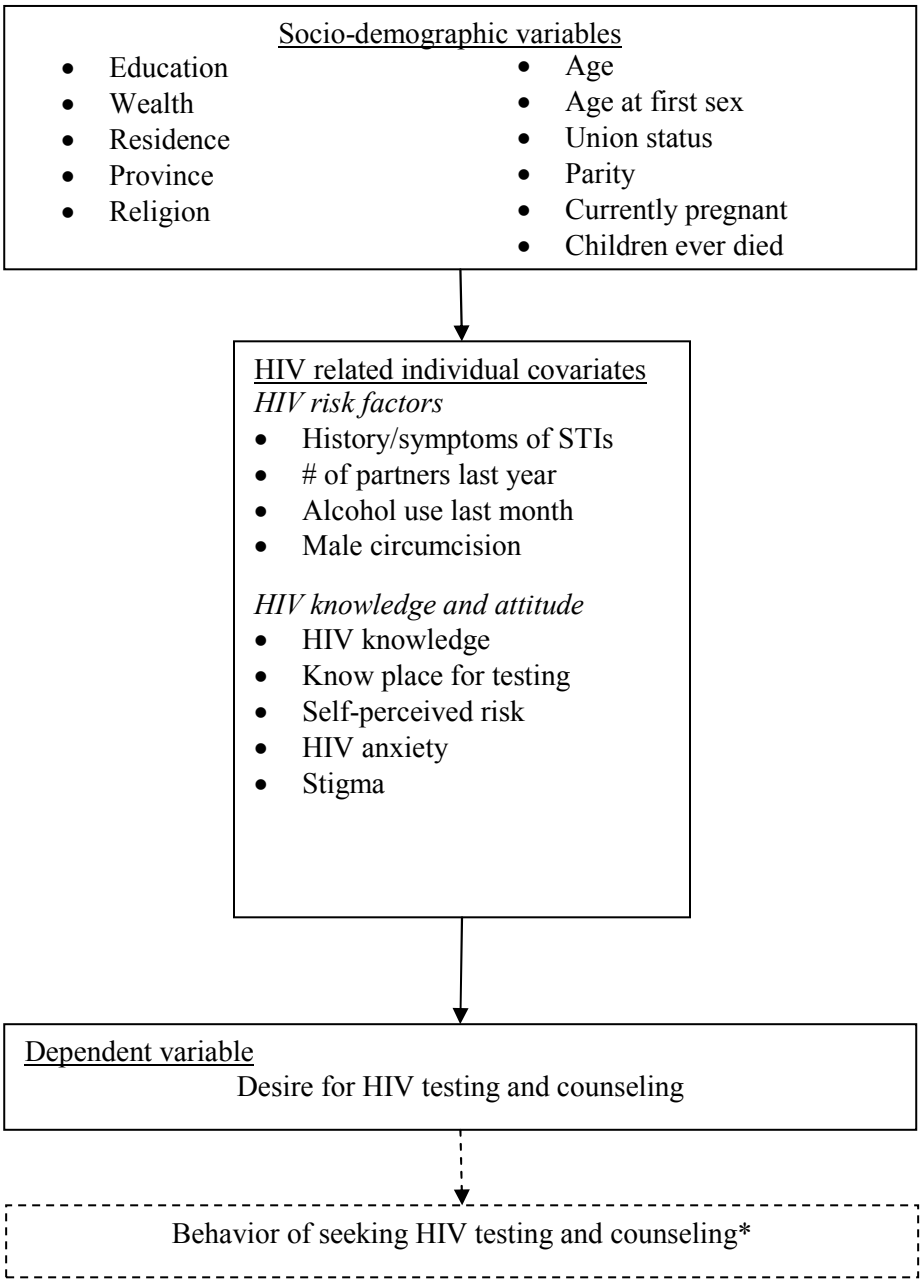
Figure 1. Increase in VCT sites and clients served in Kenya, 2000-2004.



Source: AIDS in Kenya: Trends, Interventions and Impact [29].

Figure 2. Conceptual framework of desire for HIV testing and counseling among individuals



* Behavior of seeking HTC was not directly studied.

Table 1. Study variables and coding

Variable	Category
Dependent variable	
Desire for HTC	Yes; No/unsure/don't know/missing
Independent variables	
Socio-demographic covariates	
Education	No education/preschool; Primary; Secondary; Higher education
Wealth	Poorest; Poorer; Middle; Richer; Richest
Residence	Urban; Rural
Province	Nairobi; Central; Coast; Eastern; Nyanza; Rift Valley; Western; North Eastern
Religion	Roman Catholic; Protestant/other Christian; Muslim; No religion/other religions/missing
Age	For women: 15-19; 20-24; 25-29; 30-34; 35-39; 40-44; 45-49. For men: the same as women and 50-54
Age at first sex	At younger than mean age at first sex; At mean age or later; At first union
Union status	Had sex but never in union; In union but don't know whether monogamous; Monogamous union; Polygynous union; Widowed; Divorced/separated
Parity	Continuous
Currently pregnant	No/unsure; Yes
Child ever died	No; Yes
Individual level covariates	
HIV risk factors	
History or symptoms of STI	No; Yes
Number of partners in the past year	0 partner; 1 partner; 2 and more partners
Drink alcohol in the past month	No/never; 1 or more days
Male circumcision	No; Yes
HIV knowledge and attitude	
HIV knowledge	Continuous, see text
Know a place to get HIV test	No; Yes
Self-perceived chance of getting HIV	No risk at all; Small; Moderate; Great/has AIDS
Know someone who has died of AIDS	No; Yes
Stigma	Continuous, see text

Table 2. Principle component analysis results for HIV knowledge score among sexually experienced women and men who had heard of AIDS but were never tested, Kenya, 2003

	Women			Men		
Variable	Proportion having correct knowledge	Sd	Factor loading	Proportion having correct knowledge	Sd	Factor loading
Reduce chances of AIDS by always using condoms during sex	0.61	0.49	0.38	0.74	0.44	0.36
Reduce chance of AIDS: have 1 sex partner with no other partner	0.80	0.40	0.47	0.89	0.31	0.46
Get AIDS from mosquito bites	0.59	0.49	0.38	0.73	0.44	0.38
Get AIDS by sharing food (utensils) with person who has AIDS	0.69	0.46	0.43	0.81	0.39	0.45
Reduce risk of getting sex by not having sex at all	0.78	0.42	0.46	0.89	0.31	0.47
Can a healthy person have AIDS	0.84	0.37	0.31	0.91	0.28	0.30
Eigenvalue of the first component			3.20			2.99
Difference between first and second eigenvalues			2.43			2.16
Proportion of variance explained by the first component			0.53			0.50
Number of observations included in PCA			5451			2408

Table 3. Principle component analysis results for HIV stigma score among sexually experienced women and men who had heard of AIDS but were never tested, Kenya, 2003

	Women			Men		
Variable	Proportion of having stigma	Sd	Factor loading	Proportion of having stigma	Sd	Factor loading
Would buy vegetables from vendor with AIDS	0.44	0.50	0.56	0.26	0.44	0.58
Allowed to keep AIDS infection secret	0.39	0.49	0.01	0.29	0.45	0.32
Willing to care for relative with AIDS	0.20	0.40	0.53	0.11	0.32	0.44
Person with AIDS allowed to continue teaching	0.46	0.50	0.57	0.40	0.49	0.55
Should children be taught about condoms	0.43	0.50	0.28	0.37	0.48	0.26
Eigenvalue of the first component			1.81			1.76
Difference between first and second eigenvalues			0.78			0.76
Proportion of variance explained by the first component			0.36			0.35
Number of observations included in PCA			5451			2408

Table 4. Proportion or mean of individuals' characteristics by previous testing status of HIV and sex, Kenya, 2003

Background characteristics	Women			Men		
	Never tested	Ever tested	p-value	Never tested	Ever tested	p-value
SOCIAL VARIABLES						
Education						
No education/preschool	0.152	0.055		0.069	0.030	
Primary	0.607	0.477	0.000	0.573	0.439	0.000
Secondary	0.197	0.339		0.267	0.299	
Higher	0.044	0.129		0.091	0.233	
Wealth						
Poorest	0.187	0.066		0.159	0.098	
Poorer	0.197	0.127		0.178	0.120	
Middle	0.189	0.162	0.000	0.174	0.143	0.000
Richer	0.205	0.216		0.232	0.198	
Richest	0.222	0.430		0.257	0.441	
Residence						
Urban	0.220	0.403	0.000	0.237	0.388	0.000
Rural	0.780	0.597		0.763	0.612	
Province						
Nairobi	0.084	0.186		0.098	0.192	
Central	0.131	0.202		0.141	0.170	
Coast	0.087	0.058		0.066	0.091	
Eastern	0.168	0.130	0.000	0.174	0.110	0.000
Nyanza	0.167	0.127		0.124	0.147	
Rift Valley	0.222	0.232		0.276	0.191	
Western	0.117	0.065		0.107	0.096	
North Eastern	0.024	0.001		0.014	0.003	
Religion						
Roman Catholic	0.251	0.248		0.279	0.282	
Protestant/other Christian	0.642	0.698	0.000	0.592	0.615	0.469
Muslim	0.082	0.036		0.057	0.049	
No religion/Other/Missing	0.025	0.017		0.072	0.054	
DEMOGRAPHIC VARIABLES						
Age group						
15-19	0.118	0.091		0.157	0.069	
20-24	0.202	0.262		0.199	0.178	
25-29	0.188	0.234		0.147	0.232	
30-34	0.151	0.195	0.000	0.129	0.162	0.000
35-39	0.133	0.104		0.127	0.145	
40-44	0.126	0.069		0.101	0.103	
45-49	0.083	0.045		0.065	0.060	
50-54				0.075	0.051	
Union status						
Monogamous union	0.580	0.632	0.000	0.529	0.588	0.008
Had sex but never in union	0.153	0.170		0.370	0.279	

Polygynous union	0.128	0.061		0.056	0.065	
Widowed	0.052	0.043		0.007	0.013	
Divorced/separated	0.070	0.080		0.038	0.055	
In union but don't know whether monogamous	0.018	0.015				
Age at first sex						
<Median age	0.423	0.330		0.481	0.409	
At median age or later	0.395	0.528	0.000	0.493	0.580	0.004
At first union	0.182	0.143		0.026	0.011	
Currently pregnant						
No or unsure	0.907	0.900	0.512			
Yes	0.093	0.100			NA	
Parity (mean)	3.452	2.614	0.000	2.725	2.499	0.192
At least one child ever died						
No	0.746	0.828	0.000	0.817	0.825	0.729
Yes	0.254	0.172		0.183	0.175	
HIV RELATED COVARIATES						
HIV risk factors						
History and symptoms of STI						
No	0.955	0.960	0.497	0.970	0.979	0.278
Yes	0.045	0.040		0.030	0.021	
Number of partners in the past year						
0	0.157	0.149		0.155	0.116	
1	0.823	0.828	0.778	0.705	0.760	0.057
2+	0.020	0.023		0.140	0.124	
Drink alcohol in the past month						
No day/never	0.945	0.936	0.284	0.661	0.630	0.229
1+ days	0.055	0.064		0.339	0.370	
Male circumcision						
No				0.140	0.139	0.950
Yes		NA		0.860	0.861	
HIV knowledge and attitude						
Self-perceived chance of getting AIDS						
No risk at all	0.302	0.301		0.310	0.293	
Small	0.413	0.416	0.962	0.534	0.530	0.647
Moderate	0.179	0.183		0.107	0.126	
Great/Has AIDS	0.106	0.100		0.050	0.051	
Know someone who has died of AIDS						
No	0.251	0.145	0.000	0.238	0.110	0.000
Yes	0.749	0.855		0.762	0.891	
Knowledge score (mean)	-0.041	0.580	0.000	-0.020	0.401	0.000
Stigma score (mean)	0.022	-0.447	0.000	0.042	-0.242	0.000
N	5504	1123		2478	530	

Table 5. Proportion or mean desiring HTC, by background characteristics and sex, Kenya, 2003

Background characteristics	Women			Men		
	Desire to be tested	N	P-value	Desire to be tested	N	P-value
SOCIAL VARIABLES						
Education						
No education/preschool	0.512	837		0.598	170	
Primary	0.730	3341	0.000	0.739	1420	0.000
Secondary	0.661	1085		0.686	662	
Higher	0.541	242		0.603	227	
Wealth						
Poorest	0.643	1030		0.714	394	
Poorer	0.752	1083		0.730	442	
Middle	0.706	1039	0.000	0.721	432	0.107
Richer	0.633	1130		0.715	575	
Richest	0.646	1223		0.653	636	
Residence						
Urban	0.648	1210	0.151	0.666	587	0.050
Rural	0.682	4294		0.714	1891	
Province						
Nairobi	0.706	461		0.695	243	
Central	0.566	722		0.675	348	
Coast	0.591	481		0.656	165	
Eastern	0.718	927	0.000	0.614	431	0.000
Nyanza	0.798	917		0.843	307	
Rift Valley	0.621	1220		0.702	683	
Western	0.821	645		0.760	266	
North Eastern	0.090	131		0.682	35.2	
Religion						
Roman Catholic	0.704	1382		0.742	691	
Protestant/other Christian	0.701	3534	0.000	0.717	1467	0.000
Muslim	0.425	451		0.654	142	
No religion/Other/Missing	0.519	137		0.467	177	
DEMOGRAPHIC VARIABLES						
Age group						
15-19	0.786	650		0.795	389	
20-24	0.739	1109		0.737	493	
25-29	0.696	1033		0.719	365	
30-34	0.643	832	0.000	0.670	320	0.001
35-39	0.654	730		0.646	314	
40-44	0.568	695		0.652	251	
45-49	0.567	455		0.656	160	
50-54		NA		0.647	186	
Union status						
Monogamous union	0.664	3194	0.000	0.660	1311	0.000
Had sex but never in union	0.769	839		0.780	917	

Polygynous union	0.657	705		0.648	139	
Widowed	0.578	284		0.478	16.3	
Divorced/separated	0.666	386		0.661	95.1	
In union but don't know whether monogamous	0.647	96.8			NA	
Age at first sex						
<Median age	0.745	2330		0.706	1191	
At median age or later	0.687	2175	0.000	0.701	1223	0.852
At first union	0.487	999		0.672	64.5	
Currently pregnant						
No or unsure	0.670	4993	0.016			
Yes	0.726	511			NA	
At least one child ever died						
No	0.674	4106	0.886	0.710	2025	0.138
Yes	0.677	1399		0.670	453	
HIV RELATED COVARIATES						
HIV risk factors						
History and symptoms of STI						
No	0.669	5257	0.000	0.702	2403	0.588
Yes	0.796	247		0.736	75.2	
Number of partners in the past year						
0	0.615	862		0.731	384	
1	0.685	4531	0.001	0.688	1747	0.081
2+	0.743	112		0.744	347	
Drink alcohol in the past month						
No/never	0.672	5197	0.237	0.712	1638	0.300
1+ days	0.717	303		0.685	840	
Male circumcision						
No				0.747	346	0.162
Yes				0.695	2131	
HIV knowledge and attitude						
Know a place to get HIV test						
No	0.647	2213	0.002	0.724	776	0.192
Yes	0.694	3291		0.693	1702	
Self-perceived chance of getting AIDS						
No risk at all	0.594	1660		0.690	767	
Small	0.684	2276	0.000	0.696	1323	0.284
Moderate	0.727	986		0.750	265	
Great/Has AIDS	0.782	583		0.750	123	
Know someone who has died of AIDS						
No	0.610	1382	0.000	0.651	590	0.005
Yes	0.696	4122		0.719	1888	
Total	0.675	5504		0.703	2478	

Table 6. Results of logistic regression analysis of desire for HTC, by sex, Kenya, 2003

Explanatory variables	Women			Men		
	OR	95% CI	P-value	OR	95% CI	P-value
HIV RELATED COVARIATES						
History and symptoms of STI						
No	1.00			1.00		
Yes	1.58	1.11, 2.23	0.011	1.13	0.53, 2.38	0.751
Number of partners in the past year						
0	1.00			1.00		
1	1.23	0.95, 1.60	0.113	1.11	0.79, 1.57	0.537
2+	1.08	0.60, 1.93	0.805	1.38	0.91, 2.10	0.125
Know a place to get HIV test						
No	1.00			1.00		
Yes	1.02	0.87, 1.18	0.833	0.69	0.56, 0.87	0.001
Self-perceived chance of getting AIDS						
No risk at all	1.00			1.00		
Small	1.14	0.97, 1.34	0.101	1.03	0.81, 1.31	0.812
Moderate	1.35	1.09, 1.68	0.006	1.28	0.88, 1.85	0.193
Great/Has AIDS	1.62	1.22, 2.14	0.001	1.18	0.65, 2.13	0.578
Know someone who has died of AIDS						
No	1.00			1.00		
Yes	1.15	0.98, 1.35	0.082	1.30	1.01, 1.66	0.039
HIV knowledge score	1.10	1.05, 1.15	0.000	1.14	1.05, 1.24	0.001
Stigma toward HIV/AIDS score	0.94	0.88, 1.01	0.078	0.85	0.78, 0.92	0.000
OTHER SIGNIFICANT COVARIATES						
Education						
No education/preschool	1.00					
Higher	0.53	0.35, 0.79	0.002			
Wealth						
Poorest	1.00					
Richer	0.75	0.58, 0.96	0.026			
Richest	0.70	0.51, 0.96,	0.029			
Province						
Nairobi	1.00			1.00		
Central	0.45	0.28, 0.73	0.001	0.55	0.33, 0.91	0.020
Coast	0.70	0.47, 1.04	0.074	0.63	0.40, 0.99	0.045
Eastern	0.80	0.50, 1.28	0.348	0.39	0.24, 0.64	0.000
Rift Valley	0.59	0.39, 0.91	0.018	0.66	0.42, 1.03	0.070
North Eastern	0.10	0.04, 0.21	0.000	1.59	0.62, 4.05	0.332
Religion						
Roman Catholic	1.00			1.00		
Muslim	0.70	0.49, 1.00	0.050			
No religion/Other/Missing	0.61	0.42, 0.89	0.011	0.29	0.19, 0.45	0.000
Age group						
15-19	1.00					
25-29	0.67	0.48, 0.92	0.014			
30-34	0.52	0.38, 0.72	0.000			

35-39	0.52	0.37, 0.73	0.000			
40-44	0.38	0.26, 0.54	0.000			
45-49	0.35	0.24, 0.51	0.000			
Union status						
Monogamous union	1.00			1.00		
Had sex but never in union	1.36	1.00, 1.85	0.050	2.33	1.51, 3.60	0.000
Age at first sex						
<Median age	1.00					
At first union	0.64	0.52, 0.78	0.000			
F-statistic	F(43, 168) = 10.60			F(42, 178) = 4.71		
N	5504			2478		

Table 7. Population having desire for HTC per VCT site, by province, Kenya, 2003 and 2004

Province	Population per VCT site	Desire for HTC (%)	Population having desire per VCT site
Nairobi	25,204	68	17,034
Central	59,572	63	37,602
Coast	36,648	62	22,810
Eastern	71,561	66	47,284
Nyanza	51,390	81	41,536
Rift Valley	55,234	66	36,709
Western	46,536	77	35,933
North Eastern	78,561	35	27,850

Source: Population per VCT site are from "AIDS in Kenya: Trends, Interventions and Impact [29]; Desire for HTC are estimated from KDHS 2003 [33]; and population having desire per VCT site is calculated by multiplying population per VCT site by desire.