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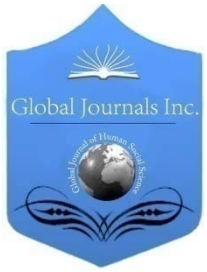

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Abstract- Voluntary Counseling and Testing for HIV is included as one of the strategy for HIV/AIDS prevention in HIV/AIDS policy, yet very little is known about what determines VCT services. This study attempts to identify determinants of Voluntary HIV counseling and testing among Addis Ababa University undergraduate students, Ethiopia. The study design was cross-sectional, including both quantitative and qualitative methods. By using multi-stage sampling technique comprising a total of 860 students were selected. Quantitative data were collected through self administered questionnaire and focus group discussions were also conducted to generate the qualitative data required to substantiate the statistical finding. The collected data were edited, entered and cleaned with SPSS Version 20 software and the data were summarized, analyzed and organized by univariate, bivariate and multivariate (binary logistic regression model) statistical technique. The findings of the study revealed that the prevalence of HIV testing was found to be 39.7% and the major finding in logistic regression model showed that marital status, childhood place of residence, life time sexual partner, perceived confidentiality of VCT service, willingness to take VCT before marriage, stigma and discrimination and attitude towards VCT were found the key determinants of practicing VCT. Finally, based on the key findings of the study, some plausible recommendations were given which includes information, education and communication program and awareness raising with regard to HIV/AIDS and gradual scaling up of VCT service, encouraging marriage and reduce stigma and discrimination should be strengthened.

Keywords: VCT, university students, determinants, practicing VCT and HIV test.

I. Introduction

HIV is a relatively newly discovered infection that has not even scored three decades of existence. However, soon after the time it was first reported in 1981, the infection has rapidly developed into an epidemic and has caused great suffering and profound development challenges (Aitken, 2005;Vandyk A and Vandyk P , 2003).

One of the important intervention strategies in the effort to curb the gradual rise in the number of people infected and affected by the epidemic is to encourage people to learn their HIV sero-status and act accordingly. This strategy is what we call voluntary counseling and testing or VCT for short. Voluntary counseling and testing is a process by which an individual or couple undergo counseling enabling him/her/ make an informed choice about being tested for HIV. This decision is entirely the choice of the individuals and he/she/they will be assured that the process is confidential (UNAIDS, 2001; Boswell and Baggaley, 2002).

In our country, the impact of HIV/AIDS on institutions of higher learning is not clearly visible at the present. However, available evidences indicate that in the near future this will be unavoidable. According to the UNAIDS's annual report, current statistics shows that adolescents whose age ranges from 15 to 24 are the most susceptible to HIV infection both nationally and internationally (UNAIDS, 2011). We know that most of the tertiary level student population belongs to this age group. What we imply that University students are among the risk groups to HIV infection.

It is reasonable to assume that students in institutions of higher learning are educated, aspiration, have access to information and would act on the information they receive and as a result a low risk population (Chetty, 2001). Nevertheless, practical observation and existing research findings show that for many campus students the opposite appears to be the case. Even though the information is available, the chances of changing behaviors in this population are lacking (Kelly, 2001). In the campuses of institutions of higher learning many students practice high-risk sexual behaviors. These include sexual experimentation, unprotected casual sex, gender violence and having multiple partners. As Kelly explained, such risky behaviors indeed occur because institutions of higher learning bring together in close physical proximity devoid of systematic supervision, a large number of adolescents at their peak years of sexual activity and experimentation. Besides this, the readily availability of alcohol and other drugs and the divergent level of economic status among the student population makes campuses a very high-risk environment from AIDS context (Kelly, 2001).

In these days, the seriousness of the problem has been acknowledged in Ethiopia and all the concerned bodies are making efforts to control the spread of the epidemic through developing different

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mechanisms of intervention. One of the many different strategies designed for prevention and control of the disease is providing voluntary HIV counseling and testing (VCT) (NACS, 2000). VCT is internationally recognized as an effective and important strategy for both prevention and care. Studies (FHI, 2002; UNAIDS, 2001) have found it to be a cost effective strategy for facilitating behavioral change. It is also an important entry point for care and support for those who test positive. Voluntary HIV counseling and testing provides people with an opportunity to learn and accept their HIV status in a confidential environment with counseling and referral for ongoing emotional support and medical care. People who have tested positive can benefit from earlier and appropriate medical care including ART treatment and HIV associated illness, social support, and emotional and spiritual care (UNAIDS, 2000).

There are several possible contributing factors that must be addressed if voluntary counseling and testing is to have an important role in HIV prevention and care. Factors that influence acceptance or refusal for voluntary counseling and testing could be characterized as socio demographic, cognitive and behavioral, and organizational of the voluntary counseling and testing service delivery (CDC, 1999).

However in comparison to other countries there is lack of information regarding the most important determinants of VCT services that is believed to be one of the best strategies for prevention and control of HIV/AIDS and care and support of already infected people. Hence, the main objective of this study was to identify the determinants of voluntary HIV counseling and testing by Addis Ababa University undergraduate students.

II. Materials and Methods of the Study

The study was conducted in Addis Ababa University; it is one of the largest higher learning institutions in Africa that was established at the end of the 1950 as an autonomous higher learning institution under different names. Since then the University has expanded and currently consists of fifteen faculties, five schools, and four research institutions which are located in Addis Ababa "Sidest Killo", "Arat Killo", "Amist Killo", Black Lion Hospital in Addis Ababa, and in Debre Zeiet faculty of Veterinary Medicine which is 45 kilo metes from Addis Ababa and currently consisted of a total number of students over 18,696 undergraduate students. (Unpublished data).

The main data for this study has come from primary data collected from 860 students through self administered questionnaire and four focus group discussions. It has both quantitative and qualitative components. The study employed cross-sectional study design where the data were collected at a specific point in time. The sample size was estimated using Hollander and Wolfe (1999). Sample size formula given in the annex.

The sampling techniques used to draw the 860 subjects were multi-stage sampling technique was employed in order to select the study units and probability proportionate to sample size (PPS) were used to determine the sample proportion. Addis Ababa University has fifteen faculties (i.e., Social Science, Business and Economics, Science, Technology, Education, Law, Medicine, Pharmacy, Language Studies, Informatics, Veterinary Medicine, Yared Music School, Fine Arts and Design, Commerce, Journalism and Communication). Accordingly, first from the fifteen faculties, eight (That is, Social Science, Science, Technology, Education, law, Medical, Pharmacy and Commerce) were selected randomly. Since the above faculties have more than one department, except Law and Pharmacy, the second stage random sampling was made from the departments. Two departments were again selected randomly from each of the faculties than has more than two departments. After identifying the specific departments: Geography and Environmental Science, SANT from the Social Science faculty; Biology, Statistics from the Science faculty; Electrical and Civil engineering from the Technology faculty; Law from the Law faculty; Educational planning and management, Psychology from the Education faculty; Medicine, Nursing from the Medical faculty; Pharmacy from the Pharmacy faculty and Administrative Services management and Technology System, Procurement and Supply Management from the Commerce faculty. List of students' names in the respective departments were taken from the registrar.

There were a total of 1,767 students in the sixteen departments. This total number was then classified by department. Then the total numbers of students found in each department were taken and proportional sample size calculated for each so as to give the total sample size. The same procedure is used to make proportional sampling of male and female students in each of the faculties. Lastly, students from the selected department were chosen randomly, assembled in a room and made to fill out the questionnaire in the presence of the data collectors.

The collected data were entered, cleaned and analyzed using SPSS Version 20 software. Both univariate, bivariate and multivariate analysis were used. In order to assess the relative importance of each predictor to the dependent variable (practicing VCT), by controlling for the effects of other variables, a binary logistic regression analysis was done. The result of the binary logistic regression model is presented as odds ratio, which is given by the form:

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$$\text{Log}\,(Pi / 1 - P_i) = e^{(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_k X_k + E_i)}$$

Where; P_i = Chance of the i_{th} respondent being practiced VCT.

$1\text{-}P_i$ = Chance of the i_{th} respondent being not practiced VCT.

$P_i/1\text{-}P_i$ = the risk or odds of the i_{th} respondent being practiced VCT.

$X_1, X_2 \ldots X_k$ = Represents predictor variables.

e = the base of natural logarithms.

B_k = Regression Coefficients of the corresponding variable X_k.

E_i = a residual term.

Estimates of $\beta_{k's}$, the logistic regression coefficients, are obtained by the maximum likelihood ratio method. A positive value of β_k means the value of the factor by which the odds change (Exp. (β_k)) greater than one means an increase in the risk of an event occurring. A negative value of β_k means the value by which the odds change (Exp. (β_k)) is less than one, indicating a decrease in the risk of an event occurring. A zero value of β_k means the factor by which the odds change (Exp.(β_k)) is equal to one, which means the odds remains unchanged. The parameters in logistic regression model represent the increase or decrease in log of odds compared to reference category code set at a value of "one".

a) Ethical Consideration

Before the data was collected, official letter from Addis Ababa University administration was obtained to ask consent from study participants. The purpose of the study was explained to all study participants; they were also informed that all of their responses are confidential and anonymous, and they have all the right not to be involved in the study or not to answer any of the questions. Ethical approval was issued by Addis Ababa city administration health bureau.

III. Results

a) Characteristic of the respondents

Table 1 shows the socio-economic and demographic characteristics of the respondents. According to the results, out of the total 860 respondents, the majority of them 551(64.1%) were males and the remaining 309(35.9%) were females giving the sex ratio of 178.3 males per 100 females (1.78:1). The distribution of the respondents age showed that 385(44.8%) were in the age group of less than 21 years. About 364(42.3%) were in the age group of 21-25, while the rest 111(12.9%) were in the age group of 25 and above. The mean age of the respondents were 23.25 years and standard deviation 5.0, with minimum and maximum ages were 19 and 55 years, respectively.

With regards to the religion of the study population, the majority of the respondents, 499(58.0%) were followers of Orthodox followed by Protestant 164(19.1%), Muslim 119(13.8%) and 78(9.1%) were other religion followers including catholic religion affiliation. The students were asked to report how frequently they attend religious services at the time of the survey, and 526(61.2%) of them responded that they attend religious services infrequently, 178(20.7%) regularly whereas 156(18.1%) never attended religious services.

The distribution of the respondents by ethnicity showed that 310(36.0%) were Amhara, 211(24.5%) were Oromo, 102(11.9%) were Tigre, 70(8.1%) were Gurage and 167(19.4%) were from other ethnic groups.

Marital status distribution of the respondents shows that majority of the respondents, 721(83.8%) have not yet married, while, the remaining 139(16.2%) were married at least once in their life time.

Regarding the Place of previous residence, most of the respondents 545(63.4%) were born and grow up in the urban areas while the rest 315(36.6%) had spent in rural areas.

Pertaining to the economic status of respondents, most of the respondents, 453(52.7%) have been obtaining $5 and above per month, 208(24.2%) got less than $5 per month, while 199(23.1%) had no pocket money at all.

Table 1 : Socio-economic and demographic characteristics (n = 860)

Variables	Number(N)	Percent(%)
Sex		
Male	551	64.1
Female	309	35.9
Age		
< 21	385	44.8
21 - 25	364	42.3
25 +	111	12.9
Marital status		
Never married	721	83.8
Ever married	139	16.2
Religion		
Orthodox	499	58.0
Protestant	164	19.1
Muslim	119	13.8
Others*	78	9.1

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Religiosity		
Never attended	156	18.1
Regularly	178	20.7
Infrequently	526	61.2
Ethnicity		
Amhara	310	36.0
Oromo	211	24.5
Tigre	102	11.9
Gurage	70	8.1
Others**	167	19.4
Pocket money		
No pocket money	199	23.1
Up to $5	208	24.2
More than $5	453	52.7
Place of previous residence		
Urban	545	63.4
Rural	315	36.6
Total	860	100.00

**Catholic and traditional religion followers*

***Somali, Harari, Hadya, Walita, Silite*

b) HIV testing (VCT uptake)

Respondents asked whether they have ever been tested for HIV. Their response to the question 'Have you ever been tested for HIV?' About 341(39.7%) of respondents have ever been tested for HIV.

c) Reasons for being tested for HIV

The main reasons gave by the respondents for being tested for HIV, majority of the respondents replied that have been tested for HIV to be engaged in marriage and to know health status, which accounts for 52.2% and 41.1% respectively. Others replied that when body weight decreases and related to pregnancy, 2.9% and 3.8% respectively. Similar reasons were also obtained from participants of the focus group discussion. Most discussants agreed that plan for marriage and immigrants to the USA through diversity visa lotteries were the two prominent reasons that lead most students to be tested for HIV.

d) Multivariate analyses: Results of binary logistic regression

Among the variables included in the Model, as indicated in table 2, marital status, place of previous residence, life time sexual partner, worry about the confidentiality of VCT, willingness to take VCT before marriage, stigma and discrimination and attitude towards VCT service come out to be important predictors of the likelihood of HIV testing among the study population, while sex, religious affiliation and feeling being at risk of HIV infection were found to be not to have an impact on HIV testing.

Marital status of the respondents' was found to have an influence on HIV testing of ever married students. The likelihood of HIV testing was significantly associated with marital status. As can be shown in the multivariate analysis at table 2, The likelihood of HIV testing of ever married respondents' had 3.5 times more likely to be tested as compared never married (OR=4.515, P<0.001). In other words, the likelihood of HIV respondents is significantly lower than those testing among never married who are ever married.

There was statistically significant association between HIV testing and place of previous residence of respondents'. The likelihood of HIV testing was significantly associated with childhood place of residence. As can be shown in the multivariate analysis at table 2, being urban had a positive effect on the likelihood of HIV testing. The likelihood of HIV testing among urban had 0.5 times more likely to be tested as compared to rural (OR=1.491, P<0.05).

Number of lifetime sexual partner shows a statistically significant effect on the practice of HIV testing (OR = 1.855, P < 0.05). The likelihood of HIV testing among respondents who have ever had only one sexual partner had 0.9 times more likely to be tested as compared to those respondents without any sexual partner. This might be the possible explanation of partner willingness to test for HIV.

The finding of the multivariate logistic regression result also indicates that, perceived confidentiality of VCT services was significant association with HIV testing and in the expected direction. Students were not worried about confidentiality of VCT services has a positive effect on HIV testing. The likelihood of HIV testing among students was not worried about confidentiality of VCT services had 2 times more likely to be tested as compared to students been worried about confidentiality of VCT service (OR = 2.997, P < 0.001). Students need confidential VCT service to test for HIV voluntarily.

The association between HIV testing and willingness to take VCT before marriage was statistically significant and in the expected direction. Unwillingness taking VCT before marriage has a negative effect on HIV testing (OR=0.079, P<0.01). Respondents who were not willing taking VCT before marriage were 92.1% less likely to be tested than those who were willing.

According to findings of the survey, stigma and discrimination of people caught HIV/AIDS has statistically significant effect on the students HIV testing. Stigmatizing has a negative effect on practicing VCT (OR = 0.481, P < 0.001). Respondents who were stigmatizing have 51.9% less likely to be tested than those who were non stigmatizing. This finding showed that fear of stigma and discrimination hindrance for HIV testing.

Attitude towards VCT of the respondents found to be predictor of HIV testing. The association between HIV testing and attitude towards VCT was significant and in the expected direction (Table 2). Unfavorable attitude towards VCT services has a negative effect on HIV testing (OR=0.446, P<0.001).

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Students who were unfavorable attitude towards VCT were 55.4% less likely to be tested than those who are favorable attitude.

Table 2 : Results of Logistic Regression (odds ratio) Model Parameters' Estimates for the Likelihood of HIV testing among Addis Ababa University Undergraduate Students (n = 860)

Variables	Selected background characteristics				
	ß	S.E	Exp(ß)(odd ratio)	95.0% C.I. for Exp (ß)	
				Lower	Upper
Sex					
Male[RC]			1.00		
Female	0.211	0.172	1.235	0.881	1.731
Age					
<21[RC]			1.00		
21 - 25	0.005	0.174	1.005	0.715	1.413
25+	-0.732	0.415	0.481	0.213	1.085
Marital Status					
Ever Married	1.507	0.418	4.515***	1.991	10.240
Never Married[RC]			1.00		
Religion					
Orthodox[RC]			1.00		
Protestant	-0.002	0.201	0.998	0.673	1.481
Muslim	-0.037	0.234	0.964	0.609	1.525
Others	0.373	0.299	1.451	0.808	2.606
Place of previous residence					
Urban	0.399	0.164	1.491*	1.081	2.057
Rural[RC]			1.00		
Life time sexual partners					
None[RC]			1.00		
1	0.618	0.302	1.855*	1.025	3.355
2+	-0.062	0.389	0.940	0.438	2.015
Feeling being at risk of HIV infection					
Yes	0.374	0.296	1.454	0.813	2.598
No[RC]			1.00		
Worry about the confidentiality of VCT					
Yes[RC]			1.00		
No	1.097	0.196	2.997***	2.039	4.404
Willingness to take VCT before marriage					
Yes[RC]			1.00		
No	-2.536	0.751	0.079**	0.018	0.345
Stigma and discrimination					
Non stigmatizing[RC]			1.00		
Stigmatizing	-0.631	0.161	0.481***	1.371	2.574
Attitude towards VCT					
Favorable[RC]			1.00		
Unfavorable	-0.807	0.192	0.446***	0.306	0.649

*Significant at: ***P<0.001 **P<0.01 *P<0.*

RC = Reference Category S.E. = Standard error

IV. Discussion

VCT has a vital role to play within a comprehensive range of measures for HIV/AIDS prevention and support, and should be encouraged. This study provided important information regarding determinants of VCT among Addis Ababa University undergraduate students.

a) Marital life encourages VCT

Marital status of respondents is one of the important factors that influence HIV testing. Ever married status has a significant contribution in facilitating HIV testing by students. Previous similar studies conducted provide a strong support for the present finding; Lisa and Yitades (2005) found that in Jamaica, among University students, the odds of HIV testing were 1.5 times higher among married students than not married.

In this study very important significant relationship was observed between perceived confidentiality of VCT services and HIV testing. So, it is the major determinant of HIV testing. Results of multivariate analysis showed that the likelihood of

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HIV testing among students was not worried about confidentiality of VCT services had 2 times more likely to be tested as compared to students have been worried about confidentiality of VCT service. The qualitative result from the Focus Group Discussions also indicated that, fear of being seen at a testing site and having health care personnel tell others about their test results were the major reasons that students often regret to seek VCT services. From the above findings, lack of confidence to VCT services decreases HIV testing. This finding was inline within the other findings, a study done in Uganda and Kenya on HIV voluntary counseling and testing among youth showed that 67% Ugandans and 53% Kenyans prefer hospitals as the convenient site to get an HIV test because of the appropriateness of hospitals to insure confidential services (Horizon, 2001).

According to Solomon et al.,(2004), there has been a great deal of resistance to VCT in African settings for reason associated with lacking trust on the confidentiality procedures. People, especially young people, are concerned about their privacy and are fearful that others may find out that they have sought an HIV test. Similarly, from a national survey, Vandyk A and Vandyk P (2003), for example, found out that about 30% of the respondents who indicated they would definitely not to go for VCT which was located nearby their village considered confidentiality as a significant barrier for their reluctance. Therefore, young people prefer to have tests in facilities where they won't run into parents or neighbors and where it is not clear to casual observers that they are there have an HIV test.

b) Students seek HIV test as a pre condition for marriage

This study also revealed that willingness to take VCT before marriage is one of the major determinants for HIV test. Multivariate result showed that respondents who were not willing taking VCT before marriage were 92.1% less likely to be tested than those who were willing. This is a possible explanation of plan for marriage is the major reason for HIV test and students often seek HIV test as a precondition for marriage. Also the participants of the focus group discussion indicated that, the major reason for HIV test was plan for marriage.

Previous researches also supported the finding that a study conducted in 2003 among newly married couples in Addis Ababa showed that 55% of the study subjects reported having had pre-marital HIV testing. Individuals of both Sexes who had frank discussion as a couple about HIV were found to be more likely to have pre-marital HIV testing (adjusted ORs 10.96, 95% CI 3.7 to 33.3 for men and 7.78, 95% CI 2.86 to 20.0 for women (Dereje, 2006). With regard to willingness to test in the future, students who were not willing taking VCT before marriage were 95.3% less likely to be tested than those who were willing.

c) Fear of stigma and discrimination is a major challenge to use of VCT service

It is known that HIV is stigmatized in many countries resulting in discrimination against and rejection of PLWHA (People living with HIV/AIDS) or those perceived to be HIV positive regardless of whether or not they have actually been tested. Stigmatizing attitudes among the society towards persons living with HIV/AIDS is one of the stumbling blocks for people not to get access to voluntary counseling and testing. The stigma, real or feared, of HIV/AIDS often is a barrier to HIV prevention programs.

If people are uncomfortable discussing their risk of infection with health care providers due to concerns about discrimination or a lack of confidentiality, they may avoid HIV testing and treatment of symptoms. Those who suspect they are infected may choose to hide their disease from friends and family for fear of abandonment. Thus, in this particular study, there are identified barriers that may act as an impediment to the effective utilization of the VCT service. From the above findings, stigma and discrimination hindered students from HIV test. That is, respondents having non stigmatizing attitude towards HIV/AIDS had tested for HIV more than stigmatizing attitude towards HIV/AIDS, fear of stigma is a major challenge to use of VCT service. Also the focus group discussants indicated that the major factor that prevents students from HIV testing was fear of stigma and social rejection or discrimination being identified HIV positive and fear of learning the outcome of HIV status.

This finding is in line with the other findings that, a study done in a national survey of adults in the United States, Herek and colleaques found that 38% of the respondents expressed their concern about stigma if they tested HIV positive and 44% of the clients who expressed this concern indicated that stigma influences their decisions to undergo HIV testing (Herek et.al, cited in Kalichman and Simbayi, 2003). In addition to several recent studies demonstrate how stigma and discrimination are fueled, resulting in prejudicial treatment of people living with HIV/AIDS. In Nigeria, a survey found that one in ten doctors and nurses admitted having refused care to patients with HIV/AIDS or having denied hospital admission to these patients. Twenty percent of those surveyed believed that people with HIV/AIDS were guilty of immoral behavior and were reaping their just dessert. In the Philippines, fifty percent of respondents to a recent survey conducted among people with HIV/AIDS reported having suffered discrimination by health care workers. In India, a study found that 70% of people living with HIV/AIDS had experienced discrimination, most often by

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family members or health care workers. (UNAIDS, 2003).

Also a survey conducted on Kenyan and Ugandan youth, similarly, revealed that together with other factors, stigma and discrimination played an important role for adolescents' reluctance to undergo VCT (Horizons, 2001).

d) Favorable attitude towards VCT directly related to HIV testing

In this study, favorable attitude towards VCT was the most important factor of HIV testing. The multivariate result indicates that students who were unfavorable attitude towards VCT were 55.4% less likely to be tested than those who are favorable attitude. Therefore, it needs favorable attitude towards VCT for HIV testing.

Previous researches also supported my findings, that community based studies done in South Africa have positive and statistically significant association was observed between VCT uptake and attitude towards HIV testing, in this study, those who had been tested showed more positive HIV testing attitude than participants who had not been tested (Kalichman and Simbayi, 2003). Similarly, a study on HIV testing attitudes, AIDS stigma, and Voluntary HIV counseling and testing in a black township in Cape Town, South Africa was conducted in 2003. Comparisons on attitudes toward VCT, controlling for demographics and survey venue showed that individuals who had not been tested for HIV and those tested but who did not know their results held significantly more negative testing attitudes than individuals who were tested, particularly people who knew their test results. Compared to people who had been tested, individuals who were not tested for HIV demonstrated significantly greater AIDS related stigmas, ascribing greater shame, guilt, and associated disapproval to people living with HIV, knowing test results among those tested was not related to stigmatized beliefs. (Kalichman et al, 2003).

V. Conclusions and Recommendations

The findings indicated that despite obstacles to VCT and issues surrounding HIV sero-positivity, further awareness raising programs with regard to HIV/AIDS and gradual scaling up of VCT service is of paramount importance. The prevalence of HIV testing was found to be 39.7%. Determining factors for Practicing VCT were marital status, childhood place of residence, life time sexual partner, perceived confidentiality of VCT service, willingness to take VCT before marriage, stigma and discrimination towards PLWHA and attitude towards VCT.

Finally, we forward some recommendation in light of the findings: effective programs need to be developed to promote further pre marital VCT services, interventions need to focus on providing services that ensure confidentiality to promote HIV testing, link with care and support organizations so as to establish financial independence, educate students to perceive themselves at risk of HIV infection, Sound and viable information, education and communication and counseling interventions on VCT or behavioral change communication need to be intensified to reduce stigma and discrimination that prevail in the students and to increase positive attitude towards VCT.

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a) Competing interests

The author declare that they have no competing interests.

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Annex 1

Sample size estimation

To determine the minimum number of students to be included in the study, the single population formula was used, based on the assumption that:

a) The level of confidence of the study was 95%, which gives the percentile of the normal distribution, ($Z\alpha/2=1.96$)
b) The margin of error assumed to be 5%.
c) The proportion of population possessing the major attribute (i.e. Prevalence of acceptability of VCT among students) is assumed to be 50%.
d) Estimated non-response rate in university students = 10%.
e) Contingency = 12%.

Accordingly, the following formula given by Hollander and Wolfe (1999) is used to determine the sample size:

$n = [(Z_{\alpha/2})^2 * P (1-P)] / d^2] * 2$

$n = [(1.96)^2 * 0.5 * (1 - 0.5)] / (0.5)^2] * 2$

$n = 768 + 92 = \underline{860.}$

Where,

n = the required minimum sample size.

Level of confidence 95%, which gives the percentile of the normal distribution, $Z_{\alpha/2}= 1.96$.

d = Margin of error, assumed to be 5%.

P = prevalence of VCT acceptance taken as 50%.

Estimated non-response rate in University students = 10%.

Multi- stage sampling design effect = 2.

Based on the above assumptions a minimum of 860 Students were required for the study.

Conflict of Interest:

The authors declare that they have no conflict of interest.

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