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RESEARCH ARTICLE

Factors Affecting HIV Voluntary Counseling and Testing Uptake among Undergraduate Students of Khartoum, Sudan

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Abstract:

Background:

HIV Voluntary Counseling and Testing (VCT) services provide an important start to HIV/AIDS prevention and care. The literature showed that the uptake of VCT is very low, and it is affected by many factors among university students, which are considered as high-risk group for HIV/AIDS infection.

Objective:

The objective of this study is to identify the factors that affect the uptake of voluntary counseling and testing among the undergraduate students.

Methodology:

A descriptive cross-sectional study was conducted among the undergraduate students from the faculty of sciences at the Khartoum university with a sample size of 192. The students were selected by systematic random technique. A structured questionnaire was used for data collection, and data were entered and analyzed by using the SPSS (computer program). IRB approval was obtained from the University of Science and Technology, and informed consent was taken from all participants.

Results:

A total of 192 students participated in this study 107 (55.7%) male and 85 (44.3%) female. Out of these, 100 (52.1%) were in the age group of 15-20, while 92 (47.9%) were in the age group of 21-25. Regarding the knowledge about VCT; 149 (78%) students had good knowledge. The study revealed that about 17 (9%) of the students took the HIV test, and 118 (62%) expressed their willingness to uptake VCT in the future. Reasons that hindered HIV testing during this study include: 1) Some students did not consider themselves at risk (84 *i.e.* 44%), some students did not know the place where the test is provided (74 *i.e.* 38%), some of them did not hear about VCT (32 *i.e.* 17%) and some were afraid of the test results (17 *i.e.* 32%). The study found that VCT uptake is positively associated with age, sexual intercourse, and considering themselves self at risk of HIV infection ($p=0.05, 0.00, 0.03$ respectively). Moreover, the study also found an association between willingness to uptake VCT in the future with sexual intercourse and considering themselves at risk of HIV of HIV infection ($p = 0.03, 0.00$ respectively).

Conclusion:

The uptake of VCT is very low among university students, and it is associated with age and risk perception and sexual intercourse. The most important factors include not considering themselves at risk or not knowing the place of testing or no knowledge about the test or the fear of being positive. On the other hand, willingness to uptake the test was considerably high.

Keywords: HIV/AIDS, Voluntary Counselling testing, Students, Risk, Age, Prevention.

Article History

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1. INTRODUCTION

1.1. Background

HIV/AIDS has become a major health problem in many parts of the world, and is now considered a pandemic in the

whole world, especially in Africa with a high prevalence in the general population. Currently, the total number of people with HIV in the world is approximately 38 million, of which 36.2 million were adults. In 2019, an estimated 1.7 million individuals worldwide acquired HIV, marking a 23% decline in

new HIV infections since 2010. Almost 80% of people with HIV worldwide have been tested to know their HIV status; the remaining 19% still need access to HIV testing services, which is an essential gateway to HIV prevention, treatment, care and support services. AIDS-related deaths have been reduced by 60% since the peak in 2004. In 2019, around 690,000 people died from AIDS-related illnesses worldwide, compared to 1.1 million in 2010. The vast majority of people with HIV are in low- and middle-income countries; there were 20.7 million people with HIV (54%) in eastern and southern Africa, 4.9 million (13%) in western and central Africa, 5.8 million (15%) in Asia and the Pacific, and 2.2 million (6%) in Western and Central Europe and North America [1].

In Sudan, the ministry of health has taken the initiative to establish the Sudan National AIDS Program (SNAP) in 1987. Since then, SNAP has taken the responsibility to co-ordinate the HIV/AIDS response in the country and from the data available at SNAP on HIV/AIDS, the first AIDS case in Sudan was reported in 1986 [2]. The HIV epidemic in Sudan is classified as a low epidemic with adult (15-49 years) HIV prevalence of less than 0.3% according to the 2016 estimates and projections [3]. One of the most important intervention strategies adopted by SNAP in the effort to curb the gradual rise in the number of people infected and affected by the epidemic is to encourage people to know their HIV sero-status and act accordingly. This strategy, known as voluntary counseling and testing (VCT) services was established in Sudan in the early 2004 [4]. The determinant factors affecting the uptake of VCT among young adults have an important impact on the prevention and control of HIV/AIDS, as UNAIDS's annual current statistics report shows that adolescents aged from 10 to 19 acquired HIV every hour at a rate of 250 000 [180 000–340 000] per year in 2015, in addition to that they are the only age group in which AIDS-related deaths are not decreasing [5]. The statistics from most parts of Africa show that the potential for VCT to contribute to HIV prevention is still underutilized. Young people (10 to 24 years) and adolescents (10 to 19 years) continue to be excessively affected by HIV. In 2016, two million people aged between 10 and 19 years were living with HIV and 260,000 became newly infected with the virus [6]. The failure to use HIV testing services by significant numbers of individuals at risk for HIV can be attributed to a number of factors, both on the individual as well as societal level, as shown by the review of studies conducted by Nadai A Sam Agydu *et al.* in 2016 in high adolescent HIV-burden countries targeted by the “All In to End Adolescent AIDS” initiative, and describes the fear of stigma and family reaction, fear of the impact of a positive diagnosis, perceived risk with respect to sexual exposure, poor attitudes of healthcare providers, and parental consent requirements as major barriers descriptive [7].

1.2. Study Context

This study took place at the University of Khartoum, by the faculty of sciences students in 2018. With the support of partners such as WHO and NGOs, the Sudan National AIDS

Program is investing resources in the development of VCT services as an important strategy for HIV/AIDS prevention and in early 2004, SNAP started to initiate 48 VCT centers in the capital of the city – Khartoum State and 20 in the states giving a total of 68 VCTs all over the country [8]. In the year 2009, in the northern states of the country, there were 132 VCT centers that have increased to 143 in 2014. By the end of 2013, the number who received HIV testing and counseling increased seven fold ranged from 32,329 to 233,617 since 2011 [9]. For the prevention strategy, it is important to know the factors that motivate, or deter, individuals from seeking HIV testing. These determinant factors are expected to differ from subpopulation to subpopulation. The identification of the factors affecting the uptake of VCT has an important impact on the prevention and control of HIV/AIDS. University students are among the highest HIV groups due to their age and sexual behavior. This study was conducted to assess the factors affecting VCT uptake among undergraduate students from the faculty of science at the Khartoum University.

2. MATERIALS AND METHODS

2.1. Design and Sample

Quantitative descriptive cross-sectional study was conducted at the Khartoum University, by faculty of sciences undergraduates in the period from 15th October to 30th December, 2018. The sample size was 180 calculated by the epidemiological equation Hollander and Wolfe in 1999 one-sample population proportion formula) based on the following parameters: total population of students is 2140, 95% confidence level, desired margin of error 0.05 and prevalence 0.1-0.2 (UNAIDS 2018 data) will take the mid-point (0.15 and $z=1.96$). 10% was added to cater for non-response rate =198; the collected sample was 192 with a response rate of 97%. The sample was distributed between the five classes of the science college according to probability proportional to size using the total population as denominator and number of students in each class as numerator and multiple by sample size; from the first class, we took 48 students (25%), 46 (24%) students from the second class, 35 (18%) from the third class, 31 (16%) students from the fourth class and 32 (17%) students from the fifth class. The selection of participants was done by systematic random sample, the first one was chosen using a random digit table in each class and the remaining sampling interval was measured by dividing the total number of students in the class by sample required from the class.

2.2. Data Collection

The data was collected by using a self-administered questionnaire. The questionnaire was adapted according to the research objectives and literature, and almost all of the questions in the questionnaire were close-ended. The questionnaire was anonymous, which helped in keeping the confidentiality of the respondents and reduced the bias answer. To ensure the quality of the data, the questionnaire was pretested for content validity check and to identify any problem with questions and after this pilot study, any unclear questions were deleted, the English version questionnaire was translated to the Arabic language and then the Arabic version was

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translated again to the English to ensure the validity of the questions. Only the Arabic version of the questionnaire was distributed to the respondents for help in the understanding of questions. One hundred ninety two questionnaire forms were distributed to the respondents, and the time given was thirty minutes to each respondent to fill it. After filling the questionnaire form, each respondent delivered his/her questionnaire in the box, to keep their confidentiality. Informed consent was obtained from each participant, and they were informed about the purpose, benefit and risk of the study. Voluntary data is going to be used only for the purpose of this research. Respondents also have the right to withdraw at any time in the study. Ethical approval was obtained from the University of Medical Science and Technology Institution review board.

2.3. Variables

To assess the knowledge about VCT of the respondent's scores were given for some questions related to knowledge (a total of 8 questions, VCT is important to prevent the transmission of HIV/AIDS, both HIV positive and negative persons benefit from VCT, VCT is important for the prevention of partners/others, VCT is needed to know your HIV status, VCT is important for self-care for future life, VCT can prevent mother to child transmission, VCT will help in choosing partner, VCT is needed to start antiretroviral treatment) total of 8 points as each question had a response of "Yes" for correct answers or "No" for wrong answers. Scores of all the respondents were sum up and the mean value was calculated. Those who scored 75% (6 out of 8) and above, were considered having good knowledge with VCT, while those who scored below 75% (less than 6), they were considered to have low knowledge; also, mean knowledge using the mean as a balancing point with the standard deviations as standardizing the values. For the uptake of VCT, there were 6 constructed questions (ever had the test, willing to take the test, had sexual intercourse, consider themselves at risk, preferred testing method and preferred method of getting the result); moreover, their sub-questions such as reasons for having the test, if they receive counselling as well as the type of counselling, reasons for not having the test.

Table 1. knowledge about VCT n=192.

Items	Frequency and Percentages of Correct Answers
VCT is important to prevent the transmission of HIV/AIDS	168(88%)
Both HIV positive and negative persons benefit from VCT	164(85%)
VCT is important for Prevention of partners/others	167(87%)
VCT is needed to know your HIV status	167(87%)
VCT is important for Self-care for future life	163(84%)
VCT can Prevent mother to child Transmission	149(78%)
VCT will help in Choosing partner	147(77%)
VCT is needed To start antiretroviral treatment	144(75%)
Good Knowledge at least 6 out of 8 correct answer	149(78%)
Low knowledge less than 6 correct answer	43(22%)

2.4. Statistical Analysis

The questionnaires were coded and entered using SPSS (Statistical Package for Social Sciences) version 15. Then, the data were analyzed by obtaining the frequencies and percentage of the variable and chi-square bivariate analysis (cross tabulation) was used for some variables to test the association.

2.5. Limitation of the Study

The study addressed sensitive issues such as sexual behavior and HIV test, so we expect certain biases in the answers associated with sexual behavior.

3. RESULTS

In total, in 2018, we surveyed 192 undergraduate university students at the University of Kahratoum, Faculty of Science. According to the results, more than half of the study population were males. The distribution of the respondent's age showed that slightly more than 50% were in the age group of 15-20 years, and a little bit less than 50% were in the age group of 21-25 years. With regard to the marital status, the distribution of the respondents showed that the majority of the respondents in 97% are not yet married, while only 3% were married at the time of the study.

Table 1 shows the knowledge of the respondents about VCT and according to the scoring, 78 of the students were knowledgeable about VCT as they answered six questions correctly out of the eight questions, and about 22% of the study population had little knowledge of VCT, as they answered two questions. Regarding the detailed knowledge, which includes advantage of VCT, the majority of the respondents, 88% believed that VCT is important to prevent transmission of HIV/AIDS. Also, when respondents were asked some questions related to VCT knowledge, 164 (85%) of the respondent answered that both HIV positive and negative persons can benefit from VCT. On the other hand, 167 (87%), 163 (85%), 149 (78%), 147 (77%) and 144 (75%) have mentioned that the importance of VCT is to prevent partner and other people, knowing self-care in the future life, prevention of mother to child transmission and to start HIV/AIDS treatment, respectively.

Table 2. Uptake and willingness to take the VCT among study population.

Items	Frequency and Percentage of yes Response
Ever had HIV test	17(9%)
Willing to uptake VCT	118(62%)
Consider self at the risk of HIV infection	33 (17%)
Had sexual intercourse	32(17%)
Had sexual intercourse male (% from total males)	28(87%)
Had sexual intercourse female(% from total females)	4(13%)
Preferred testing method	150(87%)
• Confidential linked testing,	73(39%)
• Anonymous testing,	
Preferred method of getting the HIV test result	
1. Face to face	161(84%)
2. By telephone,	40(21%)
3. By letter	29(15%)
4. Through Relative or partner,	13(7%)

Table 2 showed VCT uptake and willingness to take the test; only seventeen (9%) respondents took the HIV test. Among those, males account for almost 87% . 118 (61.5%) respondents expressed their willingness to uptake VCT in the future, 150 (87%) respondents preferred the confidential linkage testing method, while 75 (39%) preferred anonymous test. With regard to the method of getting HIV test result, 161 (84%) respondents preferred face to face getting HIV test result correctly, followed by telephone 40 (20.8%), letter 29 (15.1%) and relatives 13 (6.8%). Among the people who undergone HIV test, 9 (53) of them had the test for a voluntary purpose, followed by required for visa 7 (41%) and required for work 1 (1%). For those who did the test, 8 (47%) had received counseling, and the rest 9 (53%) did not receive it.

Table 3 shows the reasons for not having VCT by

respondents or those who did not undergo VCT: (38. %) of the respondents did not know where to go for the test, 84 (44%) trusted themselves that they were not at the risk of HIV, 38 (20%) feared the test result, 32 (16.7%) did not hear about VCT, 54 (28.1%) stated the absence of VCT center nearby. Other factors include 29 (15.1%), (12%) and 6 (3.1%) fear from stigma, the test does not help and cost of the test, respectively.

Table 4 shows the association between VCT uptake for those who actually did the test and demographic variables (Age, Sex/Gender, Marital status, as well as knowledge of VCT). There is no significant statistical association between any of these variables and the test uptake except for the age with a P-value of 0.05. There is a statistically significant association between taking the test and considering themselves at the risk of HIV infection or had sexual intercourse.

Table 3. Respondents reasons for not having HIV testing (for those who didn't had HIV test=175 respondents).

Items	Frequency and Percentages
I don't know where the test	74(38%)
The test doesn't help	23(12%)
Trust self and partner not at the risk of HIV infection	84(44%)
Fear of stigma	29(15%)
Fear from test result	32 (17%)
Didn't hear about VCT	32(17%)
Partner refusal	13(7%)
No near VCT center	54(28%)
Cost of services	6(3%)

Table 4. Relationship of VCT uptake (HIV test) in those who actually did the test with some selected variables.

Variables	Yes	P -value
Sex		
Male	12	1.96
Female	5	

(Table 4) contd....

Variables	Yes	P -value
Age 15-20 21-25	5 12	0.05
Marital status Marriage Single	1 16	0.37
Knowledge about VCT Knowledgeable Low knowledgeable	12 5	0.47
Consider self at the risk of HIV infection Yes No	9 8	0.00* P < 0.05
Had sexual intercourse Yes No	6 11	0.03* P < 0.05

Table 5 shows the relationship of willingness to uptake VCT with some selected variables. The only significant association is when respondents consider themselves at the risk of HIV infection or had sexual intercourse.

Table 5. Relationship of those who willing to uptake VCT in the future with some selected variables.

Variables	Willing to uptake VCT in future	P -value
Sex Male Female	65 53	0.82
Age 15-20 21-25	58 60	0.31
Marital status Marriage Single	4 114	0.39
Consider self at the risk of HIV infection Yes No	33 85	0.03* P < 0.05
Had sexual intercourse Yes No	27 91	0.00* P < 0.05
Knowledge about VCT Knowledgeable low knowledgeable	88 30	0.20

4. DISCUSSION

The objective of this study was to assess the factors affecting VCT uptake among undergraduate students from the faculty of science at Khartoum University. Specifically, we examined knowledge and uptake of VCT as well as factors affecting the uptake. Regarding the knowledge about VCT, the study found that around 78% of the students knew six out of eight questions about VCT correctly, which is considered as high knowledge. This result is almost similar to the study from Ethiopia conducted by Addis Z *et al.*, among university students, which indicated that the knowledge of VCT was high; this may reflect the similarity in the social background of the two countries [10]. The high knowledge could be contributed to the ongoing education for youth by SNAP as an intervention strategy for providing information on HIV/AIDS (9)

The study has shown that less than 10% of students had undergone HIV test, this number was lower than indicated in studies from Ethiopia, Tanzania and South Africa with the percentage of students tested for HIV in each country accounts for 60 and 50, respectively [10 - 12]. The low VCT uptake in this study may be due to the fact that the students believe that they are not at the risk of HIV infection and did not practice sex before and therefore no need for the test. Anyway, this will remain a very low number to serve as an effective intervention for HIV/AIDS prevention, although students are considered at risk of acquiring HIV as classified by UNAIDS. Most of those who had undergone HIV in this study took the test on a voluntary basis, followed by required for the visa, and similar findings were reported in the studies [10 - 12]. The main reason for not having an HIV test was they trusted themselves of not being at the risk of HIV infection, followed by not knowing where to go for the test, which necessities the need to develop a policy framework targeted at expanding access and uptake of HIV testing among young people. Adding to that some students did not hear with VCT for HIV, this result is similar to the previous studies in Ethiopia among undergraduate students, which indicate the predominant reason was low HIV risk perception followed by fear of stigma and in Kenya, which indicated that the main reasons were no risk perception and stigma [10, 13]. These results highlighted the fact that including HIV/AIDS, education of young people will not only increase the uptake of HIV testing but also improve other health outcomes such as reduction of sexual transmitted diseases.

According to the Bivariate analysis (cross tabulation) that tests the association between the variables, the results showed no association between demographic characteristics (age, sex/gender, marital status and academic year) and VCT uptake (HIV test). Similar to a study conducted among undergraduate in Jamaica showed a significant result between age and HIV testing [14]. Also, similar to the study from Ethiopia, which showed that marital status and academic year of respondents are not influencing HIV testing [10]. This points out the fact that testing for HIV /AIDS should be availed to all population regardless of the socioeconomic status .

The study showed that 30% of the students reported had sexual intercourse, and about almost fourth of the male

reported had sexual intercourse, the proportion of the males who had sexual intercourse in this study was comparatively lower than the study conducted among Turkish university students, which revealed the proportion of sexual intercourse among male students was 60% and in Ethiopia, among university students, it was shown that the proportion of men who had sexual intercourse was almost 50 [10, 15]. This may be due to the fact that most Sudanese people are strictly Muslims followers where sexual intercourse is not allowed outside marriage. According to the result of bivariate analysis (cross tabulation), the students who had sexual intercourse are more likely to uptake HIV test, so that there is a strong association between sexual intercourses and VCT uptake. This finding is similar to other studies from Ethiopia and Jamaica, among the students [10, 14]. This is because unsafe sex (sex without condom) puts the individual at the risk of HIV; this is why sexual intercourse is usually associated with VCT.

Also, the result indicated that 20% of the students perceived they were at the risk of HIV infection, and this is comparatively lower than that found in similar studies, which indicated the risk in studies from Ethiopia [11]. The study showed considering self at risk of HIV infection induces students to uptake the VCT service, and therefore there is a strong association between considering self at the risk of HIV infection and VCT uptake. This is due to the seeking of students to know their HIV status because they are at risk of HIV infection.

Knowledge of VCT did not show any association with VCT uptake in Bivariate analysis. This finding was consistent with the finding of a similar study which was done among the university students in Ethiopia [10]. This result emphasized the importance of other factors such as peer pressure in decision to take the test, which should be taken into consideration when planning an intervention.

According to the study, 61.5% of the students expressed their willingness to test for

HIV in the future, which is low compared with a similar study from Tanzania, in which the proportion of students who were willing to uptake the test was 85 [12]. Also, some studies among youths from Ethiopia reported a high willingness for VCT [10]. This study and all studies explained that willingness and practice may not always support each other since many people seem to be willing, but those who actually go for the test are few. The reasons for this may be mentioned already, like no HIV risk perception, do not know where to go for the test and fear of stigma. The study revealed no association between the demographic characteristics (age, sex, marital status and academic class) and willingness to uptake VCT in the future. Some similar studies agree with this finding and other studies disagree [11]. On the other hand, the study found a strong significant association between students risk perception for HIV, sexual intercourses with the willingness to up taking VCT in the future, so the students who ever had sexual intercourse and also those who considered they are at risk of HIV infection were more likely to uptake the VCT in the future.

CONCLUSION

Although a large percentage of students heard about VCT, only around 10% of students have undergone an HIV test, but willing to uptake the test is much higher, and most of those who uptake the test took it on a voluntary basis, followed by the requirement for travel visa. Those who did not take the test for HIV, their main reasons include low perception of risk for HIV infection followed by do not know where to test and no near VCT center. The study found no association between sex, marital status, academic year, but there is a statistical association between age, sexual intercourse, HIV risk perception and VCT uptake. The same association was found between willingness to take the test and perception of risk of infection and sexual intercourse. Information, education and communication interventions are needed to raise the awareness and knowledge of the importance of VCT among students and to encourage them to take VCT, especially those who expressed their willingness for VCT. Also, the government should increase the availability and accessibility of VCT services.

AUTHORS' CONTRIBUTIONS

The authors contributed equally in conducting the study; first author collected and analyzed the data, conducted the literature search and review, and wrote the initial manuscript. Second author assisted in the study design and review of the manuscript and did all the required corrections suggested by the reviewers. All authors read and approved the final paper.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical clearance was obtained from the University of Medical Sciences and Technology in Khartoum, Sudan Institutional Review Board with approval number 7/27.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures were followed in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Verbal consent form was provided to the participants wherein the procedure of the study was explained, its risks and benefits to the participant, confidentiality and the participant's right of withdrawal from the study at any time. Only participants who gave their consent by signing the consent form were recruited into the study.

AVAILABILITY OF DATA AND MATERIALS

All data generated or analyzed during this study are included in this published article.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

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