

*Full Length Research Paper*

# HIV-Related knowledge, attitudes, and practice among educated young adults in Botswana

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**Students at the University of Botswana, an at-risk group, have previously been shown to have high levels of risky sexual behavior despite widespread knowledge that these behaviors might lead to HIV-1 infection. As there have recently been considerable efforts focused on HIV-1 prevention in Botswana through nationwide media education campaigns and the opening of voluntary counselling and testing centers, re-evaluation of HIV-related knowledge, attitudes, and practices among students is needed. A cross-sectional survey was administered to 393 students chosen via a random cluster method. Respondents were 50% junior and 50% senior students with 42% males. Half (52%) were “single”, 44% were “in a relationship”, and 4% were “married”. The mean percentage of knowledge questions answered correctly was 96%. 98% agreed that all sexually active adults should know their status and that condom use is important, but only 56% believed getting tested was common and 66% believed that it was common for students to always use a condom. As with the previous survey, we again found that students had excellent knowledge yet perceived use of testing services and condoms remain lower than might be predicted based on knowledge scores.**

**Key words:** HIV/AIDS, health knowledge, attitudes, practice, Africa, southern, university students, University of Botswana.

## INTRODUCTION

Young adults in Botswana are members of the first generation to be threatened by the HIV/AIDS epidemic nearly their entire lives. This group is at risk for HIV-1 infection in a country where 31.8% of women presenting for antenatal care and 17.6% of the general population have recently been documented to be HIV-1 infected

(Botswana Ministry of Health, 2009; National AIDS Coordinating Agency, 2008).

In 1999, a survey of HIV/AIDS-related knowledge and sexual practices was conducted among students at the University of Botswana, the country's major center of education and higher learning, which found that high levels of risky behavior were prevalent among students despite widespread knowledge that these behaviors may lead to HIV-1 infection (Seloilwe et al., 2001; Seloilwe, 2005). In particular, three areas of concern were identified: low uptake of testing services, low rates of

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consistent and correct condom usage, and high rates of sexual activity occurring under the influence of alcohol or drugs, or in exchange for money or gifts.

Since 1999, the Botswana government has implemented many new initiatives, including the following: (i) a large national information, education, and communication (IEC) strategy that has included large-scale community awareness via the media (that is, radio, television, community mobilizations, brochure/booklet distribution—available in both English and the native language Setswana), and traditional dance/drama groups); (ii) the opening of numerous free-standing free HIV voluntary counseling and testing centers (“*Tebelopele*” clinics) across the county; (iii) enhanced prevention-of-mother-to-child transmission (PMTCT) care and services; (iv) the provision of isoniazid (INH) preventative therapy to prevent active tuberculosis among all HIV-1 infected adults; and (v) the opening and rapid scale-up of a national antiretroviral treatment program (“*Masa*” which means “new dawn” in Setswana) which now provides public combination antiretroviral therapy to more than 120,000 persons nationally at greater than 33 designated treatment sites.

Previous data on mass-media and voluntary testing and counseling programs for primary prevention of HIV-1 infection have yielded mixed results; mass-media campaigns are associated with increased knowledge, but have only modest effects on risk behaviors (Bertrand and Anhang, 2006). HIV-1 testing and counseling programs have shown only a modest reduction in risk behaviors limited mostly to those who test positive (Denison et al., 2008; Weinhardt et al., 1999). Because of these potential limitations, it is crucial to periodically assess the knowledge and sexual behaviors of University of Botswana students, an at-risk group, to determine whether such educational and programmatic initiatives are translating into lower infection risk for students.

Two recent follow-up studies using student focus groups found continued perceptions that these high-risk sexual behaviors were common among University of Botswana students, but recent quantitative data are lacking (Brown et al., 2008; Sabone et al., 2007). Given this, the goals of the current study were twofold: to quantitatively examine the knowledge, attitudes, and sexual practices in relation to HIV-1 prevention among University of Botswana students, a highly educated group of at-risk young adults, and to document the attitudes and beliefs of these students around HIV testing and condom use.

## MATERIALS AND METHODS

A cross-sectional survey was conducted in April 2008, at the University of Botswana’s main campus in Gaborone, Botswana. In addition to collecting aggregate information, a cluster design was used in order to assess whether years of study at the University of Botswana correlated with students’ knowledge level, attitudes, and behavior. The survey collected information on participant

demographics (gender, year of study, marital/relationship status). The knowledge section consisted of nine true/false questions on basic HIV-related information such as mode of transmission, methods of prevention, and ways to obtain treatment. For the attitudes section, participants used a four-point Likert-style scale to indicate agreement or disagreement. For the practice section, participants responded to how common or uncommon certain behaviors were in their experience, also using a four-point Likert-style scale. There were three open-ended questions that asked for motivations for students to get tested, the reasons students might not use condoms, and the types of gifts students may exchange with sexual partners. Questions were chosen to be similar to the previous survey instrument used by Seloiwe et al. 2001, Seloiwe, 2005, and were designed for junior (first and second year) and senior (third and fourth year) University of Botswana students who were predominantly between 18 and 30 years old. Copies of the survey instrument are available on request to the corresponding author.

The 32-question study survey was available in English. A waiver of Setswana translation was obtained because the primary language of instruction at the University of Botswana is English. All participants required between five to ten minutes to complete the survey. The surveys were anonymous and participants were informed that their responses were confidential due to the sensitive nature of discussing practices and behaviors that put people at risk for HIV/AIDS.

Sample size calculations were based on the assumption that 85% of total surveyed students would have adequate knowledge (namely, score  $\geq 80\%$  on the section of the survey regarding knowledge of HIV risks and behavior). Then assuming that there were only relatively small differences between the two surveyed student populations (that is, junior versus senior students), in the range of 5% (precision of 2.5% for half-length/width of the 95% confidence interval), accepting a 5% error, then 196 students were needed in each survey group.

Classes receiving the survey were selected via random sampling. Four of the University of Botswana faculties were randomly selected, followed by random sampling of departments from each faculty, and then classes from each department. Upper and lower division classes were chosen to balance junior level students from senior level students. Teaching staff were contacted to obtain permission to conduct the survey at the end of the class period. None of the teaching staff refused to allow class participation.

All University of Botswana students greater than 18 years of age attending one of the designated classes were considered eligible and oral consent was obtained before administration of the survey. Students were excluded if they refused voluntarily or did not provide informed consent. Also excluded were students that were married for more than 12 years, likely placing them out of the target range of 18 to 30 years of age. Only questionnaires with complete demographics and multiple-choice sections  $>75\%$  complete were included. If a questionnaire had incomplete open-ended questions it was still included.

All survey variables were categorical and frequency distributions were used to describe variables of interest. Specifically, two-way tables with a Chi-square distribution were used to assess the associations between socio-demographic variables, knowledge, attitudes and practice. Fisher’s exact tests were employed where table cells had expected counts of less than five. Scores on the knowledge portion of the survey were calculated by dividing the number of questions answered correctly by the total number of questions answered and comparisons were made between subgroups using the Wilcoxon rank-sum test. Data was double-entered into a database using Microsoft Access and analyzed using SAS statistical software version 9.2 (Cary, NC; USA). All P-values were 2-tailed, and a P-value  $< 0.05$  was considered statistically significant.

This study was approved by Botswana’s Ministry of Health,

**Table 1.** Baseline demographics of the surveyed population.

Characteristics	n (%) (Total = 393)	First / Second Year (n=197)	Third / Fourth Year (n=196)	P-value <sup>a</sup>
<b>Gender</b>				
Male	166 (42)	84 (43)	82 (42)	0.87
Female	227 (58)	113 (57)	114 (58)	
<b>Relationship status</b>				
Single	203 (52)	115 (58)	88 (45)	<b>&lt;0.05</b>
In a Relationship	172 (44)	75 (38)	95 (49)	
Married or Engaged	18 (4)	7 (4)	11 (6)	

<sup>a</sup>Calculated using Pearson's chi-squared test or Fisher's exact test as appropriate. Statistically significant associations (P-values < 0.05) are in bold.

Botswana's Health Research Development Unit and the Harvard School of Public Health's Human Subjects Committee.

## RESULTS

Questionnaires were administered to 453 students during a one-week period in April 2008 on the main campus of the University of Botswana in Gaborone, Botswana. Of the 453 surveys distributed, 393 students returned complete surveys yielding a response rate of 87%. Fifty-three (13%) junior student and seven (2%) senior students' surveys were excluded on the basis of incomplete multiple-choice and demographic sections.

Respondents were equal in percentage of junior (50%, n=197) and senior students (50%, n=196) with fewer males (42%, n=166) than females (58%, n=227) (Table 1). Approximately half of the respondents were "single" (52%, n=203), 44% (n=172) were "in a relationship", and 4% (n=18) were "married". Among women, higher percentages reported being in a relationship (52%, n=119/227) compared to men (43%, n=71/166).

The mean percentage of knowledge questions answered correctly was 96% (standard deviation: 6.6%). There were no statistically significant differences in percentage correct by gender, year of study, or relationship status (P-values=0.36, 0.80, and 0.47, respectively, Wilcoxon rank-sum test).

While overall knowledge scores were excellent, some questions were answered incorrectly more often than others. Eight percent (n=32/385) of respondents disagreed with the statement "Having another sexually transmitted infection increases your risk of getting HIV," 6% (n=23/391) of respondents disagreed with the statement "HIV infection in Botswana is mainly attributed to unprotected, heterosexual sex," 4% (n=14/392) of respondents disagreed with the statement "Regular use of condoms prevents HIV and other sexually transmitted infections", and 4% (n=17/391) agreed incorrectly with the statement "It is possible to get HIV from sharing a glass, kissing, or holding hands". Some questions were answered almost universally correctly, including that 99%

(n=388/391) of respondents disagreed with the statement "Taking a shower after having unprotected sex will protect one from HIV infection," and 99% (n=386/392) of respondents agreed with the statement "HIV transmission from mother to baby can be prevented."

In regards to utilization of HIV testing services, 98% (n=384/393) of respondents agreed that "All sexually active individuals should know their HIV status through regular HIV testing" while 56% (n=216/388) of students believed it was common for students to get tested for HIV but 60% (n=231/388) believed that it was uncommon for students to encourage friends and family to be tested for HIV. There were no statistically significant differences in responses between junior and senior students. On open-ended questions regarding motivations for students to be tested for HIV, 25% (n=98) of students were motivated by incentives, 22% (n=87) by the desire to know status, 7% (n=29) by the fact that they were having unprotected sex, and 7% (n=28) by the influence of peers and family (Table 2). There was no statistically significant relationship between motivations for testing and gender, relationship status, or year in school.

With regard to questions on condom use, 98% (n=381/389) agreed that, "It is important to exercise safer sex precautions (that is, condoms) in one's sex behaviors in order to prevent HIV and/or AIDS" but 80% (n=302/376) of respondents believed it was common for students to use condoms with some partners and not others, 62% (n=238/386) of respondents believed it was common to talk about using condoms with their partners, and only 66% (n=255/386) of respondents believed that it was common for students to always use a condom. There were no statistically significant differences in responses between junior and senior students. Answers to open-ended questions regarding the reasons students would not use condoms included increased pleasure (30%, n=116), the influence of drugs and alcohol (27%, n=106), trust of one's partner (16%, n=63), unavailability of condoms (10%, n=39), influence of peers (7%, n=29), fear (7%, n=29), unprotected sex as proof of love (6%, n=25), and money or gifts (3%, n=13) (Table 2). Students who were in a relationship or married were more likely to

**Table 2.** Participants' responses regarding condom use, gifts, and motivations for HIV testing.

Variable	Total n(%) <b>(n=393)</b>	Women (n=227)	Men (n=166)	P-value <sup>a</sup>	Single (n=203)	In relationship / Married (n=190)	P-value	First / Second Year (n=197)	Third / Fourth Year (n=196)	P-value
<b>Motivations to be tested</b>										
Incentives	98 (25)	58 (26)	40 (24)	0.74	49 (24)	49 (26)	0.71	46 (23)	52 (27)	0.47
To know status	87 (22)	52 (23)	35 (21)	0.67	49 (24)	38 (20)	0.32	38 (19)	49 (25)	0.17
After unprotected sex	29 (7)	13 (6)	16 (10)	0.14	13 (6)	16 (8)	0.44	17 (9)	12 (6)	0.34
Influence of peers and family	28 (7)	17 (8)	11 (7)	0.74	17 (8)	11 (6)	0.32	18 (9)	10 (5)	0.12
<b>Reasons not to use condom</b>										
Increased pleasure	116 (30)	61 (27)	55 (33)	0.18	59 (29)	57 (30)	0.84	59 (30)	57 (29)	0.85
Under the influence of alcohol or drugs	106 (27)	57 (25)	49 (30)	0.33	49 (24)	57 (30)	0.19	50 (25)	56 (29)	0.48
Trust partner	63 (16)	42 (19)	21 (13)	0.12	20 (10)	43 (23)	<0.001	30 (15)	33 (27)	0.66
Not available	39 (10)	12 (5)	27 (16)	<0.001	20 (10)	19 (10)	0.96	15 (8)	24 (12)	0.12
Influence of peers	29 (7)	19 (8)	10 (6)	0.38	14 (7)	15 (8)	0.71	7 (4)	22 (11)	<b>&lt;0.01</b>
Fear	29 (7)	24 (11)	5 (3)	<0.01	14 (7)	15 (8)	0.71	19 (10)	10 (5)	0.09
Proof of love	25 (6)	16 (7)	9 (5)	0.51	11 (5)	14 (7)	0.43	13 (7)	12 (6)	0.85
Money / gifts	13 (3)	10 (4)	3 (2)	0.15	1 (<1)	12 (6)	<0.01	3 (2)	10 (5)	0.05
<b>Common types of gifts from partners</b>										
Cell phones / credit	220 (56)	135 (59)	85 (51)	0.10	121 (60)	99 (52)	0.13	117 (60)	103 (53)	0.17
Money	239 (61)	148 (65)	91 (55)	<0.05	133 (66)	106 (56)	<0.05	129 (65)	110 (56)	0.06
Clothing	155 (39)	104 (46)	51 (31)	<0.01	76 (37)	79 (42)	0.40	83 (42)	72 (37)	0.27
Flowers, teddy bears, jewelry	115 (29)	67 (30)	48 (29)	0.90	55 (27)	60 (32)	0.33	67 (34)	48 (24)	0.04
Alcohol	26 (7)	12 (5)	14 (8)	0.22	11 (5)	15 (8)	0.32	12 (6)	14 (7)	0.68

<sup>a</sup> Calculated using Pearson's chi-squared test or Fisher's exact test as appropriate. Statistically significant associations (P-value < 0.05) are in bold.

cite trust in their partner as a reason not to use condoms (P<0.001). Men were more likely than women to cite unavailability as a reason for not using a condoms (P<0.001), and students in a relationship or married were also more likely to list money or gifts as a reason to not use condoms (P<0.01). Women were more likely than men to list fear as a reason for not using

condoms (P<0.01).

Frequent types of gifts from partners listed by students were cell phones/airtime (56%, n=220), money (61%, n=239), clothing (39%, n=155), flowers/jewelry (30%, n=115), and alcohol (7%, n=26). Students in a relationship were more likely to list money as a common gift from their partners (P<0.05) and women were

more likely than men to report money (P=0.04) and clothing (P<0.01) as common gifts.

## DISCUSSION

The current study again showed disparities in HIV-related knowledge and behaviors among

University of Botswana students since 1999. For example, whereas all students believed that all sexually active adults should know their HIV status through regular testing, only half perceived that HIV testing was common among their peers. The reasons for this discrepancy are unclear, but may be related with factors previously identified in Botswana and elsewhere in sub-Saharan Africa: concerns over breaches in confidentiality, pre-test counseling methods that frightened students, lack of knowledge of a local test site, fear of learning one's status, and lack of perceived HIV risk (Bwambale et al., 2008; Gage and Ali, 2005; Hutchinson and Mahlalela, 2006; Sabone et al., 2007; Weiser et al., 2006; Wringe et al., 2008). While voluntary counseling and testing has not been consistently shown to reduce risk behaviors for all persons tested, specific groups such as those in discordant relationships and those who test positive may reduce the frequency of unprotected intercourse as a result of being tested (Denison et al., 2008; The Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000; Weinhardt et al., 1999). In addition, HIV testing remains the portal of entry for HIV-seropositive persons to receive medical care.

With regard to condom use, nearly all students knew that the HIV epidemic in Botswana is mainly attributed to unprotected heterosexual sex, that regular use of condoms prevents HIV and other sexually transmitted infections, and thought it was important to exercise safer sex precautions (that is, condoms) in one's sex behaviors in order to prevent HIV infection. However, only two-thirds of respondents thought it was common for students to always use condoms. This result is not significantly changed from previous reports in this population: 60% of female and 78% of male University of Botswana students reported always using a condom in the 1999 survey (Seloilwe, 2005).

Reasons cited for not using condoms were numerous and included alcohol/drug use, receipt of money or gifts, and fear of sexual partner. Alcohol is associated with both high-risk sexual behavior and HIV-1 infection itself, but most interventions studied have not routinely included screening and treatment for alcohol use disorders to reduce HIV-1 transmission (Fisher et al., 2007; Kalichman et al., 2007). Sex for money or gifts (that is, transactional sex) and fear of sexual partner or intimate partner violence have also been associated with unprotected sex and HIV-1 infection in previous studies (Ankomah, 1998; Dunkle et al., 2004; Gregson et al., 2002; Karamagi et al., 2006; Maganja et al., 2007; Maman et al., 2002).

Botswana is not alone in its struggle to translate HIV-1 education programs into higher rates of condom use among adolescents and young adults. Similar studies in South Africa, Tanzania, Uganda and Nigeria have shown that the majority of respondents know HIV transmission can be prevented by the use of condoms but significantly fewer report using them (Hulton et al., 2000; James et al., 2004; Kaya and Kau, 1994; Lema et al., 2008; MacPhail and

Campbell, 2001; Maswanya et al., 1999; Ogbuji, 2005; Olugbenga-Bello et al., 2010; Simbayi et al., 2004). The factors cited for not using condoms were similar to those in the current study but with additional concerns that condoms themselves may lead to disease or that they are dangerous if they remain in the vagina after sex (Maswanya et al., 1999). As concluded by Hulton et al. (2000) high rates of risky sexual behaviors, even among educated adolescents and young adults, strongly suggests that other social and cultural barriers in addition to HIV/AIDS knowledge, such as stigma and gender disparities in sexual decision-making, may play a significant role in the spread of HIV-1 (Hulton et al., 2000).

Limitations of this study include the possibility of a significant social desirability bias leading to survey results that were not reflective of respondents' true attitudes and practices. This could potentially be due to social pressure to de-stigmatize HIV/AIDS and present oneself as aware of and proactive in HIV prevention. There was also the possibility of selection bias. We utilized a random cluster design, but there was the potential that students answering our survey were not representative of the student body (about 15,000 students) and consensus views of University of Botswana students were not obtained. Additionally, since our survey respondents included only 5% married people, it is unclear if results can be generalized to that population. In our analyses of open-ended questions, we grouped married students with students in a relationship because survey responses from such a small group may not be reflective of married people as a whole, and married people could be considered a subset of all of those in a relationship. However, there may be substantive differences in perceptions of attitudes and behavior between the two groups that warrant further study.

Botswana's Vision 2016 goal is for an AIDS-free generation, and the fulfillment of this vision depends on school-aged and university-aged youth. HIV-1-related knowledge is excellent among the University students surveyed, but despite large-scale educational campaigns, there remains a disconnection between knowledge and actual practice. While many interventions have shown improvement in knowledge or change in certain behaviors such as condom use (Michielsen et al., 2010), the few randomized trials of educational and behavioral interventions which studied biologic outcomes have not demonstrated a reduction in HIV-1 incidence (Cowan et al., 2008; Doyle et al., 2010; Jewkes et al., 2008; Ross et al., 2007). Clearly, there is a strong need for novel methods to examine knowledge-independent factors that lead to continued high-risk sexual behavior in order to reduce HIV-1 infection rates in this vulnerable population of young adults.

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