RESEARCH ARTICLE

Knowledge, attitudes and perceptions about HIV self-testing amongst college students in Namibia [version 1; peer review: 2 approved with reservations]

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Abstract

Background: In 2019, the Namibian Ministry of Health introduced HIV self-testing (HIVST) as an additional strategy to increase uptake of HIV self-testing in traditionally hard-to-reach subpopulations, such as young adults and males. It is unclear how the utilisation of HIV self-testing is optimised in young adults. The study objective is understanding knowledge, attitudes, and perception levels amongst college-going young adults in Namibia.

Methods: This quantitative study utilised a sample of 97 young college students who received a pre-test structured questionnaire. One sample *t*-test was used to analyse the average score from the Likert scale. A cut-off *p*-value of 0.05 to determine statistical significance of variables was used. Logistic regression computation was used to identify independent variables significantly associated with the dependent variable. A univariate analysis was done on awareness and acceptability with statistical significance of $p < 0.05$ to obtain preliminary insights into the association between independent and dependent variables. The net effect variables are assessed using multivariate analysis using STATA 13.1, taking into account confounding factors.

Results: Out of the 97 participants, only 23.7% knew about HIV self-testing. The logistic regression had a significant association with awareness of HIV self-testing ($p \leq 0.05$): on condom use during a first sexual encounter; being with a single sexual partner in the last 12 months; not having a sexually transmitted infection. The univariate analysis revealed an association with the acceptability of HIV self-testing from females; those who live in urban settlements; having not had sexually transmitted infection in the last twelve months. Moreover, findings reveal there are low levels of awareness, yet participants had positive attitudes and levels of acceptability to HIV self-testing.

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Conclusion: This study shows promise if awareness through health education and promotion about HIV self-testing can be increased. This can form part of scaling up HIV testing in Namibia.

Keywords

HIV self-testing; young adults; Namibia

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Introduction

The introduction of Highly Active Antiretroviral Therapy (HAART) in the mid-1990s, has been applauded for its significant reduction of AIDS-related morbidity and mortality (Iloeje *et al.*, 2005). Administration of HAART brought about a tremendous and profound reduction in the rate of immunodeficiency-related opportunistic infections (Iloeje *et al.*, 2005). As well as, the most important stage in the initiation of an HIV positive individual into the care and treatment cascade remains a conclusive HIV diagnostic test (Omondi, Mbogo and Luboobi, 2018). The Joint United Nations Programme on HIV/AIDS (UNAIDS) targets to have reached at least 73% viral suppression in people living with HIV/AIDS (PLWH) by the end of the year 2020 which in turn will make it possible to end AIDS by the year 2030 (Celum and Barnabas, 2019). This ambitious goal is only possible if at least 90% of PLWH are diagnosed and linked to care. Previously, facility-based HIV testing has targeted volunteers, who were mostly women. However, with this strategy; a significant number of men and youth are missed, as they are not as forthcoming as women with regards to testing, and therefore, contribute disproportionately to testing gaps (Kumwenda *et al.*, 2019; Dzinamarira *et al.*, 2020).

Various centers in the Northern region of Namibia offer HIV testing through voluntary counseling and testing (VCT) where individuals initiate testing and the provider-initiated testing counseling (PITC), where HIV testing is offered to clients who would have visited health centers to access medical services (Jong *et al.*, 2013). The World Health Organisation (WHO) introduced PITC as a way of increasing testing and counseling services uptake (Kennedy *et al.*, 2013). With the setting of 90-90-90 vision 2020 by UNAIDS the government of Namibia through the Ministry of Health and Social Services (MoHSS) increased ways to scale up HIV testing services (HTS) all over the country to reach underserved populations such as young adults and men (Indravudh *et al.*, 2019). All these strategies have seen successes in ensuring universal testing. However, despite these efforts, gaps in meeting the UNAIDS 90-90-90 have been identified by the recent Namibia population-based HIV impact assessment (NAMPHIA) which found that 86 % of PLWH in the age group 15-64 years knew their status with 79.6 % of the males and 89.5 % of females (MoHSS, 2018). In Namibia, HTS has been offered through traditional facility-based testing (MoHSS, 2011), which is considered to lack privacy, delays clients whilst waiting in line for their turn, associated with stigma, inconveniences of distance, and total costs involved (Wood, Ballenger and Stekler, 2014). There has been global progress in the promotion of HIV status awareness even though approximately 50% of PLWH do not know their status (UNAIDS, 2019). To attain the first 90 of the UNAIDS vision 2020 90-90-90 target in young adults, urgent and innovative ways of scaling up HTS are needed to improve the epidemic control as a substantive number of these young adults are unaware of their status in East and Southern Africa (UNAIDS, 2019).

There is a need for urgent action, as only approximately 10% of the young males and 15% of females, are aware of their HIV serostatus in East and Southern Africa. For this action, innovation is needed to increase HIV testing. Extending HTS out of the immovable facilities might be the solution especially in a country like Namibia where 5% of females and 11 % of males are reported to have sex before the age of 15 (Gumede and Sibiya, 2018; UNAIDS, 2019). It is of paramount importance that in the process of scaling up HTS the decision for someone to get tested should not compromise their autonomy (Wurm *et al.*, 2019). This is why it is important to acquaint young adults with HIV self-testing (HIVST).

HIV self-screening tests could help in increasing the number of individuals who have been tested and are aware of their HIV status (Dzinamarira and Mashamba-Thompson, 2019). With HIVST, the individual is accorded with convenience and privacy, as testing can be done in the comfort of one's home residence. It further adds empowering options for care at the same time, offering means of fast-tracking, pre-screening, and triaging out those who have self-tested negative (Dzinamarira, 2019; Dzinamarira *et al.*, 2020). HIVST will therefore help in closing the existing testing gap between women and young adults, as it can scale up HIV testing coverage and frequency. This will allow health systems to focus only on those who would require further assistance concerning counseling, HIV confirmatory testing, and initiation into the treatment and care cascade. Generally, studies have shown knowledge and acceptance of, and positive attitudes towards HIVST in key populations (Harichund and Moshabela, 2018; Tun *et al.*, 2018; Dzinamarira, Pierre and Rujeni, 2019; Hatzold *et al.*, 2019).

Behaviour change is difficult and complex as it is based on a comprehensive understanding of the factors that influence the uptake and implementation of specific health behaviours. The theoretical domains framework incorporates a range of factors that influence the extent to which a behaviour change can be enacted, such as knowledge, social influences, and emotions among others (Cane, O'Connor and Michie, 2012). This study is based upon the theoretical domains framework as the ability and urge to self-test is dependent on the knowledge, attitudes, and perceptions of an individual. In November 2018, the MoHSS started allowing and urging the citizens of Namibia to make use of HIVST. However, not everyone is versed with this new strategy so there is a need to explore awareness and acceptance through studying how knowledgeable young adults are about this topic, and what their perceptions of and attitudes towards HIVST are. This will help in identifying gaps in scaling up HIVST among potential young adult self-testers in Namibia.

Methods

The study was conducted at Elite Tutorial College in Ondangwa. Elite Tutorial College is a tertiary institution located in Ondangwa town in the Oshana region, which is in the Northern part of Namibia located 60km from the Angola border.

To calculate the sample size, Cochran's formula was used.

$$n = Z^2 pq / e^2$$

Where:

n is the sample size.

Z is the z -value at the 95% level of significance (1.96).

p is the (estimated) proportion of the population with the attribute in question. In this case the attribute was knowledge of HIVST which according to [Dzinamarira et al. 2019](#) is 21%. The proportion of knowledge was used in this case as knowledge precedes acceptability and perceptions.

q is $1-p$

e is the desired level of precision; i.e., the margin of error which was set at 0.05 in this study.

Using Cochran's formula, a sample size of 255 was calculated. However, the total number of students at Elite college is 1000, and this sample size is more than 5% of the population hence a finite population correction had to be factored in to calculate the final sample size. Therefore, a modification to Cochran's sample size for small populations was used to calculate the new sample size. The following formula was used:

$$n_1 = n_0 / (1 + [n_0 - 1] / N)$$

Where:

n_1 is the new adjusted sample size.

n_0 is the initial calculated sample size (255 calculated above).

N is the size of the population.

After adjusting for the population size, a new sample size of 203 was calculated. However, due to the covid restrictions prevailing at the time the study was conducted the researchers conveniently restricted the sample size to 106 after considering school attendance patterns. Only 96 students finally took part in the study. This still represents more than 5% of the target population hence the results of this study have enough power to infer to the sample population.

The study used a self-administered structured questionnaire adapted from ([Gumede and Sibiya, 2018](#); [Dzinamarira et al., 2020](#)). The questionnaire comprised of 65 questions and used the language of instruction in the College, which is English. The study was approved by the Stellenbosch University Research Ethics Committee (REC): Social, Behavioural and Education Research (SBER) under protocol number HIV-2020-18539. Written informed consent for participation and for publication of the participants' details was obtained from all participants.

For this survey, we included four main sections to assess their socio-demographic characteristics, their sexual health, and their health-seeking behaviour, knowledge about HIVST, attitudes, and perceptions towards HIVST and HIV positive status disclosure. We validated the questionnaire through a pilot study at Credential College with a sample of 10 students. The comments from the respondents in the pilot project were used to amend some of the questions in the questionnaire.

Outcome measures

The awareness of and perceived acceptability of HIVST among young adults was assessed in this study.

Awareness of HIVST

“Do you know what HIVST is?” was used to assess the awareness of participants to HIVST; a binary response was captured as either a yes, which was categorised as (Aware), or no, which was categorised as (Unaware)

Acceptability of HIVST

“I would prefer to do an HIV self-test and read the results myself” was used to assess the acceptability of HIVST. The responses for strongly agree and agree were categorized as (Accept) and for neutral, disagree, and strongly disagree were characterized as (Do not accept) to allow for further analysis.

Data management

The researcher collected the questionnaires at the end of each day. Completed questionnaires were stored in a locked file cabinet and only the researcher had access. The data collation and extrapolation from questionnaires was done using Microsoft Excel spreadsheets. Categorical data was checked, for out-of-range and missing values by employing the use of cross-tabulations and frequency tables. Normality tests for continuous data were done using the Shapiro-Wilk test. Frequencies and percentages were used to report categorical variables. Means and standard deviations were used to report normally distributed continuous variables. Median and interquartile ranges were used to report variables that are not normally distributed. A one-sample *t*-test was used to analyse the average score of results from the Likert scale. A cut-off *p*-value of 0.05 was used to determine if variables were statistically significant. Univariate logistic regression analysis was carried out to obtain a preliminary insight into the unconditional association of each independent variable and dependent variable. Multivariate logistic regression analysis was employed to assess the net effect of each independent variable on the dependent variable controlling for all other confounding variables. A higher cut-off *p*-value of 0.25 was used for inclusion in the multivariate model so as not to miss out on vital variables. However, significance in the final model was set at $p \leq 0.05$. The overall fitness of the model to the data was tested using the Hosmer and Lemeshow goodness of fit tests and Odds ratios at 95% CI were employed to estimate the effects. Analysis was done using STATA software version 13.1 (Stata, RRID:SCR_012763). A similar analysis was also done using R version 4.1.1 (R Core Team 2021) with no differences in the outputs from the two software. Thus, R can be used as an alternative to STATA and vice versa.

Results

Demographic characteristics

A total of 97 participants took part in this survey with a mean (SD) age of 20.8 (± 1.85) years. The majority of participants were females (67 [69.1%]). The majority of respondents identified themselves sexually as heterosexuals (79 [81.44%]). The major source of income amongst respondents was parents (71.13%). Table 1 presents more information on the demographic details of participants.

Sexual health and health seeking behaviour characteristics

The mean age for the first sexual encounter is 17.21 (± 2.11) years. This is similar to the average age found in a study done among medical students in the Kilimanjaro region in Tanzania. This Tanzanian study revealed that the average age for sexual debut was 19 (Vara *et al.*, 2020) and the majority of respondents (73.2%) reported using a condom on the first sexual encounter which corroborates with a study by Dzinamarira and colleagues showing 75 % of the participants using a condom on their first sexual encounter (Dzinamarira *et al.*, 2020). Consistency of condom use is confirmed by 49.5% of the respondents, while 7.2% reported that they never use condoms during sex. The majority of respondents (67.01%) confirmed having only one sexual partner. About 18% of the respondents reported having contracted an STI within the previous 12 months. Approximately 10% reported not using a condom in the last 12 months. Of the 30 men, 43% reported being circumcised. More information about health-seeking behaviour and sexual health is presented in Table 2 below.

Knowledge of HIV self-testing

Knowledge of HIVST was very limited in this sample of respondents with the majority of respondents (76.29%) confirming that they do not know what HIVST is all about. The same proportion of respondents reported that they had never heard about HIVST, while a slightly higher proportion (79.38%) said they had never read about HIVST. Despite this, more than 90% of the respondents confirmed that they had never used an HIVST kit, and at least more than half of them (51.04%) were aware that HIVST kits are legally allowed to be used in Namibia. Most participants were aware of the existence of HIVST kits in private pharmacies (78.35%), while only 44.33% were aware that HIV test kits were available on the internet platforms. The majority of respondents indicated that HIVST is done using blood (89.69%) with less indicating that saliva can also be used as a sample for HIVST (22.68%). Table 3 is a summary of the findings on the knowledge of HIVST by respondents.

Table 1. Demographic characteristics.

Variable	Frequency n (%)
Age _(mean [SD])	20.8 [1.85]
Gender	
Female	67 (69.07)
Male	30 (30.93)
Ethnicity	
Herero	7 (7.22)
Damara	1 (1.03)
Oshiwambo	89 (91.75)
Religion	
Christian	94 (96.91)
Muslim	1 (1.03)
African traditional religion	2 (2.06)
Sexual orientation	
Heterosexual	79 (91.75)
Lesbian	3 (3.09)
Gay	2 (2.06)
Bisexual	5 (5.25)
Prefer not to say	8 (8.25)
Source of income	
Parents	69 (71.13)
Guardian	17 (17.53)
Employed	1 (1.03)
Husband	3 (3.09)
Student loan	4 (4.12)
Sexual partner	3 (3.09)
Residential type	
Rural	61 (62.89)
Urban	31 (31.96)
Informal settlement	5 (5.15)
Currently living with	
Parents	47 (48.45)
Guardian	28 (28.87)
Husband	3 (3.09)
Sexual partner	2 (2.06)
Alone	6 (6.19)
Fellow student	11 (11.34)

In cross-tabulations, there is no existence of a significant difference in knowledge of HIV self-testing between males and females ($p > 0.05$) in all the attributes except for the need to have a retest after 3 months when the test is negative ($p = 0.009$), as shown in [Figure 1](#) below. A higher proportion of females (86.57%) were more knowledgeable compared to their male counterparts in this attribute.

Table 2. Health seeking behaviour and sexual health.

Variable	Frequency n (%)
Age at first sex _(mean[SD])	17.21[2.11]
Condom use first sex encounter	
Yes	71 (73.2)
No	26 (26.8)
Frequency of condom use during sex	
Never	7 (7.22)
Rarely	2 (2.06)
Sometimes	40 (41.24)
Always	48 (49.48)
Condom use last 12 months	
Never	10 (10.31)
Sometimes	37 (38.14)
Always	50 (51.55)
More than 1 sex partner past 12 months	
Yes	32 (32.99)
No	65 (67.01)
Paid/received money/gifts for sex	
Yes	23 (23.71)
No	74 (76.29)
Ever had STI last 12 months	
Yes	17 (17.53)
No	80 (82.47)
What did you do the last time you were sick	
Nothing	13 (13.40)
Consult qualified medical practitioner	43 (44.33)
Consult community health worker	4 (4.12)
Consult pharmacist	23 (23.71)
Consult family members	14 (14.43)
Circumcised _(Men, n = 30)	
Yes	13 (43.33)
No	15 (50.0)
Not applicable	2 (6.67)

Attitude towards HIV self-testing and linkage to care

Overall, respondents had a positive attitude towards HIVST. About 84% of the participants agreed/strongly agreed that HIV self-testing is a good idea while 80.41% agreed/strongly agreed that they can self-test at home using the HIV self-test kit. In addition, 82.47% of the respondents confirmed that they are happy to do the self-test with their sexual partner (Strongly agree – 55.67%, Agree – 26.8%). If the test result is positive, 87.63% of the respondents agreed/strongly agreed that they would seek help from a health facility. In addition, 92.78% of the respondents agreed that it is vital to get counseling and health advice after a positive HIV test result. Table 4 summarises the attitude of respondents towards HIVST and linkage to care.

Perceptions on HIV self-testing and HIV positive status disclosure

Perceptions on HIVST and disclosing HIV-positive status were largely positive. About 82% of the respondents perceived HIV self-testing as a faster strategy of ensuring that more individuals become aware of their HIV status (Strongly agree – 50.52%, Agree – 31.96%). This would enable screening of those who test positive and allow health professionals to triage

Table 3. Knowledge of HIV Self-testing.

Variable	Frequency n (%)
Know what HIV self-testing is	
Yes	23 (23.71)
No	74 (76.29)
Heard about HIV self-testing	
Yes	23 (23.71)
No	74 (76.29)
Read about HIV self-testing	
Yes	20 (20.62)
No	77 (79.38)
Ever seen a HIV self-testing kit	
Yes	21 (21.65)
No	76 (78.35)
Ever used an HIV self-testing kit	
Yes	9 (9.28)
No	88 (90.72)
Is it legal to use a HIV self-testing kit in Namibia?	
Yes	49 (51.04)
No	47 (48.96)
HIV self-testing kits are available in private pharmacies	
Yes	76 (78.35)
No	21 (21.65)
HIV self-testing kits are available in government clinics and hospitals	
Yes	73 (75.26)
No	24 (24.74)
HIV self-testing kits are available on the internet	
Yes	43 (44.33)
No	54 (55.67)
HIV self-testing can be done using blood	
Yes	87 (89.69)
No	10 (10.31)
HIV self-testing can be done using saliva from the mouth	
Yes	22 (22.68)
No	75 (77.32)
A person can perform HIV self-testing on himself/herself	
Yes	56 (57.73)
No	41 (42.27)
It takes 20 to 40 minutes to get results from the HIV self-testing process	
Yes	63 (64.95)
No	34 (35.05)
The HIV self-testing result can be negative if the HIV infection is less than 3 months old	
Yes	52 (53.61)
No	45 (46.39)

Table 3. Continued

Variable	Frequency n (%)
The person needs to retest after 3 months if the test is negative	
Yes	77 (79.38)
No	20 (20.62)
There is need for an HIV counselor before taking the HIV self-test	
Yes	81 (83.51)
No	16 (16.49)

Figure 1. Cross tabulation by gender.

them quickly to access treatment early before the disease progresses, as attested to by 71.13% of the respondents (Strongly agree – 38.14%, Agree – 32.99%). On disclosing one's HIV status, the majority of respondents (78.35%) said HIV positive status should be a secret and this agreement was strong (Mean = 1.86, SD= 1.03, $t(96) = -10.9$, $p = 0.00$). Furthermore, 65.98% agreed that those who test positive should only disclose their status to partners and this agreement was strong (Mean=2.25, SD=1.27, $t(96) = -5.8$, $p = 0.00$). There was no significant agreement or disagreement with respect to HIV positive people disclosing their status to significant others (Mean = 3.06, SD = 1.32, $t(96) = 0.46$, $p = 0.65$). A significant proportion of respondents (59.8%) disagreed with the notion that HIV positive people should talk openly about their HIV status (Mean = 3.54, SD = 1.35, $t(96) = 3.99$, $p = 0.001$). Table 5 summarises the perceptions towards HIVST and HIV positive status disclosure.

Regression analysis

Univariate analysis (Awareness)

In the univariate analysis, a year increase in age was associated with a two percent increase in awareness of HIVST [OR = 1.02; 95%CI (0.79; 1.31)]. Individuals who never used a condom during their first sexual encounter were 5% less likely to be aware of HIVST as compared to those who used a condom on their sexual debut [OR = 0.95; 95% CI (0.33; 2.76)]. Having one sexual partner in the last 12 months was associated with a 53% increase in HIVST awareness compared to those individuals with more than one sexual partner within the same 12-month period [OR = 1.53, 95% CI (0.54; 4.37)]. Individuals who had never suffered from an STI within the last 12 months were 55% more likely to be aware of HIVST in comparison to those who had suffered from an STI within the same period [OR = 1.55, 95% CI (0.40; 5.97)]. Unfortunately, none of these associations was statistically significant at the 95% level of significance ($p \leq 0.05$). In addition, no variables were significant for inclusion into the multivariate analysis. Univariate analysis findings with awareness as the dependent variable are presented in Table 6.

Univariate analysis (Acceptability)

An increase in age by a year was associated with a five percent increase in HIVST acceptability [OR = 1.05; 95% CI = (0.83; 1.32)], with women being 36% more likely to accept HIVST compared to men [OR = 1.36; 95% CI = (0.55; 3.37)].

Table 4. Attitudes towards HIV Self-testing and HIV status disclosure.

Variable	Frequency n (%)
HIV self-testing is a good idea	
Strongly agree	56 (57.73)
Agree	25 (25.77)
Neutral	3 (3.09)
Disagree	4 (10.31)
Strongly disagree	3 (3.09)
I am able to do HIV self-testing at home	
Strongly agree	33 (34.02)
Agree	45 (46.39)
Neutral	7 (7.22)
Disagree	8 (8.25)
Strongly disagree	4 (4.12)
I think I will find the HIV self-testing procedure difficult to perform	
Strongly agree	16 (16.49)
Agree	25 (25.77)
Neutral	12 (12.37)
Disagree	37 (38.14)
Strongly disagree	7 (7.22)
I would prefer to do an HIV self-test alone	
Strongly agree	25 (25.77)
Agree	33 (34.02)
Neutral	3 (3.09)
Disagree	27 (27.84)
Strongly disagree	9 (9.28)
I would prefer to self-test at a health facility	
Strongly agree	32 (32.99)
Agree	37 (38.14)
Neutral	5 (5.15)
Disagree	14 (14.43)
Strongly disagree	9 (9.28)
I would prefer to self-test with my sexual partner	
Strongly agree	54 (55.67)
Agree	26 (26.80)
Neutral	2 (2.06)
Disagree	12 (12.37)
Strongly disagree	3 (3.09)
I would prefer to do an HIV self-test and read the results myself	
Strongly agree	31 (31.96)
Agree	35 (36.08)
Neutral	7 (7.22)
Disagree	15 (15.46)
Strongly disagree	9 (9.28)

Table 4. *Continued*

Variable	Frequency n (%)
I would like to get telephone counseling before the HIV self-testing procedure	
Strongly agree	26 (26.80)
Agree	31 (31.96)
Neutral	13 (13.40)
Disagree	17 (17.53)
Strongly disagree	10 (10.31)
I would like to have an HIV counsellor present when performing the HIV self-test	
Strongly agree	59 (60.82)
Agree	19 (19.59)
Neutral	8 (8.25)
Disagree	11 (11.34)
Strongly disagree	0 (0.00)
I would seek help from the health facility if the HIV self-test come out positive	
Strongly agree	62 (63.92)
Agree	23 (23.71)
Neutral	5 (5.15)
Disagree	4 (4.12)
Strongly disagree	3 (3.09)
I would like to get face to face counselling after the HIV self-test	
Strongly agree	52 (53.61)
Agree	34 (35.05)
Neutral	6 (6.19)
Disagree	3 (3.09)
Strongly disagree	2 (2.06)
It is important to follow up an HIV positive self-test result at the clinic	
Strongly agree	52 (53.61)
Agree	39 (40.21)
Neutral	2 (2.06)
Disagree	2 (2.06)
Strongly disagree	2 (2.06)
It is important to get counselling after HIV self-testing	
Strongly agree	48 (49.48)
Agree	42 (43.30)
Neutral	3 (3.09)
Disagree	4 (4.12)
Strongly disagree	0 (0.00)

Individuals residing in urban areas were two percent more likely to accept HIVST compared to those residing in rural areas [OR = 1.02; 95% CI = (0.40; 2.57)], while those residing in informal settlements were 95% more likely to accept HIVST compared to those in rural areas [OR = 1.95; 95% CI = (0.20; 18.61)]. However, at the 95 % level of significance ($p \leq 0.05$); none of these findings were statistically significant. The odds of accepting HIVST were 2.97 higher among those who had never suffered an STI in the last 12 months as compared to those who had suffered from an STI within the same period [OR = 2.97; 95% CI = (1.02; 8.66)] and this was statistically significant ($p = 0.047$). Results from the univariate analysis for acceptability are presented in [Table 7](#).

Table 5. Perceptions towards HIVST and HIV status disclosure.

Variable	Frequency n (%)
HIV positive status should be a total secret	
Strongly agree	46 (47.42)
Agree	30 (30.93)
Neutral	12 (12.37)
Disagree	7 (7.22)
Strongly disagree	2 (2.06)
HIV positive people should tell their partners only	
Strongly agree	35 (36.08)
Agree	29 (29.90)
Neutral	12 (12.37)
Disagree	15 (15.46)
Strongly disagree	6 (6.19)
HIV positive people should inform significant others	
Strongly agree	12 (12.37)
Agree	30 (30.93)
Neutral	10 (10.31)
Disagree	30 (30.93)
Strongly disagree	15 (15.46)
HIV positive people should talk openly about their HIV status	
Strongly agree	8 (8.25)
Agree	20 (20.62)
Neutral	11 (11.34)
Disagree	27 (27.84)
Strongly disagree	31 (31.96)
Privacy is ensured in HIV self-testing	
Strongly agree	41 (42.27)
Agree	34 (35.05)
Neutral	12 (12.37)
Disagree	8 (8.25)
Strongly disagree	2 (2.06)
Less time is spent in clinics and hospitals by the use of HIV self-testing procedure	
Strongly agree	21 (21.65)
Agree	52 (53.61)
Neutral	10 (10.31)
Disagree	10 (10.31)
Strongly disagree	4 (4.12)
More people can know their status by the use of HIV self-testing	
Strongly agree	31 (31.96)
Agree	49 (50.52)
Neutral	7 (7.22)
Disagree	7 (7.22)
Strongly disagree	3 (3.09)

Table 5. *Continued*

Variable	Frequency n (%)
People who are afraid to go to the health facilities can test at home using HIV self-testing	
Strongly agree	33 (34.02)
Agree	41 (42.27)
Neutral	9 (9.28)
Disagree	10 (10.31)
Strongly disagree	4 (4.12)
People can get anti-retroviral treatment before they get sicker	
Strongly agree	37 (38.14)
Agree	32 (32.99)
Neutral	8 (8.25)
Disagree	13 (13.40)
Strongly disagree	7 (7.22)
There could be less transmission of HIV to other people	
Strongly agree	16 (16.49)
Agree	19 (19.59)
Neutral	22 (22.68)
Disagree	27 (27.84)
Strongly disagree	13 (13.40)
People could be tested more frequently	
Strongly agree	44 (45.36)
Agree	42 (43.30)
Neutral	6 (6.19)
Disagree	3 (3.09)
Strongly disagree	2 (2.06)
People may read or interpret results incorrectly	
Strongly agree	21 (21.65)
Agree	35 (36.08)
Neutral	25 (25.77)
Disagree	13 (13.40)
Strongly disagree	3 (3.09)
People may fail to read and interpret instructions correctly	
Strongly agree	17 (17.53)
Agree	46 (47.42)
Neutral	13 (13.40)
Disagree	18 (18.56)
Strongly disagree	3 (3.09)
Children and workers may be tested against their will	
Strongly agree	16 (16.49)
Agree	35 (36.08)
Neutral	4 (4.12)
Disagree	26 (26.80)
Strongly disagree	16 (16.49)

Table 5. *Continued*

Variable	Frequency n (%)
Family members could be tested against their will which could result in abuse	
Strongly agree	13 (13.40)
Agree	33 (34.02)
Neutral	17 (17.53)
Disagree	21 (21.65)
Strongly disagree	13 (13.40)
People could blame others should they test positive	
Strongly agree	13 (13.40)
Agree	29 (29.90)
Neutral	7 (7.22)
Disagree	30 (30.93)
Strongly disagree	18 (18.56)
People may commit suicide after getting a positive result without counselling	
Strongly agree	33 (34.02)
Agree	38 (39.18)
Neutral	4 (4.12)
Disagree	9 (9.28)
Strongly disagree	13 (13.40)
If not properly regulated by the government, unreliable test kits could be sold thus giving wrong results	
Strongly agree	19 (19.59)
Agree	36 (37.11)
Neutral	9 (9.28)
Disagree	24 (24.74)
Strongly disagree	9 (9.28)
Do you think the institution you are currently learning at should make HIV self-testing kits accessible to you so as to increase access to HIV testing	
Strongly agree	32 (32.99)
Agree	34 (35.05)
Neutral	3 (3.09)
Disagree	22 (22.68)
Strongly disagree	6 (6.19)

Only two variables (suffered an STI in the last 12 months and gifts for sex) were eligible for inclusion into the multivariate model using a cut-off p-value of 0.25. However, in the multivariate model, none of the two was significant, thus the model was dropped.

Discussion

The study's main aim was to explore how knowledgeable young adults in Ondangwa are to HIVST, their attitudes, perceptions, and acceptability of home-based approaches to HIV testing. This study brought up vital findings; firstly, young adults lack knowledge on HIVST as only 23% revealed knowing about HIVST; secondly, this study showed a positive attitude towards HIVST as they agreed that it was a good idea. The participants showed positive perceptions about HIVST offering privacy, allowing positive people to get treatment before they get sicker but issues of regulation, suicide, and abuse by family members and employers. Demographics revealed that the study predominantly consisted of females with 69% of the participants being female and 31% being male. Of those who took part in this study, 89% spoke Oshiwambo with few representations from other ethnic groups. A recent population and housing census conducted by the

Table 6. Univariate analysis - awareness of HIVST.

Variable	OR	95%CI	P
Age	1.02	0.79; 1.31	0.869
Sex			
Male	1.00	-	-
Female	0.79	0.29; 2.13	0.647
Type of residential area			
Rural	1.00	-	-
Urban	4.17	1.53; 11.40	0.005
Informal settlement	1.44	0.14; 14.45	0.754
Age at first sex			
<18 years	1.00	-	-
>18 years	0.82	0.32; 2.10	0.683
Used condom at first sexual encounter			
Yes	1.00	-	-
No	0.95	0.33; 2.76	0.929
Condom use in the last 12 months			
Never	1.00	-	-
Sometimes	0.12	0.02; 0.61	0.011
Always	0.39	0.97; 1.55	0.181
More than 1 sexual partner in last 12 months			
Yes	1.00	-	-
No	1.53	0.54; 4.37	0.422
Circumcised			
Yes	1.00	-	-
No	1.57	0.34; 7.32	0.567
I would rather not say	-	-	-
Not applicable	0.87	0.21, 3.66	0.849
Gifts for sex			
Yes	1.00	-	-
No	0.63	0.22; 1.80	0.388
Suffered an STI last 12 months			
Yes	1.00	-	-
No	1.55	0.40; 5.97	0.520

None of the variables were significant for inclusion in the multivariate analysis.

Namibian Statistics Agency, found that the Oshana region is home to approximately 91% Oshiwambo speaking (NSA, 2017) which is in line with the findings of this present study.

The study found out that only 23% were aware of HIVST and had heard about it whilst 68% of the participants found it acceptable. Of importance to this study is the focus by the republic of Namibia in the 2017/2018 – 2021/2022 HIV and AIDS strategic framework. The HTS section of the AIDS strategic framework seeks to improve HTS uptake among young adolescents (MoHSS, 2017) as a vital step in meeting the 90-90-90 UNAIDS and ending HIV/AIDS by 2030. Studies have reported that HIVST offers the capacity to close the testing gap (Freeman *et al.*, 2018; UNAIDS, 2019). In this study, the reports about condom usage during the first sexual encounter, late sex debut (sex after 18 years), knowledge of HIVST, and positive attitude towards HIVST and HIV risk perception were found to be factors associated with HIVST awareness. The present study further found that health-seeking behaviour, knowledge of HIVST, and positive attitude towards HIVST to be factors associated with acceptability of HIVST. The results from the present study

Table 7. Univariate analysis - acceptability of HIVST.

Variable	OR	95% CI	P
Age	1.05	0.83; 1.32	0.701
Sex			
Male	1	-	-
Female	1.36	0.55; 3.37	0.507
Sexual orientation			
Lesbian	1	-	-
Gay	0.5	0.01; 19.56	0.711
Bisexual	2	0.08; 51.59	0.676
Prefer not to say	3.5	0.14; 84.69	0.441
Heterosexual	0.96	0.08; 11.10	0.976
Type of residential area			
Rural	1.00	-	-
Urban	1.02	0.40; 2.57	0.959
Informal settlement	1.95	0.20; 18.61	0.561
Age at first sex			
<18years	1.00	-	-
>18years	1.46	0.62; 3.43	0.389
Used condom first sex encounter			
Yes	1.00	-	-
No	0.67	0.26; 1.72	0.407
Frequency of condom use with partner			
Never	1.00	-	-
Rarely	0.17	0.01; 5.45	0.314
Sometimes	0.35	0.04; 3.18	0.349
Always	0.33	0.04; 3.01	0.328
More than 1 sex partner last 12 months			
Yes	1.00	-	-
No	0.61	0.24; 1.57	0.305
Gifts for sex			
Yes	1.00	-	-
No	1.94	0.74; 5.11	0.179
Suffered from an STI last 12 months			
Yes	1.00	-	-
No	2.97	1.02; 8.66	0.047
Action taken last time sick			
Nothing	1.00	-	-
Consult qualified medical practitioner	0.28	0.05; 1.41	0.123
Consult community health worker	0.18	0.02; 2.15	0.177
Consult pharmacist	0.42	0.07; 2.39	0.325
Consult family member	0.67	0.09; 4.80	0.687

corroborate previous calls to find solutions to poor sexual reproductive health-seeking behaviour by young adults and men (Ekouevi *et al.*, 2020). Due to lack of knowledge, use was also minimal as only 9% reported having self-tested before, with 76 % reporting they knew that HIVST kits existed in private pharmacies. This corroborates with what Greacen *et al.* recommended in their study in 2016 that free HIVST kits be made available in medical centers and other public institutions (Greacen *et al.*, 2016).

Approximately 60% of the participants in this study preferred to test alone and this has been evidenced as well in a study by Young and colleagues in 2014 (Young *et al.*, 2014). The participants unanimously (87.6%) agreed that they would seek medical help with a positive HIV test result. Previous studies (Kalibala *et al.*, 2014; van Rooyen *et al.*, 2015; Gumedde and Sibiya, 2018) agree with these results. Despite participants indicating positively that they would follow up with health professionals after a positive HIV self-test result, Peate (2015) raised concerns about the lack of linkage to care of HIVST citing that, contacting a health professional is an individual responsibility (Peate, 2015). Concerns about confidentiality in HIVST were raised by 78% of the participants agreeing on secrecy regarding the HIV positive test and 55% disagreeing to disclose a HIVST positive result to their sexual partners; this corroborates with studies by Dzinamarira and colleagues and that by Gumedde and colleague (Dzinamarira *et al.*, 2020; Gumedde and Sibiya, 2018).

Despite participants agreeing to HIVST as part of the HIV/AIDS epidemic control, 67.7 % of participants fear incorrect readings and poor interpretation of the test results, which may lead to either false positives or false negatives. Furthermore, 64.9 % agreed that testing instructions could be wrongly read and interpreted. These fears have also been of concern in past studies (Ng *et al.*, 2012; Choko *et al.*, 2015; Martínez Pérez *et al.*, 2016; Sarkar *et al.*, 2016; Gumedde and Sibiya, 2018). Regulation of HIVST kits sale has not yet been enacted in Namibia both online and in pharmacies and in this study, 56.6 percent agreed that if not regulated by the government, chances of illegal HIVST kits flooding the streets are high. This drawback has been of concern in past studies (Koutentakis *et al.*, 2016; Williams *et al.*, 2017; Gumedde and Sibiya, 2018). The findings of this study revealed low awareness of HIVST at 23 percent and high acceptability of 68 percent among young adults attending Elite tutorial college in Ondangwa. Previous studies done in different subpopulations revealed similar patterns; for example, a study in Kigali Rwanda among men by Dzinamarira and colleagues revealed an awareness of 21 % and acceptability as high as 74 % (Dzinamarira, 2020); whilst another study among bisexual men in Australia revealed that 41.9 % were aware of HIVST (Dean *et al.*, 2019). A South African study done in the district of eThekweni in KwaZulu Natal showed higher levels of awareness at 69.9 % (Gumedde and Sibiya, 2018). The similarity of the study in eThekweni to this present study is that they both had an almost similar representation of (males 30.1 % females 68.8), and (males, 30.9 % females 67.7 %) respectively. Other studies that were done in Peru and Brazil also revealed awareness at high levels of 97 % among men (Volk *et al.*, 2016). In addition, the low levels of awareness may be due to HIVST being a new intervention that many people are not aware of and it is still in its inception stages.

The findings of this study found HIVST acceptability at 68.8%. Acceptability slightly lower than this of 56.2% was found among Australian MSM (men who have sex with men) and bisexual men (Dean *et al.*, 2019). In a study among Chinese MSM 43.8 % found HIVST to be acceptable (Wong *et al.*, 2015). Attributes to variations in acceptability also vary according to differences in the sampled populations. In both Dean *et al.* and Wong *et al.*, the sampled populations were MSM (Dean *et al.*, 2019; Wong *et al.*, 2015). A study among 3662 South African students showed acceptability of 75% with around 43.4% of the sample being males (Mpata Mokgatle and Madiba, 2017). High acceptability of this magnitude was also found out in a Kenyan study (Kalibala *et al.*, 2014). Results of this survey corroborate findings from a systematic review carried out by Krause and colleagues in 2013 (Krause *et al.*, 2013). The findings from this study are also in tandem with findings from literature reviews by Figueroa and colleagues (Figueroa *et al.*, 2018) and Pant Pai and colleagues (Pant Pai *et al.*, 2013). Acceptability of HIVST in SSA has been found out to range from 22% to 94% with a biased pattern where men benefit more than women from HIVST interventions (Kurth *et al.*, 2016; Maheswaran *et al.*, 2016). In comparison, studies that have men only reported high acceptability rates of around 70 to 94% whilst those that include women as the present study ferry around 22 to 64% (Dyk, 2013; Kurth *et al.*, 2016; Gumedde and Sibiya, 2018; Vara *et al.*, 2020). The highlights of this study are that key factors such as knowledge of HIVST and health-seeking behaviour influence the acceptability of HIVST. This is similar to findings from another study by Izizag and colleagues (Izizag *et al.*, 2018).

Recommendations

The Namibian government should implement a programme that increases awareness of HIVST in universities and colleges as well as in secondary schools. We recommend designing innovative policies that ensure HIVST is offered in a more youth appealing, user-friendly, and readily available to those who never took HTS for whatever reasons (Wong *et al.*, 2014; Van Rooyen *et al.*, 2015).

Conclusion

The findings from this current study revealed low levels of HIVST knowledge but the young adults in this study showed high acceptability of HIVST. These findings accentuate the importance of advancing awareness programmes for HIVST as an alternative strategy of scaling uptake of HTS among young adults in Namibia.

Data availability

The data that support the findings of this study cannot be made openly available due to security risks. The data will be made available to researchers upon reasonable request by emailing the corresponding author.

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It is an article that provides basic information on the level of knowledge and attitudes about ADVIH by youths. This can be a lever for the introduction of HIVST in Namibia. However, the authors should be more explicit and detailed on some points in the article that were noted in the comments provided. Their statistical analyses and interpretations deserve another opinion.

Comments:

Abstract section

- "In 2019, the Namibian Ministry of Health introduced HIV self-testing (HIVST) as an additional strategy to increase uptake of HIV self-testing in traditionally hard-to-reach subpopulations, such as young adults and males": I hope you want to mean "to uptake HIV testing".
- It is unclear how the utilisation of HIV self-testing is optimised in young adults
- "The logistic regression had a significant association with awareness of HIV self-testing ($p \leq 0.05$): on condom use during a first sexual encounter; being with a single sexual partner in the last 12 months; not having a sexually transmitted infection. The univariate analysis revealed an association with the acceptability of HIV self-testing from females; those who live in urban settlements; having not had sexually transmitted infection in the last twelve months" is different from the results section where you write "Unfortunately, none of these associations was statistically significant at the 95% level of significance ($p \leq 0.05$)".

Introduction section.

- The references related to Highly Active Antiretroviral Therapy impact should be updated, and cited from direct sources. For example, the authors cited Iloeje *et al.*, who have cited other sources.
 - The same suggestion about "UNAIDS statement about 73% viral suppression....". Why

did they cite other authors than UNAIDS?

https://www.unaids.org/sites/default/files/media_asset/global-AIDS-strategy-2021-2026_en.pdf

- Jong *et al* publication is not available
- “The World Health Organisation (WHO) introduced PITC as a way of increasing testing and counseling services uptake”. Why didn't the authors cite WHO PITC guidelines directly?
- While citing Namibia government policy, they mentioned another author. Why?
- I suggest changing “UNAIDS vision 2020 90-90-90 target” to the 95-95-95 target.
- Some publications could be useful for the authors
 - For UNAIDS targets: https://www.unaids.org/sites/default/files/media_asset/global-AIDS-strategy-2021-2026-summary_en.pdf
 - van Empel E, De Vlieg RA, Harling G, Marcus ME, Kahn K, Bärnighausen TW, *et al*. Reaching for the « first 95 »: a cross-country analysis of HIV self-testing in nine countries in sub-Saharan Africa. AIDS. ¹
 - Lyons CE, Coly K, Bowring AL, Liestman B, Diouf D, Wong VJ, *et al*. Use and Acceptability of HIV Self-Testing Among First-Time Testers at Risk for HIV in Senegal. AIDS Behav. ²

Methods section

- We lack information on the study period, and how many times the authors took to collect data
- The sampling was not described: “Only 96 students finally took part in the study” how have they been selected?
- We need more details to understand how participants expressed their opinions and attitudes in this section to understand the results. For example, more students than those who have ever heard about HIVST reported that they will be able to do HIVST by themselves; or disagree that “HIV self-testing procedure difficult to perform...”; How did they know HIVST and give their opinion?
- The number of participants varied: 96 in the method section and 97 for the results.
- It seems like acceptability is defined as a preference by authors; somebody can accept HIVST but doesn't prefer it to usual HIV testing services. And this can contribute to underestimating the acceptability percentage in the study. If they agree with that, it must be discussed in the “discussion section”.
- Also, in this section, it's “perceived awareness” and I agree with that because it's a self-report. But in the other sections of the article, they write “awareness”. Could they be more rigorous, and also discuss this aspect at the end? Perhaps in a “study limitation” section?

Results section

- The statistics in Table 1 must be checked. For example, the total percentage of reported sexual orientation is over 100%.
- It seems like the sample is insufficient for these quantitative analyses. Also, the authors specified that they “conveniently restricted the sample size to 106”.
- The mean age for the first sexual encounter is 17.21 (± 2.11) years. What about males and females? We know that girls are having sex earlier sex than boys. When providing results, give more gender details; data in tables 1-3 could be presented by gender.
- Condom use items: In general, the number of participants who were sexually active in a given time period, such as the last 12 months, is sought before exploring sexual behaviors. If participants reported not having had sex in the last 12 months, for example, they should be subtracted before calculating percentages. Could you clarify whether all participants were sexually active during the time period?
- Avoid discussing the results by providing information from other authors in the results section. To move to the discussion section:
 - *This is similar to the average age found in a study done among medical students in the Kilimanjaro region in Tanzania. This Tanzanian study revealed that the average age for sexual debut was 19 (Vara et al., 2020) and the majority of respondents (73.2%) reported using a condom on the first sexual encounter which corroborates with a study by Dzinamarira and colleagues showing 75 % of the participants using a condom on their first sexual encounter (Dzinamarira et al., 2020)*
- This result is somewhat unclear “Knowledge of HIVST was very limited in this sample of respondents with the majority of respondents (76.29%) confirming that they do not know what HIVST is all about. The same proportion of respondents reported that they had never heard about HIVST....and at least more than half of them (51.04%) were aware that HIVST kits are legally allowed to be used in Namibia”. Could you give more details or discuss it?
- “Retest needed after 3 months if test is negative”. Is it a recommendation from Namibia to retest 3 months later? If so, write it in the introduction section because this is not a WHO recommendation. See page 104, at <https://apps.who.int/iris/rest/bitstreams/1313903/retrieve>

I suggest presenting the results in a table, with all items, and not a figure with only gender analysis.

- Univariate analysis (Awareness); urban residence seems to be statistically associated with good awareness
- Gifts for sex are not statistically associated with acceptability. The sentence “Only two variables (suffered an STI in the last 12 months and gifts for sex) were eligible for inclusion into the multivariate model...” must be corrected

Discussion section

- In the discussion at the end of each paragraph, please draw a conclusion in terms of public health: do you have any hypotheses or recommendations to make regarding these results?

The discussion is not simply a comparison of the results with those of other authors.

- Study limitation discussed by the authors: "Demographics revealed that the study predominantly consisted of females with 69% of the participants being female and 31% being male. Of those who took part in this study, 89% spoke Oshiwambo with few representations from other ethnic groups...". This may be a limitation? I suggest removing this if it is not a limitation of the study.
- Paragraph 1.
 - HIVST is different from home-based testing because it can be used at any place
- Paragraph 2
 - "as a vital step in meeting the 90-90-90 UNAIDS and ending HIV/AIDS by 2030" to check and accurate according to UNAIDS statement; it's 95-95-95 by 2030. Reference also needed
 - "...in meeting the 90-90-90 UNAIDS and ending HIV/AIDS by 2030": could you let us know the reference, please?
 - I am not very comfortable with this conclusion " In this study, the reports about condom usage during the first sexual encounter, late sex debut (sex after 18 years), knowledge of HIVST, and positive attitude towards HIVST and HIV risk perception were found to be factors associated with HIVST awareness. The present study further found that health-seeking behaviour, knowledge of HIVST, and positive attitude towards HIVST to be factors associated with acceptability of HIVST" because the authors seem to assert the opposite in the results section.
 - Paragraphs 1 &2: Some repetitions like "The study found out that only 23% were aware of HIVST and had heard about it whilst 68% of the participants found it acceptable" to be avoided.
 - "...use was also minimal as only 9% reported having self-tested before, with 76 % reporting they knew that HIVST kits existed in private pharmacies". Maybe you can suppose that is a financial barrier to access and not a lack of information on HIVST, which is in line with the following sentence and recommend free access to HIVST kits.
- Paragraph 3. "Concerns about confidentiality in HIVST were raised by 78% of the participants agreeing on secrecy regarding the HIV positive test and 55% disagreeing to disclose a HIVST positive result to their sexual partners;...". Was this attitude specific to HIVST in the Namibia context? It seems to be a general attitude regarding HIV. What suggestion or recommendation could you do to help to remove this barrier?
- Paragraph 5. SSA to detail
- The recommendation section could be a part of the conclusion.
- A study limitation section needs to be added.

References

1. van Empel E, De Vlieg R, Harling G, Marcus M, et al.: Reaching for the 'first 95': a cross-country analysis of HIV self-testing in nine countries in sub-Saharan Africa. *AIDS*. 2022; **36** (2): 297-304 [Publisher Full Text](#)
2. Lyons CE, Coly K, Bowring AL, Liestman B, et al.: Use and Acceptability of HIV Self-Testing Among First-Time Testers at Risk for HIV in Senegal. *AIDS Behav*. 2019; **23** (Suppl 2): 130-141 [PubMed Abstract](#) | [Publisher Full Text](#)

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

I cannot comment. A qualified statistician is required.

Are all the source data underlying the results available to ensure full reproducibility?

No

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public health-Qualitative studies

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 19 April 2022

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Tracey Naledi

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Cape Town, South Africa

This is important research investigating an important issue to advance HIV prevention, early diagnosis, and early treatment specifically for young people and other vulnerable groups.

Minor comments:

- Typo in Abstract second sentence (iw)
- Please define young adults
- Please provide a reference for “approximately 10% of the young males and 15% of females, are aware of their HIV serostatus in East and Southern Africa”
- Please use SARS-CoV-2 or COVID-19 in full not covid please
- Please include date of research
- This statement is not clear “A higher proportion of females (86.57%) were more knowledgeable compared to their male counterparts in this attribute.”
- It is not clear what the mean values, SD etc. are measuring please clarify “On disclosing one’s HIV status, the majority of respondents (78.35%) said HIV positive status should be a secret and this agreement was strong (Mean = 1.86, SD= 1.03, $t(96) = -10.9$, $p = 0.00$). Furthermore, 65.98% agreed that those who test positive should only disclose their status to partners and this agreement was strong (Mean=2.25, SD=1.27, $t(96) = -5.8$, $p = 0.00$). There was no significant agreement or disagreement with respect to HIV positive people disclosing their status to significant others (Mean = 3.06, SD = 1.32, $t(96) = 0.46$, $p = 0.65$). A significant proportion of respondents (59.8%) disagreed with the notion that HIV positive people should talk openly about their HIV status (Mean = 3.54, SD = 1.35, $t(96) = 3.99$, $p = 0.001$).”
- The results section is for results of the study only – please do not include any commentary or references to other studies that belong in the discussion.

Major methods issues

- How comparable to the broader population is this study sample? Only one variable i.e distribution of Oshiwambo speaking people is included.
- The sample size is less than half what was calculated, how did the authors choose the 96 people?
- Results must have p values
- The results to be discussed in the discussion must be in the results section and not only in the tables
- The authors have used results that are not statistically significant to make conclusions “ In this study, the reports about condom usage during the first sexual encounter, late sex

debut (sex after 18 years), knowledge of HIVST, and positive attitude towards HIVST and HIV risk perception were found to be factors associated with HIVST awareness." Please be explicit that this is not statistically significant and explain the implications of this.

- Limitations of the study must be included especially with the sample size issues raised

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public Health Medicine special interest in HIV, Adolescent Health, Health Equity

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

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