

## Knowledge and attitudes on sexually transmitted infections and HIV among undergraduates in the state universities

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### ABSTRACT

This study aimed to describe knowledge and attitudes on sexually transmitted infections (STI) and HIV among undergraduates in state universities of Western province, Sri Lanka. A descriptive cross-sectional study was conducted among second and third year undergraduates in 2014. The stratified cluster sampling method was applied to select 1575 undergraduates. A pre-tested self-administered questionnaire was administered to assess knowledge and attitudes on STI and HIV. The associations of knowledge and attitude categories with selected variables were assessed. Most (42.3%, n=667) of the undergraduates belonged to poor knowledge category, 41% (n=646) satisfactory knowledge on STI. Only 16.6% (n=262) had good overall knowledge on STI. Undergraduates who had studied in bioscience stream (36.7%, n=91) were better knowledge than others (12.6%, n=171) ( $p < 0.001$ ). A majority (62.6%, n=976) of undergraduates had overall good knowledge on HIV, 27.7% (n=432) satisfactory knowledge and 9.7% (n=151) had poor knowledge. Males who had studied in bioscience stream and those who had studied at non-mixed schools were better knowledge on HIV than the counterparts. A majority (56.5%, n=883) of undergraduates had undesirable attitudes and 43.5% (n=681) had desirable attitudes towards HIV. Males (45.9%, n=294) had more desirable attitudes than females (42%, n=386) ( $p > 0.05$ ). Knowledge on STI was low and HIV was higher. About half of the undergraduates had desirable attitudes towards HIV.

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## 1. INTRODUCTION

Sexually transmitted infections (STI) are infections that spread mainly through sexual contact. STI and their complications rank in the top five adult disease categories in developing countries [1]. Several studies reported that most of the undergraduates had ever heard of STI and HIV/AIDS [2-5]. However, the knowledge on STI including HIV/AIDS was not satisfactory among young adults [2, 6].

A Sri Lankan study found that overall knowledge on symptoms and signs of STI was 29.1% and awareness of methods of prevention was 42.4% among out of school adolescents [7]. One study from West Indies [8] reported that the knowledge on STI was high (95.4%) among the medical students while another study from India [9] reported that it was satisfactory among the medical students. In contrast, one study reported that the knowledge on STI was weak among the Italian undergraduates [10].

A study found that overall knowledge on HIV/AIDS transmission was 56.8% among out of school adolescents in Sri Lanka [7]. As revealed by the Demographic Health Survey (DHS), knowledge on HIV/AIDS among women aged between 20-24 years in Sri Lanka was high [11]. In contrast to that finding, among young ever-married women aged between 15-24, comprehensive knowledge about HIV/AIDS was very low as 24% [12]. Another Sri Lankan study also reported that the knowledge on HIV transmission was fair among university students [13]. A study among African-American undergraduates revealed that 95.6% had good knowledge on HIV/AIDS [14]. Another study conducted in China reported that knowledge on HIV/AIDS was higher among the Chinese medical students compared to the foreign students [15].

One Chinese study reported that 93.7% of dental students' attitudes towards HIV/AIDS was negative [16]. Two other Sri Lankan studies also reported that undergraduates' attitude towards people living with HIV/AIDS was found to be negative [13, 17]. A total of 21,973 new patients had received services from the STD clinics during 2016 in Sri Lanka [18]. Among them 41% diagnosed as STI. The most common STIs were genital herpes, non-gonococcal infections, genital warts, syphilis, gonorrhoea, and trichomoniasis in descending order of frequency. Sri Lanka is regarded as a country with a low level of HIV epidemic status. However, national estimates show that 3900 people are living with HIV up to the end of the year 2016 and new infections are more than 550, at a prevalence rate of less than 0.1% [18]. The majority of Sri Lankan undergraduates are single. Many students have begun to reside independently in hostels and private accommodations away from their families. The liberal nature of the environment without close supervision encourages them towards risk behaviors which put them at high risk of unsafe sexual activities [19]. Currently, all the undergraduates are provided with curative care services. However, there is no program for promoting reproductive health, targeting prevention of risky sexual behaviors. Studying their knowledge and attitudes on STI/HIV would have a greater effect on planning and implementation of targeted preventive programs. Improving the knowledge on STI/HIV would lead to change the attitudes and sexual behaviours [20, 21]. The objective was to describe knowledge and attitudes on STI and HIV among undergraduates in the state universities of Western province in Sri Lanka.

## 2. RESEARCH METHOD

This was a descriptive cross-sectional study conducted in four state universities in Western Province of Sri Lanka. Those were the University of Colombo, University of Sri Jayewardenepura, University of Kelaniya, and the University of Moratuwa. University of visual and performing arts and the Open University were excluded from the study due to the differences in criteria for university admissions. The total number of undergraduates studying in these four universities is 32,200. There were 18,280 undergraduates including 10,225 and 8,055 students in second and third academic years respectively. The study population consisted of undergraduates studying in second and third years in the above universities. Undergraduates in first years were excluded due to less familiarity to new environment, fourth and fifth year students due to their unavailability in most courses, undergraduates from foreign countries due to their different socio-cultural background and clergymen undergraduates due to the sensitive nature of the selected subject. The details of methodology have been published elsewhere [22].

A multistage stratified cluster sampling technique with probability proportionate to the size of the population of each university was carried-out to select a representative sample of undergraduates. Undergraduates were stratified according to their respective universities and academic years and academic streams. A cluster was defined as a tutorial group or a whole batch according to the structure of the selected undergraduates' group. A total of 43 clusters were allocated. According to the proportions of the number of undergraduates in each academic year, 24 and 19 clusters were selected for second and third years respectively. All the eligible undergraduates of the selected clusters were recruited.

A self-administered questionnaire was used for data collection. It included socio-demographic and academic data, statements on knowledge on STI including HIV/AIDS symptoms, transmission and prevention and questions to assess the attitudes towards STI and HIV/AIDS. The validity of the questionnaire was ensured by assessing the judgmental validity which included face, content and consensual validity. Content validity was assessed by checking whether or not all aspects of measures were covered using literature review and expert opinion. A multi-disciplinary panel of experts in the fields of public health and reproductive health was used for assessment of validity. The questionnaire was pre-tested among a group of 30 undergraduates outside the study population. The overall knowledge on STI was included in four sets of questions. The first set of questions were on the awareness of each STI, which included ten items. The second set was for the symptoms of STI which included ten symptoms of STI. The third set was for the transmission and prevention of STI which included five statements on transmission and prevention of STIs. The fourth section included five places to get tested for STI where each correct answer was allocated

one mark. The overall knowledge on HIV/AIDS was assessed by thirteen statements on transmission and prevention of HIV. One mark was given for each correct answer and zero marks were given for incorrect and 'do not know' answers. All marks were added separately for STI and HIV/AIDS and final marks were obtained, made into percentages and then categorized. If the obtained mark was 75% or more, it was categorized as good knowledge, satisfactory and poor knowledge were categorized for 50-74% and less than 50% respectively.

The overall attitude on HIV/AIDS was assessed by nine statements of attitudes on HIV/AIDS. Each statement had five answers as strongly agree, agree, neutral, disagree, strongly disagree. One mark was allocated for desirable attitudes while minus one mark was given for undesirable attitudes. Zero marks were given for neutral responses. All marks were added to obtain the final score. The range was from (-9) to +9. In order to make the answers positive, +9 was added and the calculated range (0-18) was turned in to percentages and categorized as follows. Desirable attitude was 75% or more; undesirable attitude was less than 75%. Frequency distributions of knowledge and attitude items were described. Percentage of knowledge and attitude categories were calculated. Associations of knowledge and attitude categories with the selected demographic and academic variables were assessed by calculating with odds ratios (OR) and 95% confidence intervals (CI). All the variables which had a p-value of <0.20 at the bivariate analysis were considered for the multivariate analysis. Multiple logistic regression was applied to confirm the association with knowledge on STI, knowledge on HIV/AIDS and attitudes on HIV/AIDS after controlling any confounding effect. Informed written consent was obtained from the participants. Ethical clearance was taken from the Ethical Review Committee, Faculty of Medicine, University of Kelaniya (Reference number P202/12/2013). Administrative clearance was obtained from the Vice Chancellors and Deans of the selected faculties.

### 3. RESULTS AND DISCUSSION

The majority of respondents were females (n=926, 58.8%) and unmarried (98.5%, n=1551). The mean age of the study sample was 23 years (SD=0.9) and 1082 (68.7%) were residing in a university hostel or a boarding place as shown in Table 1.

Table 1. Distribution of undergraduates' socio-demographic and other characteristics

	Variable	Number	Percentage
<b>Age (in years) *</b>	21	20	1.3
	22	449	28.5
	23	696	44.2
	24	307	19.5
	25	83	5.3
	26	11	0.7
<b>Ethnicity**</b>	Sinhalese	1480	94.1
	Others	92	5.9
<b>Religion***</b>	Buddhism	1414	89.9
	Others	158	10.1
<b>Residence</b>	Own home	453	28.8
	Relative's house	36	2.3
	University hostel	411	26.1
	Boarding place	671	42.6
	Other	3	0.2
<b>Marital status</b>	Single	1551	98.5
	Married	13	0.8
	Divorced/Separated	2	0.2
	Living together	5	0.3
	Not answered	4	0.3
<b>Permanent residence</b>	Western Province	612	39.9
	Other Provinces	963	60.1
<b>University</b>	Kelaniya	339	21.5
	Sri Jayewardenepura	576	36.6
	Colombo	353	22.4
	Moratuwa	307	19.5
<b>Academic year</b>	Second year	930	59.0
	Third year	645	41.0
	Total	1575	100.0

\*missing data=9, \*\*missing data-3, \*\*\*missing data-3

#### 3.1. Knowledge on STI

A majority (97.4%) of undergraduates were aware of at least one STIs. The most commonly known type of STI was Genital Herpes (79.4%) followed by Genital warts (71.5%), Gonorrhoea (70.3%) and Syphilis (66.5%). Genital warts (67.5%) and painful ulcers (63.7%), itching of the genitalia (59.6%) were the most

commonly known symptoms of STI. The least known symptoms were vaginal discharge (33%) and urethral discharge (32%). The respondents were aware that some STI are incurable (80%), some STI can be transmitted from mother to unborn child (73.7%), and a person is at risk of contracting STI if he/she has unprotected sex once (70.1%). Most (42.3%) of the undergraduates belonged to poor knowledge category, and 41% (n=646) had satisfactory knowledge. Only 16.6% (n=262) had good overall knowledge. As shown in Table 2, undergraduates who had studied in bioscience stream (36.7%) had more good knowledge than others (12.5%) ( $p < 0.001$ ). This association was confirmed by multiple logistic regression.

Table 2. Association between overall knowledge on STI and selected variables among undergraduates

Variable	Overall knowledge on STI			Total n (%)	OR (95% CI, p value)
	Good n (%)	Satisfactory n (%)	Poor n (%)		
<b>Sex*</b>					
Male	118 (18.3)	292 (45.3)	235 (36.4)	645 (100.0)	1.23 (0.94-1.60, p=0.13)
Female	143 (15.4)	353 (38.1)	430 (46.4)	926 (100.0)	Reference
<b>Study Stream</b>					
Bio Science	91 (36.7)	112 (45.2)	45 (18.1)	248 (100.0)	3.92 (2.89-5.31, p<0.001)
Art	89 (17.2)	200 (38.8)	227 (44.0)	516 (100.0)	
Commerce	38 (9.0)	160 (37.7)	226 (53.3)	424 (100.0)	Reference
Mathematics	44 (11.4)	174 (45.0)	169 (43.7)	387 (100.0)	
<b>School type**</b>					
Mixed	107 (16.6)	253 (39.2)	285 (44.2)	645 (100.0)	0.97 (0.72-1.31, p=0.86)
Boys	55 (21.0)	124 (47.3)	83 (31.7)	262 (100.0)	
Girls	48 (13.9)	145 (42.0)	152 (44.1)	345 (100.0)	Reference
<b>Total</b>	<b>262 (16.6)</b>	<b>646 (41.0)</b>	<b>667 (42.3)</b>	<b>1575(100.0)</b>	

\*missing data=4, \*\* missing data=312, STI=sexually transmitted infections

For application of statistics, satisfactory knowledge and poor knowledge categories were amalgamated as less knowledge. Study streams and school type were also amalgamated to take as binary variables, study streams as Bio Science verses non-Bio Science while school type as mixed verses non-mixed schools

### 3.2. Knowledge on HIV

Most (99.4%, n=1565) of the undergraduates had heard about HIV. Over 90% of undergraduates knew that HIV could be transmitted through infected blood or blood products. The knowledge of transmitting HIV from pregnant mother to unborn child was 89.8%. The proportion of undergraduates who were aware that HIV could be transmitted through breast milk of infected mother was low (41%). Only 43.2% of undergraduates believed that HIV can be transmitted by mosquito bites while 11.9% thought HIV can be transmitted by sharing a meal. The percentages of other incorrect methods of transmission were 33.9%, 21.5%, and 32.3% respectively for sharing bed linen, sharing cups and plates and by hugging an infected patient as shown in Table 3.

Table 3. Distribution of accurate responses on given statements on transmission and prevention of HIV

Statement	Accurate responses n (%)
i. A person can get HIV infection by infected blood or blood products	1462 (93.4)
ii. A person can get HIV infection by getting injections with a needle that was already used by someone infected with HIV.	1431 (91.4)
iii. A person can get HIV infection by unprotected sex with an infected person.	1517 (96.9)
iv. A woman with HIV infection can transmit the virus to her newborn child through breastfeeding.	642 (41.0)
v. A pregnant woman infected with HIV may transmit the virus to her unborn child.	1406 (89.8)
vi. A person can get HIV infection by sharing bed linen with HIV infected person.	1035 (66.1)
vii. A person can get HIV infection from mosquito bites	889 (56.8)
viii. A person can get HIV infection by sharing a meal with someone who is infected.	1378 (88.1)
xi. A person can get HIV infection by sharing cups and plates with an infected person.	1227 (77.9)
x. A person can get HIV by hugging an infected patient.	1059 (67.7)
xi. A healthy-looking person can be infected with HIV.	1264 (80.8)
xii. A person can protect himself from HIV by having one uninfected faithful sexual partner	1248 (79.8)
xiii. People can be protected themselves from HIV by using a condom correctly every time they have sex with a partner other than uninfected faithful partner.	661 (42.3)

Nearly 80 % of the undergraduates believed that a person can protect himself from HIV by having one uninfected faithful sexual partner. Only a few (42.4%) thought that protection from HIV can be achieved by using a condom correctly every time they have sex with a partner other than uninfected faithful partner. Majority (62.6%, n=976) of undergraduates had overall good knowledge on HIV, 27.7%, (n=432) satisfactory

knowledge and 9.7% (n=151) poor knowledge. Males, those who had studied in bioscience stream and those who had studied at non-mixed schools had better knowledge on HIV than the other counterparts. The differences were statistically significant as presented in Table 4. In multivariate analysis, bioscience study stream (OR: 2.92, 95% CI: 2.08-4.09) and male sex (OR: 1.49, 95% CI: 1.20-1.84) remained positively associated with knowledge on HIV/AIDS.

Table 4. Frequency distribution of knowledge on HIV transmission and prevention related to sex, study stream and school type of undergraduates

Variable	Overall Knowledge on HIV***			Total n (%)	OR (95% CI, p value)
	Good n (%)	Satisfactory n (%)	Poor n (%)		
<b>Sex *</b>					
Male	432 (67.7)	152 (23.8)	54 (8.5)	638 (100.0)	1.44 (1.17-1.78, p=0.001)
Female	543 (59.2)	278 (30.3)	96 (10.5)	917 (100.0)	Reference
<b>Study Stream</b>					
Bio Science	196 (80.7)	39 (16.0)	8 (3.3)	243 (100.0)	2.87 (2.05-4.01, p<0.001)
Art	297 (57.9)	159(31.0)	57 (11.1)	513 (100.0)	
Commerce	224 (53.1)	144 (34.1)	54 (12.8)	422 (100.0)	
Mathematics	259 (68.0)	90 (23.6)	32 (8.4)	381 (100.0)	Reference
<b>School type**</b>					
Mixed	384 (60.2)	177 (27.7)	77 (12.1)	638 (100.0)	0.72 (0.57-0.91, p=0.006)
Boys	184 (70.8)	60 (23.1)	16 (6.2)	260 (100.0)	
Girls	223 (65.4)	95 (27.9)	23 (6.7)	341 (100.0)	
Total	690 (43.8)	578 (36.7)	307 (19.5)	1575 (100)	

\*missing data=4 \*\*missing data=320 \*\*\*missing data=16

For application of statistics, satisfactory knowledge and poor knowledge categories were amalgamated as average knowledge. Study streams and school type were also amalgamated to take as binary variables, study streams as Bio Science verses non-Bio Science while school type as mixed verses non-mixed schools

### 3.3. Attitudes towards HIV/AIDS

Out of nine statements on HIV and AIDS, more than 50% responded with desirable attitudes on seven statements. More than three fourths (78.7%) of respondents thought that they will not mind studying with an infected person in the same classroom. More than 70% of undergraduates had desirable attitudes towards teachers and friends with HIV/AIDS. Only one fourth of the undergraduates (25.7%) thought that HIV cannot be prevented by the isolation of infected persons as presented in Table 5.

Table 5. Undergraduates attitudes on HIV and AIDS by responses for given statements

Statement	Attitudes on HIV/AIDS		
	Desirable n (%)	Neutral n (%)	Undesirable n (%)
i. If an undergraduate has HIV but is not sick, he or she should be allowed to continue attending university.	1105 (67.4)	316 (20.2)	195 (12.5)
ii. If a relative of mine became ill with HIV, I would be willing to care for him/her in my household.	884 (56.4)	425 (27.1)	257 (16.4)
iii. I would be willing to share a meal with a person I knew had HIV or AIDS.	897 (57.0)	352 (22.5)	317 (20.2)
iv. If a teacher has HIV but is not sick, he or she should be allowed to continue teaching in school.	1108 (70.8)	267 (17.1)	190 (12.1)
v. I will not mind buying food from a shopkeeper or food seller who had HIV.	657 (42.0)	360 (23.0)	549 (35.1)
vi. I do not want it to remain secret if a member of my family became ill with HIV.	1066 (68.6)	299 (19.2)	190 (12.2)
vii. HIV cannot be prevented by isolation of infected patients	402 (25.7)	377 (24.1)	786 (50.2)
viii. I will not mind to continuing friendship with an infected friend.	1103 (70.4)	248 (15.8)	215 (13.7)
ix. I will not mind to studying with an infected person in a same class room.	1232 (78.7)	192 (12.3)	142 (9.1)

Majority (56.5%, n=883) of undergraduates had undesirable attitudes and 43.5% (n=681) had desirable attitudes on HIV and AIDS. Males (45.9%, n=294) had more desirable attitudes than females (42%, n=386). Those who had studied in Bioscience stream (47.2%, n=116) and those who had studied in non-mixed schools (45.9%, n=272) had more desirable attitudes. None of above mentioned differences were statistically significant.

### 3.4. Knowledge on STI

We found only 16.6% of undergraduates had a good overall knowledge on STI. Undergraduates who had studied in bioscience stream had better knowledge than others. This could be due to the fact that the advanced level school curriculum in biology contains topics on reproductive health. Similar findings were reported that health science students were more knowledgeable than the non-health science undergraduates [5, 23].

All the statements for assessing knowledge on transmission and treatment of STIs were correctly answered within the range of 64% to 80% of the undergraduates in the present study. A study from Bangladesh reported that 73% of female undergraduates had no knowledge on transmission of STI and HIV [4]. An Iranian study reported low knowledge on STI among adults [24].

### 3.5. Knowledge on HIV/AIDS

More than 99.4% of the undergraduates had heard about HIV/AIDS in our study. According to DHS 2006, the percentage of women aged between 20-24 years who have heard of AIDS is 91.9% in Sri Lanka [11]. We found that a majority (62.6%) of undergraduates had overall good knowledge on HIV. Males had better knowledge on HIV than females. A study carried out among final year dental students in China revealed that more than half of the respondents had a good knowledge on HIV/AIDS [16]. In contrast to our study, there was no significant difference between the sexes [16]. A study conducted among Malaysian undergraduates revealed the higher knowledge in males as our study [23]. However other two researches in Mumbai and Ireland universities revealed high knowledge on HIV but no differences in between sexes [25, 26].

A study on students of a Kuwait University reported that they were significantly more knowledgeable on HIV/AIDS than the dental undergraduates in Sri Lanka [17]. Another study conducted in Uganda revealed that 98.8% of undergraduates had knowledge on prevention of HIV [2]. Nearly 80% of women had known that limiting sexual intercourse to one faithful and uninfected partner can reduce the chances of contracting HIV and the comparative figure of the undergraduates was also the same in our study [11]. However, comparison of knowledge across the countries as well as across the studies could be done with caution. The items of the questionnaire, the scope of the knowledge on STI/HIV, methods and year of data collection, scoring criteria and determining the cutoff levels of knowledge categories may vary across the studies. Across the countries, the knowledge on STI/AIDS could be limited due to limited access to comprehensive health education, cultural and social norms which limited open communication between the parents and colleagues, inherent moral values of some cultures and truthfulness of the religions which influence the use of contraceptives and sexual behavior of an individual [19, 27].

### 3.6. Attitudes towards HIV/AIDS

A majority (56.5%) of undergraduates had undesirable attitudes and 43.5% had desirable attitudes towards HIV. Another Sri Lankan study reported the assessment of attitude towards people living with HIV/AIDS using nine statements, and those who agreed to all desirable statements were 3.2% [13]. While in another study conducted among the dental students reported that the attitude was negative [17]. A study conducted among Turkey undergraduates revealed that only 28% had positive attitude towards HIV/AIDS patients while male students had more than female students [28]. A representative sample of undergraduates was taken from the selected universities; therefore the risk of selection bias is less. Even though we excluded the foreign and clergy undergraduate that would account less than 1% of the target population. Although we used a self-administered questionnaire for acquiring data, underreporting may be a possibility due to the sensitive nature of the topic.

## 4. CONCLUSION

In conclusion, awareness of STI and HIV was very high. Knowledge on HIV was much higher than the knowledge on STI. Attitudes towards HIV was not satisfactory. Some aspects of knowledge should be further enhanced and the desirable attitudes must be expanded to improve reproductive health outcomes. The findings of the study would be used to develop a comprehensive program to improve the knowledge and desirable attitudes on STI and HIV/AIDS aiming to change the risky sexual behaviour.

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