# AWARENESS, KNOWLEDGE LEVEL, AND MISCONCEPTIONS ABOUT SEXUALLY TRANSMITTED INFECTIONS AMONG SECONDARY SCHOOL STUDENTS IN BRUNEI DARUSSALAM

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**Abstract.** Sexually transmitted infections (STI) remain an important public health issue globally, particularly among the young population. Despite being preventable and curable, STI continue to spread. Lack of access to treatment is an important factor in many developing and underdeveloped nations. Lack of awareness and knowledge is another important factor. This study assessed the awareness, knowledge, and misconceptions among secondary school students on STI. Overall, awareness was poor but better among male students and those in the Pure Science academic streaming. Similarly, the knowledge level of STI was also poor: low level (63.0%), moderate level (34.4%), and high level (2.6%). Male students ($p$=0.014) and Pure Science academic streaming students ($p$<0.001) scored better. There were misconceptions, but poor knowledge was predominant. Common sources of information were teachers, health professionals, Internet, parents and TV programs. Based on our study, more needs to be done to improve the awareness and knowledge level of STI, and detailed inclusion into the educational curriculum may be a consideration.

**Keywords:** awareness, HIV/AIDS, knowledge, misconceptions, STI, students, Brunei Darussalam

## INTRODUCTION

Sexually transmitted infections (STI) are infections that spread mainly through person-to-person sexual contact, and they continue to be a major public health problem in both developed and developing countries. The prevalence rates are higher in developing countries where STI treatment is less accessible (Obiechina *et al*, 2001). Based on the World Health Organization STI fact sheet, bacterial STI (chlamydia, gonorrhea, and syphilis) and parasitic STI (trichomoniasis) are usually curable with existing, effective single-dose regimens of antibiotics (WHO, 2013). Conversely, for other STI such as Human Immunodeficiency Virus (HIV), herpes, and hepatitis B, there are effective medications that can modulate the course of the diseases but not cure. In recent years, organisms such as those that cause gonorrhea have become more resistant, and a combination of antibiotics with a longer period is required to fight the resistant strains, thus reducing treatment options (Hanlon, 2012).

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STI are also primarily a problem of young people (Samkange-Zeeb *et al*, 2011). Based on the Joint United Nations Program on HIV/AIDS (UNAIDS) (2013), adolescents are at the center of the pandemic in terms of transmission and impact. It is also estimated that 50% of all new HIV infections are among young people, and 30% of the 40 million people living with HIV infection are between the ages 15 and 24 years.

In Brunei Darussalam, STI are also becoming a public health issue, and the two most common STI are gonorrhea and chlamydia (Ministry of Health, 2012). Of more concern is that the trend is increasing over the years. The age group with the highest number of STI is 20-29 years old followed by 10-19; therefore, the youth or adolescents (Junaidi, 2012).

An important reason is that many adolescents around the world practice unprotected sexual activities; therefore, they are at risk of contracting STI (Kaur *et al*, 2009). Lack of sex education, including education on STI prevention, is also the other reason for youth vulnerability to STI (Kaur *et al*, 2009).

The Millennium Development Goals (MDGs) Report 2013, published by the United Nations (UN, 2013), states that less than 50% of the young women and men of most sub-Saharan countries have a basic knowledge or understanding of HIV. This falls far short of the 95% target agreed in 2001 at the UN General Assembly Special Session on HIV/AIDS. Other research has also reported that the levels of awareness, knowledge, and risk factors on STI are poor. Anwar *et al* (2010) conducted a study on Malaysian secondary schools students and found that those who were sexually active only had moderate knowledge on STI.

Jaworski and Cary (2007) reported that STI knowledge is often identified as a determinant of risk behavior. Therefore, it is important to identify the level of awareness and knowledge on STI among the at-risk group so that proper measure can be taken to stop the risk behavior. In Brunei, the 10-19 year-old age group, who are the adolescents, is the second most affected group with STI (Junaidi, 2012) and can be considered as the at-risk group.

Therefore, the main research aim was to assess their knowledge on STI. Moreover, to date, there is no available and published data in our local setting, and so the main research question of this study was to assess three components, namely, the awareness, knowledge levels, and misconceptions on STI among Year 9 secondary school students.

## MATERIALS AND METHODS

**Research design and sample**

This was a case study involving quantitative and qualitative approaches to data gathering. Information on the awareness, knowledge levels, and misconceptions on STI were collected using a questionnaire followed by focused group interviews with students. After permission was obtained, Year 9 students from two co-educational government secondary schools were surveyed (convenience sampling). The reason Year 9 students were selected was because they would have just completed a topic on 'Human Reproduction and STI' when they were in Year 8, the year before. Therefore, they would have some knowledge about STI.

Because the survey was conducted in English language, having prior knowledge on certain words on STI would be helpful. Pure Science and Combined Sci-

ence (both a 3-year General Education Program) students were included. Pure Science students were of higher academic ability compared to the Combined Science students. This is because Pure Science students were those who on average scored higher when they were sitting for their Year 8 final examination the year before thus enabling them to be in Pure Science academic streaming. These students take the Brunei-Cambridge GCE 'O' Level Pure Biology, Pure Chemistry, and Pure Physics as their Science subjects; whereas, those with lower average scores will be sitting for Combined Science as their Science subject.

**Questionnaire**

The questionnaire survey used in this study was adapted from Anwar *et al* (2010), which assessed the awareness of STI in school students in Penang, Malaysia. Permission from the author to use the questionnaire was also obtained. Some of the questions were modified to suit the local context. The questionnaire was divided into three main parts, namely: awareness, knowledge, and misconceptions. For the awareness questions and misconception statements, students had to answer 'Yes', 'No,' or 'Don't Know' and their answers were converted to percentages.

For the knowledge questions which looked at examples of STI, causes, symptoms, modes of transmission and control, '1' point was awarded for each correct answer and '0' point was awarded for each wrong answer or if the students answered 'Don't Know'. This scoring system was adopted from Anwar *et al* (2010) where the total score (71 points) for knowledge was equally divided into three parts to allow categorization of knowledge level into Low, Medium, and High. Percentage scores ranging from 0-33.3% was labeled as 'Low Knowledge Level,' 33.4-66.6% as 'Moderate Knowledge Level,' and 66.7-100% as 'High Knowledge Level.'

In terms of misconceptions, students were given 10 statements about STI, and they were required to answer if each statement was 'True' 'False,' or 'Don't know' and to provide a reason why. The common sources of information on STI were also enquired. Students were asked to select their sources of information from the list provided, and this was cumulative.

As part of the survey validation, a pilot study ($n$=18) was conducted in another typical government secondary school about a month before the research began. This was done to estimate the length of time required to complete the survey and to assess the questionnaires. After the pilot study, changes were made to improve and fine-tune the instrument.

**Data analyses**

Data were entered in the Microsoft Excel® (Microsoft: Redman, WA) and later analyzed with the SPSS® (version 15.0; SPSS, Chicago, IL) program. A $p$-value $<0.05$ was taken as statistically significant.

**Ethical considerations**

All students were informed of the purpose of the study prior to the distribution of surveys. Confidentiality and anonymity were maintained throughout the surveys as identifying information was not collected. The study was conducted following the guidance of the Declaration of Helsinki on research. Permission to conduct the research was obtained from Universiti Brunei Darussalam (Ref No. 420/SHBIE/UBD/2 (PG); 2013 MAR 28) and Brunei's Ministry of Education (Department of Schools, Ref No. KP/DS/19:3; 2013 Apr 11).

Table 1
Demographic data of students ($N$=303).

| Variables | No. (%) |
|---|---|
| Gender | |
| Male | 151 (49.8) |
| Female | 152 (50.2) |
| Age (years) | |
| 13 | 28 (9.2) |
| 14 | 193 (63.7) |
| 15 | 73 (24.1) |
| 16 | 7 (2.3) |
| 17 | 2 (0.7) |
| Mean±SD | 14.2 ± 0.7 |
| Race | |
| Malay | 282 (93.1) |
| Chinese | 19 (6.3) |
| Filipino | 1 (0.3) |
| Indian | 1 (0.3) |
| Academic streaming | |
| Pure Science | 81 (26.7) |
| Combined Science | 222 (73.3) |

## RESULTS

The demographic of the 303 students is shown in Table 1. Male students generally had higher awareness about STI compared to the female students and students from the Pure Science academic streaming were also more aware than the Combined Science students (Table 2).

Table 3 shows that 63.0% of the students had low knowledge level, and only 2.6% had high knowledge level. The mean score was about 28.4±18.1, which is below the midpoint (below 50% of the maximum score). The lowest total knowledge score was 0.0%, and the highest was 88.7%. This implies that majority, more than half of the sampled students had low knowledge level about STI.

Table 4 shows that both male and females students generally had very low mean scores for all knowledge questions

Table 2
Awareness of the students in terms of gender and academic streaming ($N$=303).

| Awareness questions | 'Yes' responses (%) | | | | | |
|---|---|---|---|---|---|---|
| | Gender | | | Academic streaming | | |
| | Male ($n$=151) | Female ($n$=152) | $p$-value | Pure Science ($n$=81) | Combined Science ($n$=222) | $p$-value |
| 1. Have you heard about STI? | 45.7 | 33.6 | 0.031[a] | 63.0 | 31.1 | 0.000[a] |
| 2. Are these infections dangerous? | 61.6 | 46.1 | 0.007[a] | 74.1 | 46.4 | 0.000[a] |
| 3. Can STI affect the daily lives of the infected people? | 31.8 | 24.3 | 0.149 | 42.0 | 23.0 | 0.001[a] |
| 4. Can the infection pass from person to another? | 48.3 | 34.2 | 0.012[a] | 61.7 | 33.8 | 0.000[a] |
| 5. Should we all be concern about STI? | 36.4 | 37.5 | 0.846 | 63.0 | 27.5 | 0.000[a] |

[a]$p$<0.05

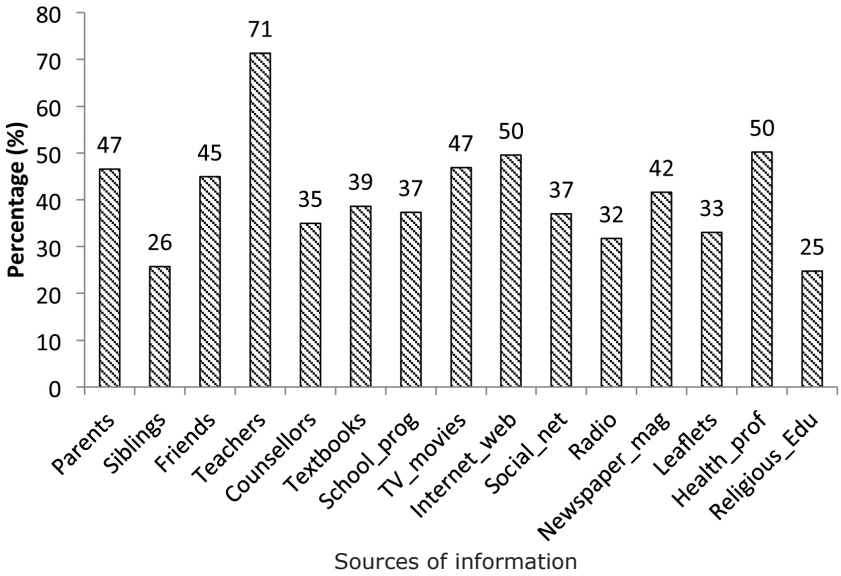


Fig 1–Students' sources of information about STI.

Table 3
Students in the low, medium and high knowledge level categories ($N$=303).

| Knowledge level categories | No. (%) |
|---|---|
| Low knowledge level | 191 (63.0) |
| Moderate knowledge level | 104 (34.4) |
| High knowledge level | 8 (2.6) |

with all mean scores below the midpoint (below 50% of the maximum score for each question). In terms of gender, the male students scored better (30.9±16.7) than the female students (25.8±19.1) for the total knowledge, and this was significantly different ($p$=0.014).

In fact, the male students scored higher than the female students in all the knowledge questions. In terms of academic streaming, Pure Science students scored significantly ($p$<0.05) better (38.6±18.8) than Combined Science students (24.6±16.3) for the total knowledge scores in all knowledge questions.

The percentage of students getting incorrect responses ranges from 3.6%-20.5%, which might seem quite low and therefore minimal misconceptions. However, this was because majority of the students put 'Don't Know' as their answers (63.4%-86.8%) and this signifies poor knowledge. Statement 'a person cannot be infected by HIV/AIDS if he/she eats healthy food and plays sports' had the highest percentage with incorrect response (20.5%) (Table 5). Some of the reasons given by students from the surveys were such as eating healthily can prevent STI.

In terms of sources of information on STI for the students, the most common source for them were teachers followed by health professionals, Internet, and parents (Fig 1).

## DISCUSSION

In this study, the male students were more aware of STI compared to female students. This may be due to our culture, whereby females are shyer. Because STI is a 'sensitive' topic, they may not want to know more about it compared to the male students. This was also observed during the separate focused group interviews between the male students and female students where female students were quiet and quite shy to answer.

Table 4
Knowledge level about STI in terms of gender and academic streaming ($N$=303).

| Knowledge questions | Mean ± SD | | | | | |
|---|---|---|---|---|---|---|
| | Gender | | | Academic streaming | | |
| | Male ($n$=151) | Female ($n$=152) | $p$-value | Pure Science ($n$=81) | Combined Science ($n$=222) | $p$-value |
| 1. Examples of STI (17) | 4.5±3.5 | 3.0±3.4 | 0.000[a] | 5.5±3.8 | 3.7±3.2 | 0.000[a] |
| 2. Causes (6) | 1.9±1.4 | 1.5±1.4 | 0.004[a] | 1.9±1.5 | 1.6±1.4 | 0.062 |
| 3. Common symptoms (8) | 1.5±1.9 | 1.4±1.9 | 0.498 | 2.5±2.2 | 1.1±1.6 | 0.000[a] |
| 4i. Spread of other STI (17) | 6.1±3.4 | 5.3±4.0 | 0.062 | 7.1±4.0 | 5.2±3.5 | 0.000[a] |
| 4ii. Spread of HIV/AIDS (17) | 5.9±3.7 | 5.0±3.9 | 0.037[a] | 7.0±3.9 | 4.9±3.6 | 0.000[a] |
| 5. Control (6) | 2.9±1.8 | 2.3±1.9 | 0.300 | 3.4±1.5 | 1.8±1.7 | 0.000[a] |
| Total knowledge scores [100] | 30.9±16.7 | 25.8±19.1 | 0.014[a] | 38.6±18.8 | 24.6±16.3 | 0.000[a] |

( ), maximum score for that question. Total knowledge scores [ ] are in percentage. [a]$p$<0.05

Table 5
Student responses to statements on STI ($N$=303).

| Statements on STI | Correct responses (%) | Incorrect responses (%) | Don't know (%) |
|---|---|---|---|
| Birth control pill can protect woman from getting STI. (False) | 8.6 | 12.9 | 78.5 |
| Condoms can protect people from getting STI. (True) | 22.1 | 6.9 | 71.0 |
| A person can have STI even without any obvious symptoms. (True) | 11.2 | 5.6 | 83.2 |
| Gonorrhoea can be cured. (True) | 10.6 | 4.6 | 84.8 |
| Human Papilloma Virus (HPV) only affects women. (False) | 7.6 | 9.9 | 82.5 |
| STI can cause infertility. (True) | 9.6 | 3.6 | 86.8 |
| HIV/AIDS can be cured. (False) | 9.6 | 15.8 | 74.6 |
| A mother can pass HIV/ AIDS to her baby through her breast milk. (True) | 24.4 | 6.6 | 69.0 |
| A person cannot be infected by HIV/AIDS if he/ she eats healthy food and plays sports. (False) | 16.1 | 20.5 | 63.4 |
| A person can have HIV and not necessarily have full-blown AIDS. (True) | 10.2 | 4.0 | 85.8 |

( ), 'Correct answer' for each statement. 'Incorrect response,' misconception.

Pure Science students were also more aware of STI. This is not unexpected as Pure Science students tend to come from a better socioeconomic background with better access to mass media outside school thus they were more knowledgeable about STI. They also tend to be more informed and resourceful in terms of finding information from books and the Internet. Furthermore, being in the Pure Science streaming meant that they are academically more capable, and their knowledge and understanding in Sciences is expected to be better than their Combined Science counterparts. However, Gerend and Magloire (2008) reported that greater awareness does not necessarily imply correct knowledge, but the lack of awareness can be translated into the students not taking proper measures that could protect their own health.

More than half (63%) of the sampled students had low knowledge level about STI (Table 3). This is of particular concern because in Brunei Darussalam as STI is on increasing trend (Ministry of Health, 2012). Moreover, adolescents aged 10-19 years old are the second most affected group (Junaidi, 2012). Therefore, low knowledge level may be one of the reasons for the high number of STI among this age group. Not knowing the risk of STI may lead to early sexual encounter without knowing the risks. In a study done in Malaysia by Anwar *et al* (2010) on secondary schools students, those who were sexually active only had moderate knowledge level.

Consequently, this was reflected in a recent newspaper article by Ismail (2013) reporting that the number of Malaysian students contracting HIV has increased by 148%. Therefore, proper sexual education and intervention may be required in order to increase the awareness and knowledge level of the students so that they can protect themselves from STI.

A more detailed breakdown of students' knowledge level on examples, causes, and symptoms on STI as well as mode of transmission and control also showed that they had scored poorly (Table 4). Similar to awareness on STI, male students had higher knowledge level scores compared to female students. Studies from India, Australia, Tanzania, and Nepal also found that male students also had higher knowledge level about STI than the female students (Agrawal *et al*, 1999; Tengia-Kessy and Kamugisha, 2006; Smith, 2009; Upreti *et al*, 2009). Girls tend to be shyer in nature, and boys tend to be more explorative; thus, they will try to find out more about STI.

In most Asian and developing countries like India and Tanzania, it is still considered a taboo for teachers and parents to talk with children about sexual matters including STI, because of cultural and religious barriers (Mwambete and Mtaturu, 2006; Chhabra *et al*, 2011). Similarly, in Cambodia, women are discouraged through cultural norms and peer pressure from being knowledgeable about sexual matters (Hor *et al*, 2000).

In terms of academic streaming, Pure Science students scored significantly better, as they are known to be academically better and have better English language ability. This result is also similar to Malaysia where Science stream students knew more about STI than the Art stream students (Anwar *et al*, 2010). In India, schools that teach Science had better scores for knowledge of HIV/AIDS (Agrawal *et al*, 1999).

In terms of misconceptions assessment, most of the students also could not answer the statements on STI correctly and selected a 'Don't know' response. Overall, the proportion of correct response

was low, ranging between 7.6% and 24.4% (Table 5). This part of the assessment again highlighted the poor awareness and knowledge level of our students. Poor knowledge can lead to misconceptions. Most of the reasons they provided for their choice of answers were also wrong and showed a poor grasp of English language, which could also be one of the causes for most of the 'Don't Know' responses.

Although examples, causes, and mode of transmission of some STI are taught in Science (Lower Secondary) and Biology (Upper Secondary) syllabuses, they are usually not taught in details due to the 'sensitive' nature of the topic. Moreover, these are usually taught in the English language. Thus, those with poor command of English may not fully understand.

Similarly, most educational talks/ presentations or interventions are typically conducted in the English language. Therefore, organizers and presenters such as teachers and health professionals should consider conducting their talks or interventions in bilinguals, namely, English and Malay in order to reach out to the Combined Science students as well, which usually made up more than half of the upper secondary student population in a secondary school in Brunei Darussalam.

With teachers being the most common source of information, it is a good opportunity to use teachers to distribute information about STI. However, teachers must be equipped with accurate information and support as well as useful teaching strategies to ensure the successful transfer of accurate information. Thus, proper training for teachers is extremely important. The data collected here is unique to Brunei Darussalam, and now we know which channels can reach the students best. It is a guideline for future planning where the involvement of teachers and schools are essential.

This information is quite similar to a review done on European youths where the school was also an important source of information on STI (Samkange-Zeeb *et al*, 2011). At the same time, schools can also invite health professionals as speakers or to conduct simple workshops about STI for the students. As the Internet, parents and TV programs were also some of their common sources of information, they should be reminded about the reliability of information acquired from the internet and TV programs. Parents should also be more aware and must play an important role in educating their children about the dangers of STI.

Poor awareness and knowledge level with a lot of misconceptions in general are not uncommon on many issues, including knowledge on many other disorders such colorectal cancer (Chong *et al*, 2015), diabetes (Rahman *et al*, 2015), hepatitis (Yau *et al*, 2016) and stroke (Shravani *et al*, 2015). Poor awareness and knowledge can lead people or patients not taking proper preventive care of their own health. It can also lead to poor compliance to management resulting in suboptimal control and disease progression.

This study was limited because only two schools were sampled. However, the two chosen schools were quite representative for most of the co-educational government schools. Despite the limitation, the data can still serve as a baseline data for future comparison. As recommendation for future research, students from Year 7, 8, 10, 11 and pre-university students should also be sampled because these are the groups of students which fall into the age group 10-19, which was the second

most common group to get STI.

In conclusion, our study has found that the awareness and knowledge level for STI are generally suboptimal among the Year 9 students from the two co-educational government secondary schools. Similarly, for misconceptions, the majority of the students did not know the answers. Moreover, in Brunei Darussalam, the youths are the second most common group to acquire STI. Therefore, more should be done in educating the students about the correct information on STI. Teachers, being their most common source of information, should take this opportunity to work with relevant health authorities and address on possible misconceptions apart from addressing awareness and knowledge gaps. This is to ensure that our youth are aware of the danger of STI, so that they can protect themselves.

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