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**Sexual Behavior, Knowledge and Attitude of Non-Medical University  
Students Towards HIV/AIDS in Malaysia.**

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**Abstract:**

**Background:** Concerns about infection with Human Immune Deficiency Virus (HIV) among adolescents has renewed interest in developing countries, where they represent a large proportion of population and are at high risk. Little is known about sexual knowledge of university students in Malaysia. University students' pattern of risky behavior and the extent of their knowledge regarding HIV can determine the type of interventional programs that can be developed for the sensitive issue of HIV in a country where Islam is the national religion.

**Methodology:** A cross-sectional study on sexual and drug use behavior, knowledge and attitude of HIV risk was undertaken amongst 530 university students using simple random sampling. The study was conducted using a self-administered questionnaire.

**Result:** Knowledge of university students about HIV was high but there are still some remaining misconceptions. Contribution of parents and medical personnel in informing students about HIV was negligible while audiovisuals including internet were found to be the main source of knowledge. Students' risk taking behavior was low as only 2.3% of students reported sexual activity during last 12 month, 58.3% of whom were using condoms. Frequency of intravenous drug use was 1.7% only. Two percent self-reported as HIV positive. However frequencies of tobacco use and alcohol intake was 21.2% and 9.7% respectively. Peer pressure (63.9%) and lack of guidance (23.9%) was reported to be the main reasons for students' drug use. Females had a better attitude than males ( $p=0.02$ ). There was a correlation between score of knowledge with attitude ( $p=0.01$ ) and behavior ( $p=0.05$ ).

**Discussion and conclusion:** Parents' guidance about risk taking behavior should be encouraged. Peer education intervention programs are needed for university students to clarify their

misconceptions, improve their attitude and prevent risky behavior. Further studies to investigate the role of tobacco and alcohol use on the students' risk taking behavior are recommended.

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**Keywords: Sexual behavior, Knowledge, HIV/AIDS, Malaysia.**

**Introduction:**

Adolescence is a period of great physical, emotional and social changes. Adulthood is a difficult period. Teenagers face lots of challenges in search of new identity. They often tormented with peer pressure to experience unsafe sexual behavior and intravenous drug use both of which makes them vulnerable to contracting HIV. Since prevention is the key elements in AIDS control, youth empowerment with knowledge related to HIV, its risk factors and preventive measures is of immense value. However, it is impossible to establish an effective educational program without knowing the existing knowledge, attitude and behavior pattern of the target population.

Several studies conducted among selected target populations in Malaysia, have evaluated HIV/AIDS knowledge and the attitudes of certain groups such as adolescence (Zulkifli, 2002), HIV positive patients, patients attending dermatology clinic (Choon, 1997) and nurses (Andrew, 2005). There has been a National Health and Morbidity Survey by the Ministry of Health in 2006 which included limited questions on knowledge and practices related to HIV/AIDS.

Majority of studies done in Malaysia, show a relatively high level of knowledge of HIV/AIDS especially among high risk groups such as sex workers, IV drug users and transsexuals (Fauziah, 2003; The, 2002; Ismal, 2001). However, un

safe practices and high risk behaviors such as unprotected sex and needle-sharing remain prevalent among sex workers and IV drug users (Fauziah, 2003; MOH, 2004). About 80% of respondents in Behavioral Surveillance Survey on high-risk groups (IDUS and sex workers) had a high level of knowledge regarding HIV and AIDS. However 68% of drug users were still sharing needles and other injecting equipment and 49% of sex workers had unprotected sex (without condom). Consistent condom use was reported to be lower among sex workers with non paying clients (18%). Female sex workers had lower use of condom as compared with male sex workers (75% of male sex workers versus 40% of female sex workers) (MOH, 2004). These data suggest that high level of knowledge does not necessarily lead to safe behavior. Adolescence were also found to have a higher level of knowledge as compared with other groups at risks (Narimah, 2003; Zulkifli, 2002). Zulkifi (2002) reports that level of knowledge for adolescents who went to school were 90% more than those who left the school. However, the depth of knowledge is questionable as not much knowledge is provided in school regarding sexor HIV/AIDS transmission.<sup>(1)</sup> Several reports have suggested serious gaps and misconceptions about HIV/AIDS (Narimah, 2003). For instance, in Reid study (2004) subjects were aware that needles are the source of infection but

did not know that sharing other injecting equipment can also transfer the virus (Reid, 2004). These gaps and misconceptions need to be rectified for groups at risks specifically for youth that is the building blocks of future for every nation, have the ability to learn and the flexibility to change.

Fight against AIDS/HIV all over the world has been focused on youth. The main reason lies in epidemiology of new HIV/AIDS cases which shows more young populations are getting infected day after day. When it comes to HIV/AIDS data young people all over the world have been considered as high risk group. Around the world each year, more than half of all people newly infected with HIV are among youth. Worldwide, about 6000 youth between the ages of 15 to 24 are infected with HIV every day. Youth under age 25 account for 28% of the 42 million people living with HIV/AIDS (Hazlina, 2002).

UNAIDS report on Malaysian data (2006), shows that of the 52,000 adults (age 15-49) living with AIDS/HIV, more than third of which are youths. Major concern is not only those young people that are already infected with the virus but also those who are prone to it (UNAIDS, 2006). It is needless to say that since AIDS is an irreversible and terminal disease, preventive measures are the best way to fight it. Thus this study focuses on young generation, the ones that can learn profusely, are more flexible to change, and hopefully have not adopted the bad habits yet. The objective was to assess the knowledge, attitude and behavior of university students towards HIV/AIDS based

on which a cultural- sensitive interventional program can be tailored.

#### **Method and subjects:**

This study was conducted in University Technology Petronas (UTP), in Perak, Malaysia. Ethical approval was taken from University Putra Malaysia Ethical Committee as this study was part of a fellowship program of the first author. Permission to obtain the study was granted by the Ministry of Health, Ipoh Branch and UTP authorities.

A total of 530 university students were randomly selected proportionate to the number of students available in 6 various departments of engineering and information technology. Sample size was calculate using the following formula:

$$n = \frac{Z^2_{1-\alpha/2} P(1-P)}{d^2} \quad \text{Where } P= 0.78; d =$$

0.025[These values were obtained from Zulkifli study (2000)], with the confidence interval of 80% and  $Z_{1-\alpha/2} = 1.282$ ; leading to sample size of 451. With estimation of 15% of loss of samples total of 518 was targeted to be recruited for this part of study. The final study sample collected was 530.

Sampling technique for this study was a combined one inclusive of proportional sampling for each department and simple random sampling. Total number of students in UTP at the starting point of the study was 5439. Stratification was done for seven faculties including Petroleum Engineering (with the population of 158 students), Business and Information (n=437), Chemical Engineering (n=1223), Civil Engineering (n=784), Electrical Engineering (n=1052), Information and computer Technology (n=535) and Mechanical Engineering

(n=1250). Students' names and their ID number were recruited through registration office. List of students' name within each department was then prepared. Sample size for each department was calculated proportionally. Simple random sampling was done using a using random number generator software.

Students were invited via letter. They were also encouraged to attend the study through intranet, student services, lecturers and campaign. A pre-designed and pre-tested questionnaire was given to all the participants. Strict confidentiality was maintained by keeping the questionnaire anonymous. Students were seated separate from each other when answering the questionnaire to ensure their privacy. Students were asked to respond honestly as information would be used for development of further educational materials for adolescents benefit. Participants read a fact sheet about the study and gave written informed consent.

The questionnaire was divided into four broad sections: socio-demographic characteristics (part A), knowledge concerning AIDS/HIV (including its symptoms, source and modes of transmission) (part B), beliefs and attitudes (origin, people, role of society, etc) (part C), next section consisted of questions about risk taking behaviors (drug use and sexual behavior) (part D). Total level of knowledge was computed using 35 items (question 5 to 13). Attitude was scored using 20 questions. Overall behavioral score was calculated based on 5 items by summing up the risk of "using intravenous drug", "being treated for sexually transmitted disease", "tested positive for HIV", "having

more than one sexual partner in the past year" and "not using condoms when having sex". These five items were then summed up to estimate the number of subjects at risk.

After checking the normal distribution of data, level of knowledge was categorized into three categories (low, medium and high level of knowledge) using mean  $\pm$  one and two standard deviations (SD) while the score of attitude was categorized into two major groups of bad and good attitude using the mean as a cut off point. Students were categorized into three groups of no risk (if none of the five questions on risky behavior was checked), low risk (if one risky behavior was checked) and high risk (if more than one risky behavior were checked).

The data was compiled, analyzed and interpreted electronically using SPSS version 12. Independent student t-test, ANOVA, Chi-square test and Pearson test was used when appropriate. A p value of less than 0.05 was considered significant.

### **Result:**

Socio-demographic characteristics:

The overall mean age of the respondents was  $19.96 \pm 1.70$  SD and ranged from 16 to of 27 years. Out of the 530 respondents, 293 subjects were male (55.3%) and 237 subjects were female (44.7%). Only one subject was married, a post graduate student. None of subjects had any children. All subjects were living on the campus. Table 1 shows the socio-demographic characteristics of the respondents. The overall mean pocket money was  $RM 447.57 \pm RM 112.84$  SD

(each US\$ equals approximately to RM 3.5).

#### **Knowledge:**

The mean score of knowledge was  $24.74 \pm 4.62$  SD and ranged from 0 to 34 with a median of 25. More than 26% of data were below the 25 percentile while only 20.9% were above 75 percentile. Table 2 shows distribution frequency of categorized knowledge. More than 57% classified as those with high level of knowledge. There was no significant difference between male and female in terms of level of knowledge ( $p=0.361$ )

More than 98% of students responded positive to the question "have you heard of HIV/AIDS?" Only 5 students (0.9%) have not heard of HIV/AIDS before. The majority of subjects, (45.2%) heard about HIV/AIDS in primary or secondary school. Audiovisual modalities such as television, internet and video were the most common source of information for UTP students (62.3%). Role of parents (3.1%), family and friends (3.1%) in informing university students in UTP was found to be negligible. Health centers inclusive of hospital, clinic and educational activities conducted by the Ministry of Health probably does not reach the students effectively as only 11.3% of subjects mentioned health services as a means of receiving information re HIV/AIDS.

Table 3 summarizes knowledge of students regarding HIV, source of infection, high risk groups and preventive measures. A third of subjects did not know that men who have sex with men can belong to high risk group (31.1%). Although majority of students were clear

about the routes of transmission, about 50% of students were doubtful. Misconception regarding the route of transmission was generally below 10% for each item except mosquito bite and sneezing/coughing which were closer to 20%. Breastfeeding was not thought as a route of transmission by majority of subjects (67.1%).

Correct answers to the preventive measures such as safe sex (using condom), not sharing needles and having a single partner sex possessed more than 80% of the responses. Misconceptions were found to be between 20% -30% while having sex during menstruation had the least response (5.3%). About 41% were not clear whether homosexuals can be at high risk.

#### **Attitude:**

Mean for the total score of attitude was  $10.97 \pm 2.69$  SD. As it is shown in table 2, 41.1% of students are classified with bad attitude. 54.7% of subjects agreed that HIV/AIDS is a punishment from God. Many (86.5%) believed that HIV is the result of decaying morals in the society and 42.3% agreed that people with HIV should be quarantined. About 47% disagree that people with HIV deserve their faith while 26.6% were not sure. Majority agreed that AIDS is a disease and not a crime (82.8%). More than 71% would not avoid friends who had relatives with HIV/AIDS. Majority agreed that there is no cure for HIV (62.4%). About forty nine percent of respondents believed that current programs of HIV prevention in Malaysia are not sufficient. Religion and moral education were found to have high frequency of response

(95.1%) in preventing HIV/AIDS. More than 54% believed that strict low enforcement is sufficient to stop the spread of the disease in the society while 46.6% believed that providing free needle can be helpful in preventing the disease. Majority believed that education has a preventive role (90.3%). Seventy seven percent were willing to attend any anti-HIV/AIDS campaign or program and 96.4% would seek advice if they catch HIV. Female had a better attitude than male ( $11.26 \pm 2.56$  vs.  $10.73 \pm 2.79$ ) ( $p=0.023$ ).

#### **Behavior:**

Mean value for total behavioral score was found to be  $0.09 \pm 0.334$  SD. A negligible percentage had high risky behavior (Table 2). There was no significant difference between male and female in terms of score of behavior ( $p= 0.969$ ).

#### **Students with high risk behavior:**

Characteristics of those at high risk ( $n=5$ ) were further analyzed with mean age of  $20.96 \pm 1.70$ . All five students were Malay, 2 females and 3 males. Average for total score of knowledge in this group of 5 students with high risk behavior was  $25.4 (\pm 4.62$  SD) and the average of their total score of attitude was found to be  $11.40 (\pm 2.70$  SD). In other words, two of the subjects had low level and three had medium level of knowledge. As for their attitude, two of the students had bad attitude while the remaining three had good attitude. One of the male students claimed to be HIV positive while another two were treated for a sexually transmitted disease or venereal disease in the past year. One fe-

male had more than one sexual partner. One male reported to use intravenous drugs in the past year. None of the subjects at high risk group were using condom when having sex with their partners.

#### **Drug use behavior:**

Most common substance used was tobacco (21.2% overall, sum of 111 students out of 524). Alcohol was the second most common type of substance used (9.7% overall, sum of 51 students out of 527). There was no report of using morphine and heroin while use of ecstasy, cannabis and amphetamine was rarely reported (overall 5 students experienced with the latter substances).

Students were asked why they think people use drugs. Graph 1 summarizes their responses. Peer pressure was found to be the most common response (63.9%, 329 students out of 515). Having no guidance was the second most common response (23.9%, 123 students out of 515).

Nine students (out of 519) responded positive to the question "have you ever injected drug through veins (1.7%)". Five students (0.9%) have not used a second hand needle (a needle used by someone else). There was no response to the question, "if you have ever shared a needle with another user, how many different people have used a needle before you". Similarly no respond was given to the question: "if you have used needle, how often have you cleaned needles before re-using them"; suggesting that there was no needle sharing. Therefore, no cleaning of needles was reported either.

### **Sexual behavior:**

Students were asked if they had sex during past 12 months. The majority of students did not report any sexual activity during last 12 months (511 out of 523, 97.7%). Twelve students (2.3%) responded positive to this question. Out of this small group, 9 reported that they had regular partners (9 out of 12; 75%). Only one female student reported to have multiple sexual partners. Seven male students (87.5%; 7 out of 8) reported to have one sexual partner while one male student reported up to three (12.5%) partners.

Total of 11 students responded to the question "during the past 12 months, have you had sex with only males, only females, or with both males and females?" Out of these small group of respondents to this question, 27.3% (n=3) had sex with male only, two of which were female. Therefore only one of these students was homosexual. The remaining 72.7% of students (n=8) had sex with female and they were all males. Seven students out of 12 (58.3%) reported that they or their partners have used condom during their last sex.

### **Correlations:**

There was a significant correlation between level of knowledge and score of attitude ( $p=0.01$ ). Score of behavior was also found to be significantly correlated with level of knowledge ( $p=0.05$ ). However, there was no significant correlation between score of behavior and attitude ( $p=0.382$ ).

### **Discussion:**

It was gratifying to find that the level of knowledge among university students was high (mean of 24.74) and the percentage of misconceptions was low. This is consistent with the result of other studies on college students (Svenson, 1990; Green 1991, Singh, 2005; Zulkifli, 2002). However, there are still some remaining misconceptions about the route of transmission and preventive measures. For instance, 67.1% of students did not consider breastfeeding as a route of HIV infection. Eighty one percent thought that donating blood using disposable equipment can transmit HIV. This finding is consistent with that of Zulkifli (2002). Misconceptions regarding preventive measures against HIV infection such as washing private parts after sex, taking antibiotics and vaccination were also found to be between 20% - 30%. It is interesting that still 40.9% were not clear whether homosexuals can be at high risk. This could be due to the fact that in Malaysia HIV is known as a disease of IV drug users as the majority of cases are from this group.

Contradictory results in terms of adolescents' level of knowledge on HIV/AIDS can be found in the literature. Poor level of knowledge was reported in many studies inclusive of Macedonia (Atanasova, 2004). High level of knowledge of HIV, on the other hand, is reported among adolescents in other studies for instance Jamaica (Robilland, 2001). A comprehensive analysis of 32 demographic and health survey around the globe by Monasch (2000) was done on studies between years 1994-1999. Levels of knowledge, awareness, and perception of risk for 15-24 year olds were linked to

HIV prevalence rates at time of surveys. Results showed that the percentage of 15-19 year old girls who have heard of HIV/AIDS vary by region. In high prevalence areas, e.g. South Africa (1998), Uganda (1995) and Zambia (1996) over 98% had heard of AIDS. Low prevalence countries showed a lower proportion having heard of HIV/AIDS - 17% Bangladesh (1997). Awareness that a healthy looking person can have HIV/AIDS was found to be low in all countries. A high incidence country like Mozambique (1997) showed 66% of girls (15-19) not knowing a healthy looking person can have HIV/AIDS. In South Africa the figure was over 50%. Uganda had the highest level of awareness in Africa with 23% not knowing. This still leave a significant proportion of adolescent ill informed. High HIV prevalence countries had less young women 20-24 who feel they had no risk at all of getting AIDS. Despite this a high proportion of young women still did not perceive themselves at risk: 68% in Haiti (1995) and 50% in Zimbabwe (1994). Although Malaysia is in the low incidence area the level of knowledge of our sample population was high (82.9%). More recent studies also suggest the same trend. A study of 3362 female adolescents in Dhaka, Bangladesh found that a large proportion of adolescents were not aware about sexually transmitted disease and AIDS (Rahman, 2004). This multistage cluster study showed that 40.9% and 54% of the adolescents ever heard of STD and AIDS respectively.

Mass-media, internet, television and video (62.3%) rather than medical personnel (11.3%) or family members and

friends (3.1%) were found to be major sources of information about HIV/AIDS which is consistent with other study findings (DiClemente, 1986; King, 1988; Green, 1991, Hingson, 1992). An unpublished study from college students in India, Mumbai, identified films, pornographic literature and peer group as the main source of sexual knowledge. Author explains that those who can afford to access internet or VCR, watch pornography at friends homes (Nainakwal, 2001). Friends were found to have a small role in students knowledge (3.1%). This is in contrast with other studies. Thornburg from university of Arizona studied a large group of 1152 students and found that 99% of initial sex information is learned through peers. Females tended to learn from more reliable sources than males although both learned more from peers than any other source (Thornburg, 1981). Another study in Midwestern College in US (Thomas, 1986) suggested that individual reading and peers were the highest rated sources of information while institutions were highly rated sources for topics related to the anatomy and physiology of sex and venereal disease.

In China, a cross sectional study identified the most important sources of sex knowledge as school teachers and mass media for a group of 682 unmarried adolescents (Liyang Zhang, 2007). Another recent study on reproductive knowledge, attitude and behavior of adolescent males in Tehran, Iran suggests that most important source of information on sex were peers (34%) and teachers (21%). Books and magazines were the preferred source of 15% of the respondents. Rela-



tively few adolescents cited their parents as their most important (16%) or preferred (12%) source of information (Alaeddini, 2006)

Parents' role in teaching sexual behavior can be of immeasurable value yet most studies including that of ours verify that parents play almost negligible role in teaching sexual matters to their adolescents. Aspy (2007) studied the role of parental communication and instructions concerning youth sexual behavior in a community-based sample of 1083 13-17 years old teenagers. He concluded that parents have the opportunity and ability to influence their children's sexual behavior decisions. In his study youth were much less likely to have initiated sexual intercourse if their parents taught them to say no, set clear rules, talked about what is right and wrong and about delaying sexual activity. If youth were sexually active, they were more likely to use birth control if taught at home about delaying sexual activity and about birth control.

High level of knowledge does not necessarily lead to better behavior as reported by many authors (Svenson, 1990; Oswald, 1992; Greenlee, 1993). However, our study findings suggested that there was a positive correlation between level of knowledge and behavior ( $p=0.02$ ) suggesting that increasing awareness among university students is more likely to result in safe behavior. Since the majority of our study population was Muslims, religious teaching to avoid sexual intercourse out of marriage may also be a contributing factor. However, we did not look at religious teaching as a confounding factor.

Unlike Zulkifli's study (2002) we found that female's attitude was better than males. This is in light of the fact that there was no significant difference between male and female in terms of knowledge. This could mean that although males' knowledge is as good as females, their attitude still needs improvement. Tavossi (2007), however, showed that Iranian female students had both higher knowledge and a better attitude about HIV than males. Misperception towards HIV such as the belief that it is God's punishment or infected people should be quarantined are still high among university students in our study. This calls for proper programming when preparing educational materials for university students.

The fact that the students believed that education has a major preventive role and that current programs in Malaysia are not sufficient to prevent the disease emphasizes the need to start educating students about HIV specifically those with non-medical background. Belief in the importance of formal education and religious teaching was strong.

Our study population had a low risk of unsafe behavior (1%). Only 2.3% reported having sexual intercourse during last 12 month majority of who were using condoms. Only 2% reported to be HIV positive. These numbers were much lower than a recent study by low (2006) which suggested 20% of adolescents from high schools in Kuala Lumpur had sexual intercourse.

Comparing rate of sexual activity between UTP students and students from other neighboring countries shows interesting result. 11% of 804 students from

four public high schools in Philippine reported of having intercourse and the rate was higher among male as opposed to females ( $p=0.001$ ) (Aplasca, 1995).

Moreover, rate of sexual activity among our target population was quite low compared with other developed countries such as US where sexual activity is reported among college students to be about 89% (Wenger, 1990). A report of Youth Risk Behavior Surveillance System in US looked at national data from 1991 till 1999 found that from 12000 independent samples of youth each year, aged 14-18, 18.7% to 16.2% were reported to have multiple sex partners (Kann, 2000). Frequency of having multiple partners in another American study was found to be about 39%. In this study, 907 adolescents were recruited from public high schools in three urban communities (Schreck, 1999). Another USA study (California) showed that only 31% of inner city junior high school students reported having a single lifetime sexual partner while 25% reported two and 43% reported 3 or more partners (Durbin, 1993).

Data on developing countries is interesting. A study of adolescent's workers in Nepal showed that despite religious and cultural restrictions, one in five boys and one in eight unmarried girls reported experience of sexual intercourse. Early sexual experimentation, multiple partners, and low and irregular use of condoms were not uncommon (Puri, 2004). A study in Zimbabwe on sexual behavior found that out of 511 male students between 11 to 19 years of age, 37% had experienced sexual intercourse, with up to 63% of them reporting having had

more than one partner (Campbell, 1994). Teenagers in Gambia were more sexually active (73% of the married boys and 28% of the unmarried girls) as were those in the 17 years age group in Nigeria (60% boys and 38% of girls). In Taiwan, however, the figures were more conservative with only 4% having experienced sexual intercourse between ages of 15 to 21 years.

Whether these data are comparable with that of Islamic countries such as Malaysia is another matter needed sourly to be discussed. However, data on Muslim countries are not available due to stereotype nature of out of wedlock sexual activity.

As for drug use, only 1.7% (9 students) reported use of drugs intravenously in our study. Frequency of drug use was examined among South African adolescents recently during a household survey ( $n=808$ ) (Brook, 2006). Adolescents' lifetime frequency of illegal drug use was relatively low, with 89% of the sample reporting no drug use. Regression analysis revealed that personal attributes, peer substance use explained the largest percentage of the variance in adolescent's frequency of illegal drug use. This finding is comparable with our findings in UTP study where factors such as peer pressure, lack of guidance were given as reasons for students drug use.

Research has consistently found that parental monitoring of adolescent peer environments has a strong influence on adolescent's use of drugs and alcohol (Chilcoat, 1996; Dishio 1998; Mount 2002). College students may have unprotected sex while under the influence of alcohol or other drugs, which they ordi-

narily might not do. Abandoning safer sex techniques, failing to use condoms correctly and consistently, and having sex while under the influence can lead to possible infection with HIV or other sexually transmitted diseases. Also, date rape, an increasing problem on college campuses, is associated with alcohol use and may present a risk for infection.

Moreover, our result showed that "having no guidance" was the second most common response to question "why do you think people use drugs?" (23.9%, 123 students out of 515). Peer pressure was thought to be the most common reason for using drugs (63.9%, 329 students out of 515).

#### Conclusion:

In conclusion, the result of this study revealed that although level of knowledge was high and risk taking behavior (inclusive of sexual behavior or drug use behavior) was low among Malaysian university students, there is still room for improvement. There are still misconceptions regarding HIV transmission and prevention and there are gender differ-

ences in terms of attitude towards HIV. Role of parents and medical personnel to inform students about HIV should be enhanced. Use of alcohol and tobacco is high among students which can be a leading factor to drug use or sexual assault. This study calls for a critical review of HIV/AIDS risk factors such as tobacco use, peer pressure and lack of parental guidance in order to design HIV prevention programs. Implementation of educational interventions to prevent risk taking behavior is strongly suggested.

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**Table 1.** Socio-demographic characteristics of respondents (n=530).

No	Variable	Number	%
1	Gender		
	▪ Male	293	55.3
	▪ Female	237	44.7
2	Race		
	▪ Malay	439	82.8
	▪ Chinese	32	6.0
	▪ Indian	7	1.3
	▪ International	52	9.9
3	Level of Education		
	▪ Foundation	132	24.9
	▪ Undergraduate	397	74.9
	▪ Postgraduate	1	0.2
4	Course		
	▪ Civil Engineering	69	13
	▪ Electrical Engineering	97	18.4
	▪ Mechanical Engineering	94	17.7
	▪ Chemical Engineering	156	29.4
	▪ Information Technology	30	5.7

	▪ Information system	59	11.1
	▪ Petroleum Engineering	25	4.7

**Table 2.** Percentage distribution of knowledge, attitude and behavior of respondents related to HIV/AIDS (n=530). Change the table with the corrected one

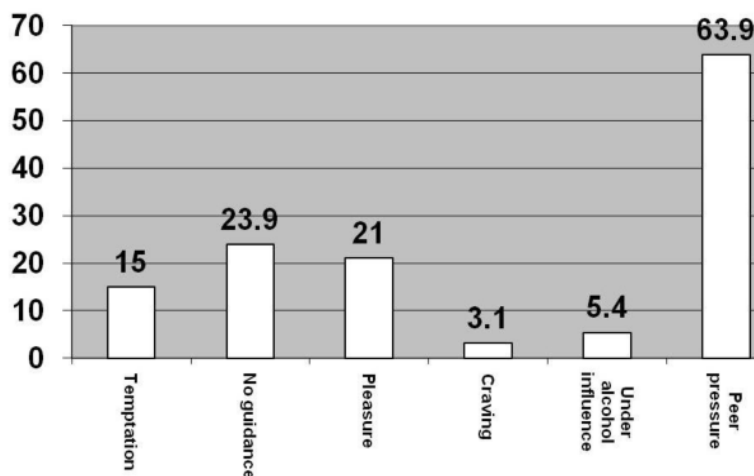
Variable	Frequency	%
Knowledge		
- Low	91	17.2
- Medium	135	25.5
- High	304	57.3
Attitude		
- Bad	218	41.3
- Good	310	58.7
Behavior		
- No risk	475	91.9
- Low risk	37	7.1
- High risk	5	1

**Table 3.** Frequency distribution of questions related to knowledge of HIV, source of infection, high risk groups and preventive measures. Check the numbers

Variable	True (%)	False (%)	Don't know (%)
Can a person infected with AIDS look healthy?	357(68.4)	108(20.7)	57(10.9)
Is there a vaccine against AIDS?	37(7)	408(77.7)	80(15.3)
Do you think that a person with AIDS or the AIDS virus can be cured?	144(27.5)	292(55.8)	87(16.7)
Can someone who looks healthy pass the AIDS virus to others?	446(84.6)	38(7.2)	43(8.2)
Taking test one week after having sex will tell a person if she or he has HIV.	124(24.0)	112(21.7)	280(54.3)
High risk group			
Prostitute	475(90.8)	5 (1.0)	43(8.2)
Men who have sex with men	308(59.1)	51(9.8)	162(31.1)
IV drug users	462(88.7)	15(2.9)	44(8.4)
Multiple sexual partners	513(97.1)	2(0.4)	13(2.5)
HIV is transmitted by			
Blood transfusion	514 (97.2)	1 (0.2)	14 (2.6)
Sneezing/coughing	60(11.7)	387(75.3)	67(13.0)
Injecting drugs/sharing needles	520(98.7)	5(0.9)	2(0.4)
Sexual intercourse	481(93.0)	6(1.2)	30(5.8)
Mother-fetus (pregnancy)	486(92.2)	21(4.0)	20(3.8)
Breast feeding	181(32.8)	216(39.1)	155(28.0)
Mosquitoes/insects	96(17.4)	361(65.4)	95(17.2)
Sharing cups/plates	43(7.7)	441(91.7)	40(8.3)
Kissing on the cheek	11(3.9)	464(83.6)	48(8.7)
Kissing on mouth	171(38.8)	262(59.4)	8(1.8)
Dirty water	16(3.1)	434(83.4)	70(13.5)
Public bathroom/toilet	26(4.8)	449(87.7)	47(9.2)
Shaking hands	4(3.8)	507(93.4)	10(1.8)
Donating blood	423(80.9)	76(73.1)	24(23.1)
Swimming in a public pool	21(4.0)	434(83.5)	65(12.5)
Anal sex	310(59.6)	32(6.2)	178(34.2)
Oral sex	256(49.0)	121(23.2)	145(27.8)
Prevention			
Safe sex (use of condom)	457(86.9)	25(4.8)	44(8.4)
Sex with single partner	408(77.7)	56(10.6)	61(11.6)
Not using commercial blood	272(52.0)	97(18.5)	154(29.4)
Vaccination	152(29.2)	211(40.5)	158(30.3)
Washing private parts after sex	97(18.5)	257(49.0)	171(32.6)

Taking antibiotics	93(17.9)	295(56.6)	133(25.5)
Having sex during menstruation	28(5.2)	302(57.6)	194(37.0)
Not sharing needles	484(91.7)	24(4.5)	20(3.8)

**Graph 1.** Frequency of answers to question “why do you think people use drugs?”



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