

## RESEARCH ARTICLES

### **An Assessment of the Knowledge, Attitudes, and Risk Perceptions of Pharmacy Students Regarding HIV/AIDS**

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**Objective.** To evaluate the level of knowledge, attitudes, and risk perceptions of University Sains Malaysia final-year pharmacy students regarding human immunodeficiency virus (HIV) and acquired immunity deficiency syndrome (AIDS).

**Method.** A cross-sectional study among pharmacy students. Data were analyzed with Chi-square to find difference at  $p$  value  $< 0.05$ .

**Results.** The majority of students (83.07%) responded showing a difference in gender and race. Students showed low willingness (9.2%) to assist patients and low confidence (36.1%) in their education about HIV/AIDS patients. Students recommended HIV testing for health care professionals (69.4%) and patients (75.9%) before surgical procedures. Students knew little about Post Exposure Prophylaxis (18.5%) or about the time for HIV to develop into AIDS (57.4%). About 40% of students were unaware of the inability of antivirals to treat HIV/AIDS. Students had low awareness for opportunistic infections (18.5%), and low agreement on competency to treat and counsel HIV patients (12.9%).

**Conclusion.** The study highlighted students' misconceptions, negative attitudes, and risk perceptions towards HIV/AIDS.

**Keywords:** acquired immunity deficiency syndrome, human immunodeficiency virus, prophylaxis

## INTRODUCTION

Since (AIDS) was first diagnosed in the United States in 1981, it remains the leading killer of humans, with 90% of all infected cases occurring in the developing world and the number of newly infected cases rising every year. The major causes of increasing HIV infection include unprotected sexual contact, injection drug use, contaminated blood transfusion, mother-to-child transmission (prenatal and while breastfeeding), and occupational exposure among health care workers).<sup>1</sup>

The first 3 cases of HIV in Malaysia were diagnosed in 1986, and the rise in HIV/AIDS has continued unabated. The number of deaths diagnosed as AIDS has risen from 14 in 1990 to 7,195 in December 2004. Obviously, the best chance of controlling the epidemic rests with a well-educated and well-trained cadre of health care providers. Steady growth of the HIV epidemic has stem-

med not from lack of preventive strategies but from failure to use the most highly effective tools available to slow the spread of HIV.<sup>2</sup>

The Joint United Nations Programme on HIV/AIDS (UNAIDS) coordinates many efforts and resources in cooperation with governments and nongovernmental organizations throughout the world to help minimize the spread of the infection, as well as provide medication for patients already infected. In this context, health care professionals have been encouraged to care for HIV/AIDS patients and conduct counseling on safety measures that minimize the rate of infection. This involvement also has compelled health care professionals to scrutinize their own practice for ways to keep up-to-date with current knowledge of prevention and treatment modifications of HIV. In the same regard, health care students must receive improved training. Many surveys have attempted to assess knowledge, attitudes, and practices, or behavior among Malaysians—particularly youths—about HIV/AIDS thus far, most studies have been based on purposive samples that cannot be generalized to the Malaysian population as a whole. Among published studies, a relatively high level

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of awareness of HIV/AIDS has been reported among the Malaysian people in various locations throughout the country and among select high-risk groups, notably sex workers, intravenous drug user, and transsexuals. Levels of knowledge were found to be higher (more than 90%) among adolescents enrolled in school compared to adolescents who had left school.<sup>16,17</sup>

Pharmacists are at low occupational risk for contracting HIV/AIDS, since they have less exposure to HIV/AIDS patients than do medical professionals. Nevertheless, pharmacy students must learn about all aspects of treatment including infection control for HIV/AIDS patients and others with infectious communicable diseases.

Further, as the rising number of newly infected patients makes clear, pharmacy and other health care students will need to stay knowledgeable and aware of HIV/AIDS. Much research from around the world has indicated gaps in students' knowledge about HIV transmission and treatment availability. Moreover, students hold negative attitudes and risk perceptions that could become barriers in their eventual professional treatment of HIV/AIDS patients.

Many interventions in educational and practical programs in different parts of the world have shown promising outcomes. It is not clear that Malaysian pharmacists know any more than their foreign counterparts about HIV/AIDS. We must then also ask whether Malaysian pharmacy students are ready and willing to treat the growing HIV/AIDS patient population. This study evaluated the knowledge, attitudes, and risk perceptions among University Sains Malaysia final-year pharmacy students about HIV/AIDS, identifying areas of misconceptions, gaps in knowledge, and conclusions on the basis of outcomes. We hope that the results of the proposed study will help the institutions implement educational interventions to improve HIV/AIDS understanding among health care students.

## METHODS

Students in the University Sains Malaysia bachelor of pharmacy (BPharm) program received training in HIV/AIDS pharmacotherapy only in the final-year course of applied pharmacotherapy. A lecture class included a 1-hour problem-based learning session. Study subjects came from the University's final-year student body (130 students). Ethical approval for conducting this study was obtained from University Sains Malaysia (USM) human ethics approval committee. Questionnaire items were developed from literature reviews and consultation with pharmacy lecturers. To validate the questionnaire; a draft was given to a group of pharmacy students for feedback.

No formal sampling methods were used for the actual survey. Instead, all final-year pharmacy students were asked to complete the questionnaire and participation was voluntary. Informed consent letters were obtained from the students before completing the questionnaire. The questionnaires were distributed and collected by class representatives.

## RESULTS

A summary of the demographic characteristics of the study subjects is presented in Table 1. The sample of final-year pharmacy students comprised 108 students from the final year study population of 130 (83.07%). Eighty-six (79.6%) students were female and 22 (20.4%) were male. The mean age was 23.7 years (range: 20 to 26 years). Almost 80% of the students were Chinese, while the remaining 20.4% were Malay.

### Pharmacy Students' Knowledge About HIV/AIDS

Possible responses to questions pertaining to HIV/AIDS knowledge were *yes*, *no*, and *don't know*. Responses were first tabulated as percentage of correct answers, then further analyzed by student demographics (gender, race). A chi-square test was conducted for this purpose, and a *p* value ( $p < 0.005$ ) was established to measure significant differences between responses (Table 2). In general there were no significant differences by gender regarding the HIV/AIDS knowledge except on the subject of postexposure prophylaxis, about which female students appeared more knowledgeable than male students ( $p=0.038$ ), and on the subject of duration of HIV to develop as AIDS, about which male students appeared more knowledgeable than female students ( $p = 0.001$ ).

Chinese students were more knowledgeable than Malay students about vertical (infected mother to child) transmission ( $p = 0.043$ ), social contacts transmission ( $p = 0.012$ ), and major routes of transmission ( $p = 0.019$ ).

Table 1. Sociodemographic Data of the Students

Variable	Value
No. (total number)	108 (130)
Response rate, %	83.07
Gender, No. (%)	
Male	22 (20.4)
Female	86 (79.6)
Age (mean)	23.7 (20-26y)
Race, No. (%)	
Malay	22 (20.4)
Chinese	86 (79.6)
Indian	0 (0)
Other	0 (0)

Table 2. Pharmacy Students' Knowledge About HIV/AIDS

Survey Question/Statement	Yes, No. (%)	No, No. (%)	Don't Know, No. (%)	Correct Answers, %	Gender, P Value (Actual Scores)	Race, P Value (Actual Scores)
Can HIV/AIDS be transmitted from infected mother to child?	105 (97.2)	3 (2.8)		97.2	0.374 (M = 100) (F = 96.51)	0.043 (ML = 90.1) (CH = 98.8)
Can HIV be transmitted via air and contact with water?	2 (1.9)	105 (97.2)	1 (0.9)	97.2	0.510 (M = 95.5) (F = 97.7)	0.510 (ML = 95.5) (CH = 97.7)
Can HIV be transferred through social contacts like sharing clothes? Cups/ plates/ spoon/ glass, bathrooms, shaking hands & kissing?	7 (6.5)	101 (93.5)		93.5	0.679 (M = 95.5) (F = 93.02)	0.012 (ML = 81.9) (CH = 96.5)
Major routes of transmission are unprotected sex, unscreened blood, occupational exposures and intravenous drug use	106 (98.1)	1 (0.9)	1 (0.9)	98.1	0.771 (M = 100) (F = 97.7)	0.019 (ML = 91) (CH = 100)
Do you think HIV can be completely cured with available antiretroviral therapy?	4 (3.7)	93 (86.1)	11 (10.2)	86.1	0.805 (M = 81.8) (F = 87.21)	0.003 (ML = 63.6) (CH = 91.9)
Non nucleosides/ Nucleosides reverse transcriptase inhibitors & Protease inhibitors are the most widely available classes of HIV medications	72 (66.7)	2 (1.9)	34 (31.5)	66.7	0.770 (M = 68.2) (F = 66.3)	0.003 (ML = 45.5) (CH = 72.1)
Do antiviral like e.g. (Acyclovir, Ribavirine, Amantadine) can be used to treat HIV/AIDS?	41(38)	46 (42.6)	21 (19.4)	42.6	0.954 (M = 45.5) (F = 41.9)	0.199 (ML = 31.9) (CH = 45.3)
Can HIV/AIDS patient donate blood?	1 (0.9)	106 (98.1)	1 (0.9)	98.1	0.771 (M = 100) (F = 97.7)	0.019 (ML = 91) (CH = 100)
Does post exposure prophylaxis using antiretroviral recommended?	20 (18.5)	40 (37)	48 (44.4)	18.5	0.038 (M = 0) (F = 23.3)	0.491 (ML = 27.3) (CH = 16.3)
Is HIV and AIDS are similar things?	34 (31.5)	66 (61.1)	8 (7.4)	61.1	0.939 (M = 59.1) (F = 61.6)	0.445 (ML = 59.1) (CH = 61.6)
Does avoiding mosquito bites prevent HIV?	12 (11.1)	81 (75)	15 (13.9)	75	0.367 (M = 86.4) (F = 72.1)	0.784 (ML = 72.3) (CH = 75.6)
Osteomyelitis, Typhoid, and Endocarditis are the major infections in HIV patients causing deaths?	37 (34.3)	20 (18.5)	51 (47.2)	18.5	0.954 (M = 18.2) (F = 18.6)	0.954 (ML = 18.2) (CH = 18.6)
Can food sharing with HIV infected individuals transmits HIV?	12 (11.1)	90 (83.3)	6 (5.6)	83.3	0.213 (M = 95.5) (F = 80.2)	0.000 (ML = 54.5) (CH = 90.7)
Can HIV infection develop into AIDS with in a year?	37 (34.3)	46 (42.6)	25 (23.1)	42.6	0.001 (M = 77.3) (F = 33.7)	0.250 (ML = 27.3) (CH = 46.5)
Contact with feces, urine, saliva can cause HIV?	20 (18.5)	74 (68.5)	14 (13)	68.5	0.439 (M = 77.3) (F = 66.3)	0.001 (ML = 36.4) (CH = 76.7)

Abbreviations: M = male, F = female, ML = Malay, CH = Chinese

† Parenthesis under Chi square test results contains percent correct answers

Also, Chinese students were more knowledgeable about the possibility of a complete cure of HIV ( $p = 0.003$ ). Malay students had good knowledge about nonnucleoside reverse transcriptase inhibitor (NNRTI), nucleoside reverse transcriptase inhibitor (NRTI), and protease inhibitor (PI) as major available treatments for HIV/AIDS ( $p < 0.001$ ). Chinese students appeared better aware than Malay students about the possibility for HIV patients to donate blood ( $p = 0.019$ ), food sharing transfers HIV ( $p = 0.000$ ), and transmission through feces, urine, and saliva ( $p = 0.001$ ).

### Pharmacy Student's Attitudes and Risk Perceptions About HIV/AIDS

Data about attitudes and risk perceptions were collected on a Likert scale that used the responses *strongly agree*, *agree*, *neutral*, *disagree*, and *strongly disagree*. These responses were shown in percentages. Within the sample, these responses were compared with gender and race differences. A chi-square test was used and a  $p$  value was established ( $p < 0.005$ ) as significant for differences, which are presented in Tables 3 and 4. The data indicated that male students were more confident than female students about competency regarding treatment and counseling ( $p < 0.001$ ). More male students had positive attitudes, compared with their female counterparts, about the willingness to assist/take care of ( $p = 0.009$ ) HIV/AIDS patients. But females were more positive than males regarding confidence in their professional education to assist HIV patients ( $p < 0.001$ ). Fewer Malay students than Chinese students indicated a preference not to take care of HIV/AIDS patients. More Malay than Chinese students agreed with the idea of separate nursing ( $p = 0.001$ ). More Chinese than Malay students favored the idea of educating HIV-infected children in separate schools ( $p = 0.02$ ).

Students expressed low confidence in their overall competency in treating HIV patients and willingness to assist HIV patients. Most students were in favor of nursing HIV patients separately. Students appeared to have low confidence in their educational training on treating HIV/AIDS patients. Most students indicated they were opposed to stigmatizing the HIV patient through quarantine or through separate education for an infected child. Students unanimously recommended voluntary testing of all health care staff and mandatory HIV testing for patients admitted for surgery.

### DISCUSSION

The results of this study revealed several interesting findings about the knowledge, attitudes, and risk perceptions among pharmacy students at the University Sains Malaysia toward HIV/AIDS.

Table 3. Pharmacy Student's Attitudes About HIV/AIDS

Statement	Strongly Agreed, No. (%)		Neutral, No. (%)		Disagreed, No. (%)		Strongly Disagreed, No. (%)		Gender, $P$ Value (Actual Scores) <sup>a</sup>	Race, $P$ Value (Actual Scores) <sup>a</sup>
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)				
Do you feel you are competent enough to provide treatment, care and counseling for HIV/AIDS patients?	5 (4.6)	9 (8.3)	60 (55.6)	32 (29.6)	2 (1.9)	<0.001 (M = 27.3) (F = 9.3)	0.315 (ML = 13.6) (CH = 12.8)			
I would prefer not to take care of HIV patients.	2 (1.9)	15 (13.9)	41 (38.0)	36 (33.3)	14 (13.0)	0.057 (M = 18.2) (F = 15.1)	0.001 (ML = 9.1) (CH = 17.4)			
I am willing to assist/take care of HIV patients in wards & operation theaters	5 (4.6)	36 (33.3)	54 (50.0)	12 (11.1)	1 (0.9)	0.009 (M = 59.1) (F = 32.5)	0.179 (ML = 41) (CH = 37.2)			
Patients with HIV/AIDS should be nursed separately.	33 (30.6)	46 (42.6)	22 (20.4)	7 (6.5)		0.851 (M = 72.3) (F = 73.3)	0.001 (ML = 95.5) (CH = 67.4)			
My professional education has provided me with enough education/ information to work safely with AIDS patients.	3 (2.8)	36 (33.3)	47 (43.5)	19 (17.6)	3 (2.8)	0.000 (M = 45.5) (F = 33.7)	0.173 (ML = 54.5) (CH = 31.4)			

Abbreviations: M = male, F = female, ML = Malay, CH = Chinese

<sup>a</sup>Percentage of agreement.

Table 4. Pharmacy Students' Risk Perceptions About HIV/AIDS

Statement	Strongly Agreed, No. (%)		Agreed, No. (%)		Neutral, No. (%)		Disagreed, No. (%)		Strongly Disagreed, No. (%)		Gender, P Value (Actual Scores) <sup>a</sup>		Race, P Value (Actual Scores) <sup>a</sup>			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	M	F	ML	CH		
HIV infected children should be educated in separate schools.	2	(1.9)	19	(17.6)	34	(31.5)	42	(38.9)	11	(10.2)	0.778	(M = 22.7)	(F = 18.6)	0.020	(ML = 13.6)	(CH = 21)
Patient with HIV should be quarantined	2	(1.9)	15	(13.9)	34	(31.5)	43	(39.8)	14	(13.0)	0.776	(M = 18.2)	(F = 15.1)	0.217	(ML = 31.8)	(CH = 11.6)
I worry about acquiring HIV at my working place in my professional life	7	(6.5)	25	(23.1)	50	(46.3)	24	(22.2)	2	(1.9)	0.478	(M = 18.2)	(F = 32.6)	0.645	(ML = 36.4)	(CH = 28)
Initial HIV test should be conducted for all patients admitted for surgical procedures.	30	(27.8)	52	(48.1)	22	(20.4)	3	(2.8)	1	(0.9)	0.0478	(M = 63.6)	(F = 79.1)	0.744	(ML = 81.8)	(CH = 74.4)
In my opinion, all healthcare students and professionals should go for mandatory HIV testing.	25	(23.1)	50	(46.3)	29	(26.9)	3	(2.8)	1	(0.9)	0.281	(M = 59.1)	(F = 72.1)	0.220	(ML = 77.3)	(CH = 67.4)

Abbreviations: M = male, F = female, ML = Malay, CH = Chinese  
<sup>a</sup>Percentage of agreement.

The study found weak areas of knowledge. In general, the study results indicate that students had a low level of knowledge about 3 major classes of currently available NRTI, NNRTI, and PI. Similarly, but unexpectedly (since pharmacy students generally are expected to have some awareness of medications), approximately 40% of students were not aware that antiviral drugs such as acyclovir, ribavirine, and amantadine cannot be prescribed for HIV, as HIV virus is a retrovirus that cannot be treated by antiviral. This last finding suggests that students might require more exposure to this topic than provided by their undergraduate pharmacotherapy lecture on HIV/AIDS.

Almost 80% of pharmacy students were not aware that post-exposure prophylaxis (PEP) using antiretroviral is recommended in case of occupational exposure (needle stick or other injuries) that can predispose a health care professional to later HIV infection—another surprising finding, given that WHO and even Malaysian guidelines call for PEP in treating such accidental HIV/AIDS exposure. Similarly, the study found a low level of knowledge about the specific meanings of HIV and AIDS (whether HIV and AIDS are the same), highlighting another remarkable gap in pharmacy knowledge.

The study revealed misconceptions about the transmission of HIV: for example, students reported that they believed it is preventable by avoiding mosquito bites and that it is transmittable through food, saliva, urine, and feces. Students also had low awareness of the common opportunistic infections that cause deaths in HIV/AIDS patients.

Most of the above-mentioned knowledge-based assessments are basics of HIV/AIDS and antiretroviral treatment, and clearly indicate the need for more comprehensive training of pharmacy students, particularly at this time in Malaysia, where pharmacy practice is playing an increasingly greater role in health care, especially through introduction of specialized ward pharmacy services in hospitals. Some Malaysian hospitals are running medication therapy adherence clinics for highly active antiretroviral therapy (HAART), also called an infectious disease (ID) or retroviral disease (RVD) clinic. Besides dispensing of medications, pharmacists in these clinics are involved in counseling on antiretroviral drugs with attention to 3 major aspects: exploration of HAART (assessing patient's acceptance to antiretrovirals), starting HAART (counseling on drug usage and related issues), and compliance to HAART (assessing compliance after 2 weeks of starting therapy and during treatment with HAART).

In regard to students' attitudes towards HIV/AIDS-infected individuals, the study indicated that students doubt their competence to treat, care for, or even counsel these patients, and that they question their educational and

training competency in “dealing with HIV/AIDS infected patient safely.” The findings suggest that students are not receiving the necessary information in the classroom or from practical experience with HIV/AIDS patients in hospital rotations.

Students reported believing in a misconception that the pharmacist reserves the right not to treat an HIV patient. About three-fourths of pharmacy students agreed that separate nursing of HIV patients was appropriate for minimizing risk to the pharmacist and other patients, a belief that runs counter to accepted practice and Ministry of Health Malaysia guidelines which emphasize universal precautions rather than specific cohort of patients. According to Ministry of Health Malaysia guidelines on the nursing management of HIV/AIDS patients, persons with HIV/AIDS should be nursed in an open ward and treated as any other patient, and patients should be isolated only if they are immunosuppressed, have infectious opportunistic infection (for example, tuberculosis), have persistent bodily discharges (for example, diarrhea, vomiting) or are neurologically impaired. (eg, dementia, restlessness).<sup>19</sup>

More than half of the students opposed separate schooling for HIV-infected children, indicating unwillingness among the students to stigmatize or discriminate against HIV/AIDS patients.

The study found that 29.1% students were concerned about becoming HIV-infected through occupational practice, a lower finding than in studies of medical students (Kopacz et al found 62% of medical students were concerned about becoming infected). Pharmacy students have less fear of acquiring HIV/AIDS because they have less clinical interaction with infected patients than physicians have. As expected, students unanimously recommended compulsory HIV testing of all patients admitted to a hospital or undergoing surgical interventions as a precaution for minimizing risk to health care professionals from occupational exposures. Students also recommended mandatory HIV testing for all health care professionals.

The study further defined the results by demographic characteristics. Because there were no significant differences in the ages of the students, the study focused only on gender and race. The study found no significant differences between male and female students apart from the subjects of PEP and of the development of HIV into AIDS: female students knew more about the former, male students more about the latter.

The study found significant differences between races (Chinese and Malay): Chinese students knew significantly more about mother-to-child transmission, transmission through social contacts, major routes of transmission, availability of complete cure of HIV, and

transmission by food sharing, saliva, urine, and feces. Chinese students fell behind Malay students only in knowledge of available treatment options.

The study found gender and race differences in analysis of risk perceptions and attitudes, as well. Male students were more positive about both their competency and willingness to treat HIV patients, while females were more confident about their HIV/AIDS education. Malay were significantly more positive in their attitude towards the HIV patient, opposed to stigmatizing the HIV-infected individual through separate nursing and separate schools for HIV-infected children.

While the first of its type in Malaysia, the study highlighted areas in students’ knowledge and attitudes that need improvement to ensure better outcomes for HIV/AIDS patient care. We cannot generalize these findings for all Malaysian pharmacy students as the study was conducted on a limited scale only with final-year pharmacy students of University Sains Malaysia.

## CONCLUSION

Although it was done on limited scale, the study found interesting results highlighted by significantly low awareness about HIV/AIDS treatment, ways of transmission, time for HIV to develop into AIDS, post-exposure prophylaxis and others. Low confidence on competencies, doubts on educational trainings given, and unwillingness to treat HIV/AIDS patients perhaps highlighted the negative attitudes and misperceptions towards HIV/AIDS. An optimal plan of education and practical intervention can be made based on the findings, which merit further study with a broader sample of students that would support a more generalized evaluation. A modified education program, along with continued practical experiences, could help minimize phobias, misconceptions, and other barriers to health care for HIV/AIDS patients.

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