

# KNOWLEDGE AND ATTITUDES ABOUT HIV/AIDS AMONG MALAYSIAN DENTAL STUDENTS

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**Abstract.** Good oral health is important for patients with HIV and AIDS. We aimed to determine the knowledge and attitudes of third and fifth year dental students at the University of Malaya in order to inform the dental curriculum for dental students to optimize care for patients with HIV/AIDS. Each dental student completed a self-administered questionnaire prepared by literature search and discussion with experts. The questionnaire, which consisted of 18 questions, was then pilot tested on 12 dental students from two other dental institutions. Knowledge was assessed using eight questions, which included issues regarding the risk for HIV infection, infection control procedures, oral manifestations of HIV and the potential transmission route of HIV. Students were given 2 points for each correct answer. Total knowledge scores of  $\geq 75\%$ , 51-74%, 25-50% and  $< 25\%$  were defined as having an excellent, good, average or weak knowledge, respectively. Attitude was assessed by ten questions, which comprised of items about their willingness to treat HIV/AIDS patients and the perceived potential barriers. Students with positive attitudes were given 2 points for each question they gave a positive attitude about. Students who had negative attitudes were given 0 points for each question and those who were 'neutral' were given a score of 1 point for each question. A total attitude score of  $\geq 75\%$  was considered to signify a positive professional attitude. A total of 145 students completed the questionnaire, 76.6% were females. The mean knowledge score was 67.1%, categorized as having a good knowledge of HIV/AIDS. The mean attitude score was 77.6%, was considered to be having a positive attitude about caring for HIV/AIDS patients. The percentages of study subjects who correctly identified the oral manifestations of HIV/AIDS were: 92.4% for oral candidiasis, 81.4% for necrotizing ulcerative gingivitis and 26.2% for salivary gland diseases. Although the knowledge and attitudes scores among our study subjects were acceptable, there is room for improvement. The current dental curriculum needs to be reviewed and changes made to improve the knowledge and attitudes towards caring for patients with HIV/AIDS.

**Keywords:** dental students, knowledge, attitudes, HIV/AIDS

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## INTRODUCTION

Human immunodeficiency virus (HIV) impairs the ability of the body to fight infections (WHO, 2015), and if untreated, leads to the development of Acquired Immunodeficiency Syndrome (AIDS) (Samaranayake, 1989). HIV can be transmitted through contact with infected blood or other bodily fluids, making it important for dental workers to be especially cautious (Nutt *et al*, 1999). A well-trained, knowledgeable dental practitioner has a lower risk of contracting HIV infection than less cautious, ignorant practitioners. Therefore, the educational curriculum for dental practitioners need to clarify how to reduce the risk of contracting HIV infection.

Several studies world-wide have assessed the knowledge and attitudes of dental students about treating HIV-infected patients (Azodo *et al*, 2010; Ellepola *et al*, 2011; Aggarwal and Panat, 2013; Kumar *et al*, 2015). These studies primarily found that dental students had a satisfactory knowledge level regarding HIV/AIDS, especially the oral manifestations and modes of transmission. Despite having acceptable knowledge levels, stigma and discrimination against those with HIV infection still exists among dentists. These negative attitudes may arise from fears of becoming infected or judgmental attitudes about those with HIV (EngenderHealth, 2004). Seacat and Inglehart (2009) found a dental student's knowledge about HIV-seropositive status or HIV patients and the perception that HIV patients should be held responsible for contracting HIV, are predictors of negative attitudes about treating HIV patients. Proper training about the medical and psychological aspects of treating HIV positive patients may improve the knowledge about HIV

infection among dental students and change their attitudes about HIV patients (Mulligan *et al*, 2006). The Institute of Medicine stressed the importance of adequately preparing future dentists to effectively deliver care for diverse and underserved patient populations (Field and Jeffcoat, 1995).

The alarmingly increasing in the number of HIV cases in Malaysia (Ministry of Health Malaysia, 2006) shows the importance of assessing the knowledge levels and attitudes towards patients with HIV infection among third (junior) and fifth year (senior) dental students at the University of Malaya. The junior students had just entered their clinical year and senior students were in their final year of the Bachelor of Dental Surgery program. The results of this study can inform the dental curriculum at the study institution in order to improve care for patients with HIV infection.

## MATERIALS AND METHODS

We conducted a cross-sectional study to assess the knowledge and attitudes regarding the care of HIV patients using a self-administered questionnaire. Study subjects were third and fifth year Bachelor of Dental Surgery students attending the University of Malaya, which is the oldest and largest of six public dental schools in Malaysia. The other five dental schools have benchmarked their dental curriculum against that of the University of Malaya. This study was approved by the Medical Ethics Committee, Faculty of Dentistry, University of Malaya [DF CO1509/0046(U)]. Informed consent was obtained from all participants prior to their participation in the study.

The questionnaire used for this study was developed by reviewing the

literatures (Manz *et al*, 1994; Aggarwal and Panat, 2013; Fotedar *et al*, 2013), and by consulting relevant experts. The questionnaire underwent content evaluation by a senior academic at the Faculty of Dentistry, University of Malaya. The questionnaire was then pilot tested among 12 third and fifth year dental students at two other dental institutions. The questionnaire was then amended and used in this study, and was administered in a classroom setting.

The questionnaire is divided into three sections. Section I consists of questions about demographic characteristics of the subjects, including gender, year of study and ethnicity.

Section II consists of questions assessing the knowledge of the students regarding the risk factors for HIV infection, infection control procedures, oral manifestations of HIV and potential transmission routes for HIV. Answers could be yes, no or do not know. Students were given 2 points for each correct answer and 0 points for either an incorrect answer or if they did not know. A percentage of correct answers divided by the total possible score was recorded for each subject. A total correct percentage of  $\geq 75\%$  was considered excellent, 51%-74% was considered good, 25%-50% was considered average and  $< 25\%$  was considered poor.

Section III of the questionnaire consisted of 10 questions about the willingness of the subjects to treat HIV/AIDS patients, the potential barriers they perceived, and their perceptions about whether infection control procedures in the treatment of the HIV/AIDS patients were time consuming or affected the work quality. Possible answers were agree, disagree or neutral. Students with a positive attitude about the statement were given 2 points, students with a negative attitude were given 0 points and those who an-

swered "neutral" were given 1 point. A total score  $\geq 75\%$  was considered as having positive professional attitude while a score  $< 75\%$  was considered as having a negative attitude.

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 22 (IBM, Armonk, NY). Descriptive analysis was carried out and the results were expressed as frequencies and percentages. Since all senior and junior students took part in the study, no statistical significance analysis was performed.

## RESULTS

A 100% response rate was obtained for this study. Table 1 shows the demographic characteristics of the respondents. Females outnumbered males by a ratio of about 8:2. Malay and Chinese students made up the majority of the respondents. Table 2 shows the respondents' knowledge and attitude scores regarding HIV/AIDS. The mean knowledge score was 67.1%. Seniors had a slightly better mean knowledge score (69.5%) than juniors (64.6%). About 85% of students had either a good or an excellent knowledge level; 2.1% had a weak knowledge level. The mean overall attitude score among subjects was 77.6%; 78.2% among seniors and 76.9% among juniors. A total of 67.6% of the students had positive attitude whereas 32.4% had negative attitude towards patients living with HIV or AIDS.

Ninety-four point five percent of students knew that "Universal precautions include the use of masks, gloves, a protective aprons and an eye shields". Eighty point seven percent believed that "Dentists are a high risk group for contracting HIV infection", and 79.3% acknowledged "There is no cure for HIV/AIDS" (Table 3). Eighty-six point nine percent of subjects

Table 1  
Demographic characteristics of study subjects.

Characteristics	Third year <i>n</i> (%)	Fifth year <i>n</i> (%)	Total <i>N</i> (%)
Gender			
Male	16 (22.2)	18 (24.7)	34 (23.4)
Female	56 (77.8)	55 (75.3)	111 (76.6)
Ethnic group			
Malay	47 (65.3)	36 (49.3)	83 (57.2)
Chinese	23 (31.9)	36 (49.3)	59 (40.7)
Indian and others	2 (2.8)	1 (1.4)	3 (2.1)

Table 2  
Study subject knowledge and attitude scores regarding HIV/AIDS.

Grading	Third year <i>n</i> (%)	Fifth year <i>n</i> (%)	Total <i>N</i> (%)
Knowledge scores			
Excellent ( $\geq 75\%$ )	22 (30.6)	37 (50.7)	59 (40.7)
Good (51-74%)	35 (48.6)	29 (39.7)	64 (44.1)
Average (25-50%)	14 (19.4)	5 (6.8)	19 (13.1)
Weak ( $\leq 25\%$ )	1 (1.4)	2 (2.7)	3 (2.1)
Mean knowledge score, %	64.6	69.5	67.1
Attitude scores			
Positive ( $\geq 75\%$ )	47 (65.3)	51 (69.9)	98 (67.6)
Negative (0-74%)	25 (34.7)	22 (30.1)	47 (32.4)
Mean attitude score, %	76.9	78.2	77.6

knew HIV cannot be transmitted when unbroken skin is in contact with unbroken skin or saliva from an HIV-positive patient and 94.5% acknowledged that HIV can be transmitted when cut skin is in contact with blood of an HIV-positive patient. However, only 49.7% agreed that HBV is more infectious than HIV and 41.4% thought that HIV virus can be transmitted through cut skin in contact with saliva of HIV patients. The mean knowledge scores between junior and senior subjects were almost similar except with the follow-

ing statement where seniors had higher scores than juniors: "HIV infected and non-infected patients should be treated at the same dental clinic", "Hepatitis B virus is more infectious than HIV virus" and "Infection control practices for HBV are adequate protection against HIV" (Table 3).

Except for aphthous ulcers and salivary gland diseases, the majority of study subjects had a good knowledge about the oral manifestations associated with HIV/AIDS (Table 4). The majority correctly

Table 3  
Correct responses to knowledge statements by study subjects.

Knowledge statement	Correct response		
	Third year <i>n</i> (%)	Fifth year <i>n</i> (%)	Total <i>N</i> (%)
There is no cure for HIV.	56 (77.8)	59 (80.8)	115 (79.3)
Dentists are a high risk group for contracting HIV infection.	57 (79.2)	60 (82.2)	117 (80.7)
HIV infected and non-infected patients should be treated in the same dental clinic.	32 (44.4)	44 (60.3)	76 (52.4)
Universal precautions include the use of masks, gloves, protective aprons and eye shields.	71 (98.6)	66 (90.4)	137 (94.5)
Hepatitis B virus (HBV) is more infectious than HIV.	29 (40.3)	43 (58.9)	72 (49.7)
Infection control practices for HBV are adequate protection against HIV and other blood borne pathogens.	36 (50.0)	50 (68.5)	86 (59.3)
Potential transmission routes of HIV:			
-Unbroken skin in contact with the unbroken skin of an HIV-positive patient.	64 (88.9)	62 (84.9)	126 (86.9)
-Unbroken skin in contact with the blood of an HIV-positive patient.	51 (70.8)	57 (78.1)	108 (74.5)
-Unbroken skin in contact with the saliva of an HIV-positive patient.	62 (86.1)	57 (78.1)	119 (82.1)
-Cut skin in contact with the unbroken skin of an HIV-positive patient.	54 (75.0)	53 (72.6)	107 (73.8)
-Cut skin in contact with the blood of an HIV-positive patient.	68 (94.4)	69 (94.5)	137 (94.5)
-Cut skin in contact with the saliva of an HIV-positive patient.	31 (43.1)	29 (39.7)	60 (41.4)
-Inhalation of aerosol containing blood of HIV-positive patient.	36 (50.0)	38 (52.1)	76 (52.4)
-Inhalation of aerosol containing the saliva of an HIV-positive patient.	38 (52.8)	41 (56.2)	79 (54.5)

Table 4  
Subject knowledge about the oral manifestations associated with HIV/AIDS.

Oral manifestations	Correct response		
	Third year n (%)	Fifth year n (%)	Total N (%)
Oral candidiasis	67 (93.1)	67 (91.8)	134 (92.4)
Necrotizing ulcerative gingivitis	51 (70.8)	67 (91.8)	118 (81.4)
Herpes zoster	44 (61.1)	54 (74.0)	98 (67.6)
Kaposi's sarcoma	41 (56.9)	64 (87.7)	105 (72.4)
Apthous ulcers	23 (31.9)	15 (20.6)	38 (26.2)
Salivary gland disease	18 (25.0)	20 (27.4)	38 (26.2)

identified oral candidiasis (92.4%), necrotizing ulcerative gingivitis (81.4%) and Kaposi's sarcoma (72.4%) as oral manifestations associated with HIV/AIDS. Senior subjects had a better knowledge about the oral manifestations of HIV/AIDS than junior subjects, except for oral candidiasis and apthous ulcers. Only 26.2% of study subjects knew that salivary gland diseases are associated with HIV/AIDS, however 26.2% falsely thought that apthous ulcers are one of the oral manifestations.

Eighty-nine percent of subjects had positive attitude regarding the following statements: "Treating an HIV positive patient is the ethical responsibility of a dentist", "Fear of HIV/AIDS by staff/assistants can hinder care of HIV positive patients", and "Willingness to treat a HIV positive patients if gloves are not available" (Table 5). Forty point seven percent of subjects felt "Infection control procedures necessary for treatment of patients with HIV/AIDS are time-consuming and may affect the work quality of the dentist". The proportion of senior subjects who agreed with this statement was higher than the pro-

portion of junior students. Twenty-nine point seven percent of subjects believed "Dentist has the right to refuse to treat an HIV-positive patient".

## DISCUSSION

The increase in the number of people with HIV/AIDS will result in seeing more of them as dental patients (Oliveira *et al*, 2002), requiring dental practitioners to be knowledgeable about HIV/AIDS and its oral manifestations (Kitaura *et al*, 1997). Providing care to patients with HIV/AIDS is a responsibility of dental practitioners. In this study, we compared the knowledge and attitudes about HIV/AIDS between third and fifth year dental students.

Having adequate knowledge about HIV/AIDS may enhance the confidence of dental practitioners in caring for these patients. In our study, the study subjects had a mean knowledge score about HIV/AIDS of 67.1%, which is lower than that among dental students from Iran (82.1%) (Sadeghi and Hakimi, 2009) and India (78.8%) (Aggarwal and Panat, 2013). This may

Table 5  
Subjects' attitudes about caring for HIV/AIDS dental patients.

Attitude statement	Positive attitude			Negative attitude		
	Third year <i>n</i> (%)	Fifth year <i>n</i> (%)	Total <i>N</i> (%)	Third year <i>n</i> (%)	Fifth year <i>n</i> (%)	Total <i>N</i> (%)
I am willing to treat HIV positive patients.	29 (40.3)	53 (72.6)	82 (56.6)	14 (19.4)	9 (12.3)	23 (15.9)
Treating an HIV positive patient is the ethical responsibility of a dentist.	61 (84.7)	68 (93.2)	129 (89.0)	6 (8.3)	3 (4.1)	9 (6.2)
Treating an HIV positive patient places a dentist at increased risk for HIV infection.	58 (80.6)	54 (74.0)	112 (77.2)	6 (8.3)	17 (23.3)	23 (15.9)
I am willing to receive treatment from a doctor knowing that he/she is treating an HIV positive patients.	27 (37.5)	52 (71.2)	79 (54.5)	19 (26.4)	13 (17.8)	32 (22.1)
The fear among staff/assistants towards patients with HIV/AIDS can be a hindrance to providing dental care to HIV positive patients.	64 (88.9)	65 (89.0)	129 (89.0)	1 (1.4)	4 (5.5)	5 (3.4)
Infection control procedures necessary for treatment of patients with HIV/AIDS are time-consuming and may affect the work quality of the dentist.	42 (58.3)	28 (38.4)	70 (48.3)	23 (32.0)	36 (49.3)	59 (40.7)
Routine dental care should be a part of the treatment of patients with HIV/AIDS.	62 (86.1)	59 (80.8)	121 (83.4)	4 (5.6)	8 (11.0)	12 (8.3)
All dental patients should be treated even if they have HBV or HIV infection.	54 (75.0)	60 (82.2)	114 (78.6)	15 (20.8)	9 (12.3)	24 (16.6)
I am willing to treat HIV positive patients even when gloves are not available.	66 (91.7)	63 (86.3)	129 (89.0)	4 (5.6)	7 (9.6)	11 (7.6)
The dentist has the right to refuse to treat an HIV-positive patient.	37 (51.4)	39 (53.4)	76 (52.4)	20 (27.8)	23 (31.5)	43 (29.7)

Percentages may not total up to 100% because respondents who answered "Don't know" were excluded.

be due to differences in curriculum content. Majority of students (77.8% juniors, 80.8% seniors) acknowledged that there is no cure for AIDS. Current treatment can control HIV infection resulting in the patient leading an otherwise healthy life (AVERT, 2015).

More senior students (60.3%) knew that both HIV infected and non-infected patients can be treated in the same clinic than junior students (44.4%), possibly because seniors had greater knowledge than juniors. Ninety-eight point six percent of the junior students knew about universal precautions and 90.4% of senior students were aware of universal precautions. Junior students being recently introduced to the clinical practices of universal precautions may be very enthusiastic with its application. A study among final year dental students in Nigeria (Azodo *et al*, 2010) also indicates a similar level of response compared to the senior students in this study.

Only 49.7% of study subjects knew that HBV virus is more infectious than HIV. According to the Centers for Disease Control and Prevention (2015), hepatitis B virus (HBV) is 50-100 times more infectious than HIV. A better response rate (91.6%) was reported among dental students in Iran (Sadeghi and Hakimi, 2009). Our study subjects, both junior and senior students, had a poor knowledge about the potential transmission route of HIV via the saliva of HIV patients. This is unlikely due to low salivary viral titers, low numbers of CD4-positive target cells, the presence of anti-HIV antibodies and salivary antiviral factors protecting oral tissues (Shugars and Wahl, 1998). There are no reports in the literature of transmission of HIV via saliva at a dental clinic; this may be because glandular saliva may have the capacity to restrict the infectivity of HIV

(Borsum and Gjerme, 2004; Seacat and Inglehart, 2003). This information needs to be included in the dental curriculum.

A good knowledge in the recognition of oral lesions associated with HIV/AIDS is necessary in providing proper dental care to HIV/AIDS patients. As many as 40 oral manifestations of patients with HIV infection or AIDS have been reported (Samaranayake, 1992). In the present study, only the common oral manifestations had been included with the exception of salivary gland diseases. Our findings showed subjects had adequate knowledge of common lesions associated with HIV/AIDS, such as oral candidiasis, necrotizing ulcerative gingivitis, herpes zoster and Kaposi sarcoma. However, the subjects need a broader knowledge of lesions less commonly associated with HIV infection, such as salivary gland diseases. Most subjects did not know aphthous ulcers are not an oral manifestation of HIV/AIDS. This may be because oral ulcers resembling recurrent aphthous ulcers have been reported among patients with HIV infection.

Overall, 67.6% of our study subjects had a positive attitude about caring for patients with HIV/AIDS, with a mean attitude score of 77.6%, similar to 77.7% of Indian dental students (Aggarwal and Panat, 2013) but higher than 57.4% of Iranian dental students (McCarthy *et al*, 1999). Seventy-four percent of senior subjects and 80.6% of junior subjects perceived treating an HIV-positive patient would place them at an increased risk for contracting HIV infection. More junior than senior subjects perceived this risk, possibly due to lack of confidence or experience, which could have amplified their perceived risk (Oliveira *et al*, 2002). Dentists do have an increased risk for contracting HIV infection compared to



the general population. However, within the health care settings, they actually have low occupational risks of contracting HIV infection (Neiburger, 2000; Centers for Disease Control and Prevention, 1988). It was reported that from 2002 to 2015, health care workers who were exposed to HIV-contaminated body fluids had a 0% HIV seroconversion rate (Nwaiwu *et al*, 2017). That retrospective study concluded that HIV does not seem to be as easily transmitted by needlestick, laceration, or splash injuries as previously presumed.

Eighty-nine percent of our study subjects stated that they were willing to treat HIV positive patients even when gloves are not available. This statement has two sides of a coin. Subjects can be considered as having a positive attitude if they agree to the statement, especially when they are in an emergency situation. However, to treat patients without wearing gloves can be considered as violating the WHO recommendations which stated that “universal blood and body-fluid precautions” and “universal precautions” be used in the care of all patients. Although the rate of HIV seroconversion following percutaneous injuries is very low (Neiburger, 2000; Nwaiwu *et al*, 2017), universal precautions should still be adapted because the risk of transmission still exists. Dentists should always prioritize their own safety and other patients treated by them.

In the past, many dentists have been reluctant to provide dental care to HIV/AIDS patients, but this attitude has begun to change more recently (Dhanya *et al*, 2017). The majority of study subjects had a positive attitude about treating HIV/AIDS patients. Therefore, they must be adequately trained to manage these patients safely and correctly.

In conclusion, subjects in our study had an overall good knowledge and posi-

tive attitude about caring for HIV/AIDS dental patients. There were deficiencies identified by our study that need to be improved so they can be adequately prepared to safely and correctly care for HIV/AIDS dental patients.

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