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# Low attitude despite excellent knowledge in dental students on treating HIV/AIDS patients: Where are we lacking as educators?

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## Abstract:

**BACKGROUND:** To achieve the goal of the Malaysian National Strategic Plan for ending HIV/AIDS by 2030, holistic management of patients with HIV/AIDS is crucial. Dental students are integral part of the workforce in managing these patients. It is pertinent that the dental students have sufficient knowledge and a positive approach towards this disease. Therefore, it is crucial to gain insight into dental students' knowledge and attitude towards patients with HIV and improve them. The study aims to investigate the effectiveness of a brief educational intervention to improve dental students' knowledge and attitude towards patients with HIV/AIDS and to analyse the quality of teaching methods based on the results.

**MATERIALS AND METHODS:** A validated questionnaire consisting of HIV knowledge and attitude items were administered to year 3 and 4 dental students ( $n = 89$ ) by convenience sampling method. An educational intervention was conducted with the aim of improving awareness and management of patients with HIV/AIDS in dental settings. After three weeks, a post-assessment questionnaire was administered. The effect of the intervention was analysed by paired t-test ( $P < 0.048$ ) and Pearson correlation test.

**RESULTS:** The mean age of respondents was 22.2 years. Significant improvement in knowledge was seen with mean scores including pre-assessment (76.7%) and post-assessment (87.4%) indicating excellent knowledge scores. Although positive changes in attitude were noticed, they were not statistically significant. Negative correlation between knowledge and attitude was also reported ( $r = -0.303$ ).

**CONCLUSIONS:** Education about HIV/AIDS is considered the most effective method to improve knowledge and attitude. The results demonstrated that the intervention had successfully increased the students' knowledge and brought in a change attitude where the expected changes were not statistically significant. To bridge this gap between knowledge and attitude, a step ahead of just imparting 'education' is required.

## Keywords:

Attitude, dental students, HIV/AIDS, knowledge

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## Introduction

Infection with Human Immunodeficiency Virus Type 1 (HIV-1) and the resultant Acquired Immune Deficiency Syndrome (AIDS) is still a major public health challenge. Since the identification of HIV/

AIDS infection in 1981, it has manifested into a serious global health concern. The Fact sheet 2023 of Global HIV and AIDS statistics revealed that approximately 33.1 million to 45.7 million people were living with HIV and approximately 1.3 million people have been newly infected and 630000 had died from AIDS-related illnesses.<sup>[1]</sup>

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The Global AIDS Monitoring Report 2023 was produced by the HIV/STI/Hepatitis C Section of Ministry of Health, Malaysia. According to this report, since the report of the first case of HIV infection in Malaysia in 1986, its cumulative number has reached 13,1815, and there had been 62,226 deaths related to AIDS since its inception, with 69,589 people currently living with it.<sup>[2]</sup>

Malaysia commits to “Ending AIDS” by 2030 through achieving the 95-95-95 target: 95% of key populations tested for HIV and knowing their results, 95% of people infected with HIV placed on Antiretroviral therapy (ART), and 95% of these adhering to treatment with suppressed viral load. About the progress of Malaysia on the 95-95-95 treatment cascade target by the end of 2022, 81% of the people living with HIV (PLHIV) were diagnosed to be HIV positive and are aware of their results. The treatment uptake among people diagnosed with HIV was 68%, which indicated a gap in treatment and care, and out of those already receiving treatment, 87% became virally suppressed. Of the 2760 newly reported infections, around 1% includes needlestick injuries, blood transfusion, and related causes.<sup>[2]</sup>

Dental therapeutic procedures frequently involve blood and saliva that may contain a variety of blood-borne pathogens and microorganisms including HIV.<sup>[3,4]</sup> Dental students (DS) form an important part of the healthcare system at the university clinics and yet have been identified to be the weakest group during infection control audits.<sup>[5]</sup> They are exposed early to activities such as direct patient contact during their clinical practice; they might be the source of transmitting infection due to their limited knowledge and experience about blood-borne diseases and infection control practice.<sup>[5]</sup> Their compliance with Infection control and prevention (IPC) guidelines and understanding of blood-borne diseases are very important for preventing disease transmission among patients.

Dental professionals can have negative attitudes that prevent them from providing clinical care. One of the reasons could be low knowledge regarding the disease and infection control protocols. This was evident from the previous cross-sectional studies.<sup>[1,4,6-10]</sup> These studies suggested education would play a role in increasing students’ knowledge and changing students’ attitudes to treat patients with HIV/AIDS.<sup>[11]</sup> Thus, this study was designed to have an educational intervention and aimed to assess the students.

The aim of the study was to assess DS’ knowledge of HIV/AIDS and its transmission and attitudes about related issues such as infection control regulations, ethical obligations, willingness to treat HIV-positive patients, fear of contracting HIV occupationally, and

feelings about HIV-positive patients before and after an intervention.

The main objective was to identify the correlation between students’ knowledge and their attitudes towards patients with HIV/AIDS.

## Materials and Methods

### Study design and setting

This was an educational interventional study conducted in a dental college setting.

### Study participants and sampling

A total of 89 students were selected from the dental school by convenience sampling method.

#### Inclusion criteria:

1. DS of Class 2023 and 2024.

#### Exclusion criteria:

1. Students who refuse to give required consent.

Data collection tool and technique

### Methods of data collection

The survey is made up of three major categories:

1. Demographic factors, including gender, college year, and ethnicities.
2. Twelve closed questions about knowledge of HIV infection, and its transmission patterns, were included in the knowledge section. Closed questions were answered using the options “Yes” and “No”, and open-ended questions were answered with appropriate word. A total score was obtained by adding the points given for each answer. For each correct and incorrect answers, two and zero points, respectively, was given. Hence, a student’s total score ranged from 0 percent (no answers correct) to 100 percent.
3. Twelve questions addressing attitudes regarding treating HIV-positive patients, legal aspects, the right of HIV-positive health personnel to practice and willingness to treat were included in the attitude section. The answer to each question about attitudes were rated on a five-point Likert scale (strongly agree, agree, neutral, disagree, and strongly disagree). The positive attitudes were considered as professional attitudes. The professional attitudes scores will be computed from five to one and negative attitude, conversely.<sup>[4]</sup> Validity of the questionnaire was confirmed by similar articles (with some modifications)<sup>[1,7]</sup> and by dental specialist working in dental school. This questionnaire consisting of HIV knowledge and attitude items were administered to

year 3 and 4 DS (n = 89) by convenience sampling method. An educational intervention was planned for the students and done on the World AIDS day, 1 December 2023, by a medical specialist and two dental specialists by mode of lecture classes and demonstration of IPC. The program objectives were as follows:

1. Gain knowledge about the treatment cascade in HIV infection and understand the current situation of the HIV/AIDS infection in Malaysia.
2. Identifying the oral manifestations of HIV/AIDS.
3. Discuss on how the dental team can help patients with HIV maintain their general and oral health.
4. Devise a basic treatment strategy for patients with HIV in a dental setting.

The post-assessment of the same was carried after three weeks.

### Ethical consideration

The study was reviewed and approved by the Institutional Review Board (\*\*\*\*/IRB/SRP/11/21).

### Data entry and statistical analysis

The statistical analyses were performed using the SPSS 26.0 software (SPSS Inc., Chicago, IL, USA). In order to reach relevant conclusions with respect to the study participants, the obtained data for numerical characteristics are presented in the tables containing the relevant statistical parameters necessary for the statistical conclusion in the set research. The methods of differential statistics used in the research were a parametric test of dependent samples (paired samples *t*-test) for pre- and post-assessment analysis, and nonparametric tests for independent samples (Pearson Chi-square test) to find the association between knowledge and attitude.

## Results

The response rate was 100% and the participants consisted of 3 students aged 44 years and 4 students aged 45 years with the mean age of 22.2 years. In total, 71 (79.8%) were female participants and 18 (20.2%) were male participants. This study consisted of participants from the Indian (38.2%) and Chinese (33.7%) ethnic groups, followed by Malay, Sino-Dusun, Kadazan Punjabi, Iban, Filipino, Punjabi, and Kadazan.

### Interpretation of result on knowledge [Table 1; Figure 1]

Before the intervention test, the students' answers to the test pertaining to basic medical knowledge and transmission of HIV/AIDS had a low rate of awareness for most of the questions. The knowledge gained, after the intervention, had increased the awareness of HIV/AIDS,

its transmission, and prevention. This was analysed from the data that 9 out of 12 knowledge questions answered by the participants had statistically significant differences before and after the test ( $P < 0.048$ ). This highlights the effectiveness of the intervention in improving students' knowledge of HIV/AIDS. The need to enhance future dental practitioners' knowledge is a necessary, as the need of infected individuals for medical and dental care will increase.

### Interpretation of result on attitude [Table 2, Table 3, Figure 2]

Before the intervention, the participants had shown a considerable positive attitude towards patients with HIV/AIDS (6 out of 12 questions had a positive professional attitude). However, the participants showed slightly negative attitude in some questions before intervention such as "I will do cardiopulmonary resuscitation(CPR) (mouth to mouth) if HIV/AIDS patients need it" (n = 2.7753;  $P = 0.000$ ). "The infection control guidelines necessary to treat patients with HIV/AIDS would be a financial burden on my future practice" (n = 2.5618;  $P = 0.926$ ) and "If I treated patients with HIV/AIDS, other patients may be reluctant to continue in my care" (n = 2.8427;  $P = 0.841$ ). Among these three questions, participants showed positive attitude change, which is significant after the intervention regarding this question "I will do CPR (mouth to mouth) if HIV/AIDS patients need it" ( $P = 0.000$ ). The other two questions had a change, but it was not statistically significant after intervention.

The question: "I am morally responsible to treat HIV/AIDS patients." and "HIV/AIDS patients can live with others in the same place." had a positive attitude and the response rate remained the same before and after the intervention. The current guidelines are that dentists must not refuse to treat a patient solely on the grounds of HIV infection, and they cannot legally refer these patients to specialty clinics for routine dental care.<sup>[14]</sup> These facts were highlighted during the educational intervention.

After the intervention, the participants had increased positive attitude changes in these questions. "I worry about being infected with HIV by my patients." (n = 3.9551;  $P = 0.203$ ), "If I treated patients with HIV/AIDS, I would be placed at increased personal risk." (n = 3.7416;  $P = 0.075$ ) and "People with HIV/AIDS should be restricted from working in the food industry." (n = 3.2472;  $P = 0.052$ ). This could be because that the intervention conducted had increased their knowledge on mode of transmission, rate of transmission (exposure to HIV, 0.5% dentists per year – considered low),<sup>[14]</sup> and infection control protocols of HIV.

**Table 1: Percentage and comparison of HIV/AIDS knowledge before and after intervention (n=89)**

Variables	Correct score before intervention (%)	Correct score after intervention (%)	Before Intervention	After Intervention	P (<0.048)
People living with HIV can be diagnosed with oral manifestations	85.4	97.8	1.7079	1.9551	0.002
Dental workers can act as an intermediary for transmission of HIV	94.4	98.9	1.8876	1.9775	0.045
Patients with HIV/AIDS can contaminate dental workers.	67.4	84.3	1.1685	1.5506	0.006
Injury from contaminated injecting equipment can transmit HIV.	100	100	2.0000	2.0000	0.000
The negative HIV tests surely indicate that the persons are free of viruses.	58.4	77.5	1.1685	1.5506	0.001
ELISA is the screening test for diagnosis of people living with HIV	98.9	100	1.9775	2.0000	0.320
Western Blot technique is the definite test for the diagnosis of people living with HIV.	85.4	96.6	1.7079	1.9326	0.007
HIV can be transmitted through aerosols by handpieces.	58.4	60.7	1.1685	1.2135	0.741
Saliva can be a mode of transmission of HIV infection.	56.2	75.3	1.8876	1.9101	0.004
Specificity of the HIV tests is 100.	77.5	87.6	0.8539	1.3933	0.038
Sterilization methods have virucidal effects against HIV.	57.3	74.2	1.7528	1.8202	0.006
Infection control methods for Hepatitis B provide adequate protection against HIV transmission.	80.9	95.5	1.3933	1.5955	0.004

The results are significant if  $P (<0.048)$

**Table 2: Students' HIV/AIDS attitude rate comparison between before and after intervention**

Variables	Positive attitude before intervention (%)	Positive attitude after intervention (%)	Before Intervention	After Intervention	P (<0.048)
If I know that my friend has HIV infection, I end the friendship.	3.37	6.74	4.2380	4.2809	0.227
I am morally responsible to treat HIV/AIDS patients.	79.78	79.78	4.2136	4.1236	1.000
HIV/AIDS patients can live with others in the same place.	75.28	75.28	3.9888	4.0225	0.693
I worry about being infected with HIV by my patients.	5.62	11.23	3.9551	3.8202	0.203
I will do CPR (mouth to mouth) if HIV/AIDS patients need it.	21.35	34.83	2.7753	3.2360	0.000
It is my right to know if my patients are infected by HIV.	94.38	88.76	4.6292	4.5843	0.589
The infection control guidelines necessary to treat patients with HIV/AIDS would be a financial burden on my future practice.	51.69	49.44	2.5618	2.5730	0.926
If I treated patients with HIV/AIDS, other patients may be reluctant to continue in my care.	41.57	34.83	2.8427	2.8652	0.841
If I treated patients with HIV/AIDS, I would be placed at increased personal risk.	8.99	12.36	3.7416	3.5393	0.075
Reading case reports from patients with infectious diseases would help me to be a better provider for those patients.	96.63	88.76	4.4270	4.3820	0.582
Treating HIV positive patients with close clinical supervision would give me more confidence treating these patients in the future.	85.39	84.27	4.2022	4.2472	0.549
People with HIV/AIDS should be restricted from working in the food industry.	20.22	28.09	3.2472	3.0112	0.052

## Discussion

Despite achieved advances regarding prevention and treatment of AIDS in the past years, there are still a high number of people living with HIV in the world. Having that in mind, it is of utmost importance that students and dentists are trained to best serve patients with HIV/AIDS. Thus, this study was designed to carry out an intervention in the form of education. The students' knowledge and attitude to manage patients with HIV/AIDS and maintain appropriate infection control were assessed before and after the intervention.

The present study showed that the knowledge gained, after the intervention, had increased the awareness

of HIV/AIDS, its transmission, and its prevention. However, the findings of this study should be interpreted with caution, since the attitude to treat people living with HIV was low. There was a negative correlation between knowledge and attitude that was evident from the Pearson correlation analysis result showing  $-0.303$ , which was not significant. This was similar to a study in Iran where only 1% of DS exhibited positive attitude towards treating patients with HIV/AIDS, meaning that professional attitude on this subject remain poor despite the excellent/good knowledge of students.<sup>[15]</sup> Furthermore, the fact that increased professional knowledge does not translate to acceptance of patients with HIV/AIDS has also been shown in other studies.<sup>[16]</sup> Given these considerations,



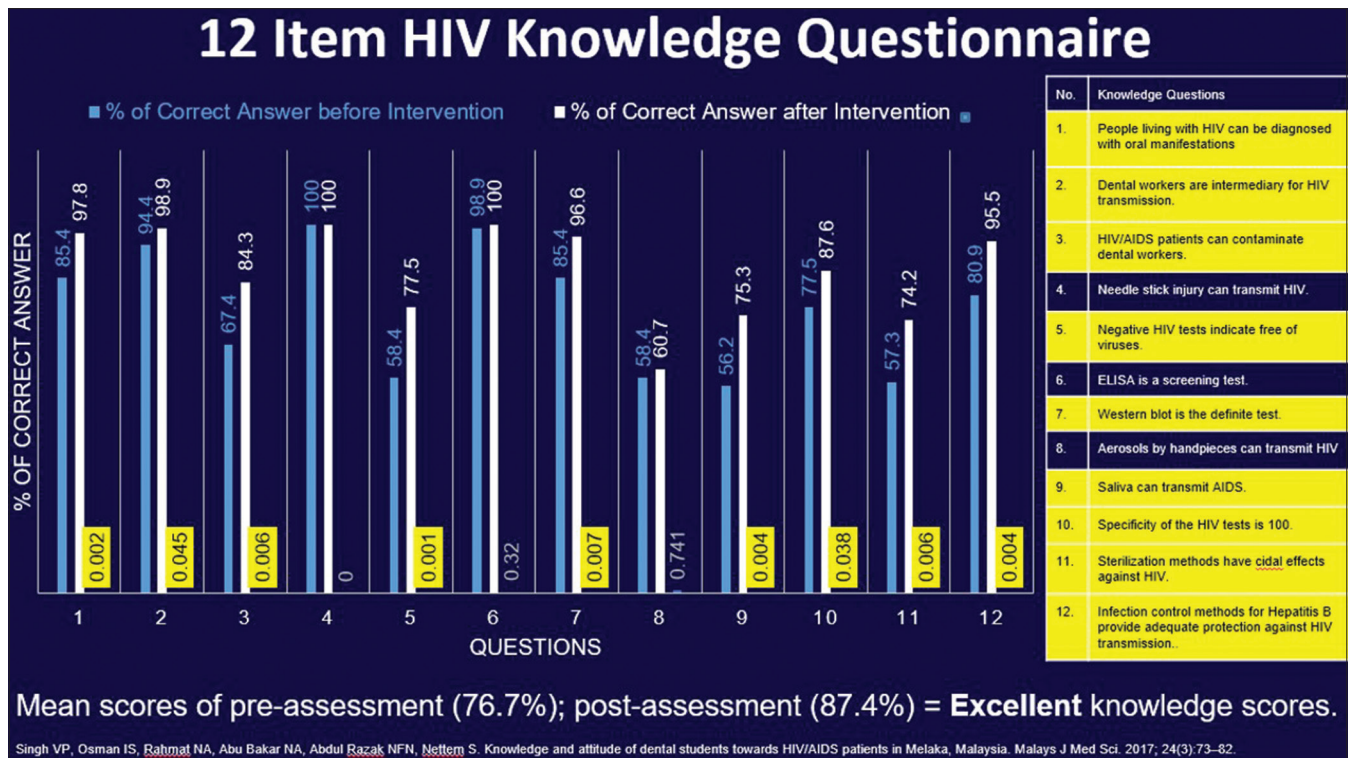


Figure 1: Responses of students on questionnaire on knowledge about HIV/AIDS

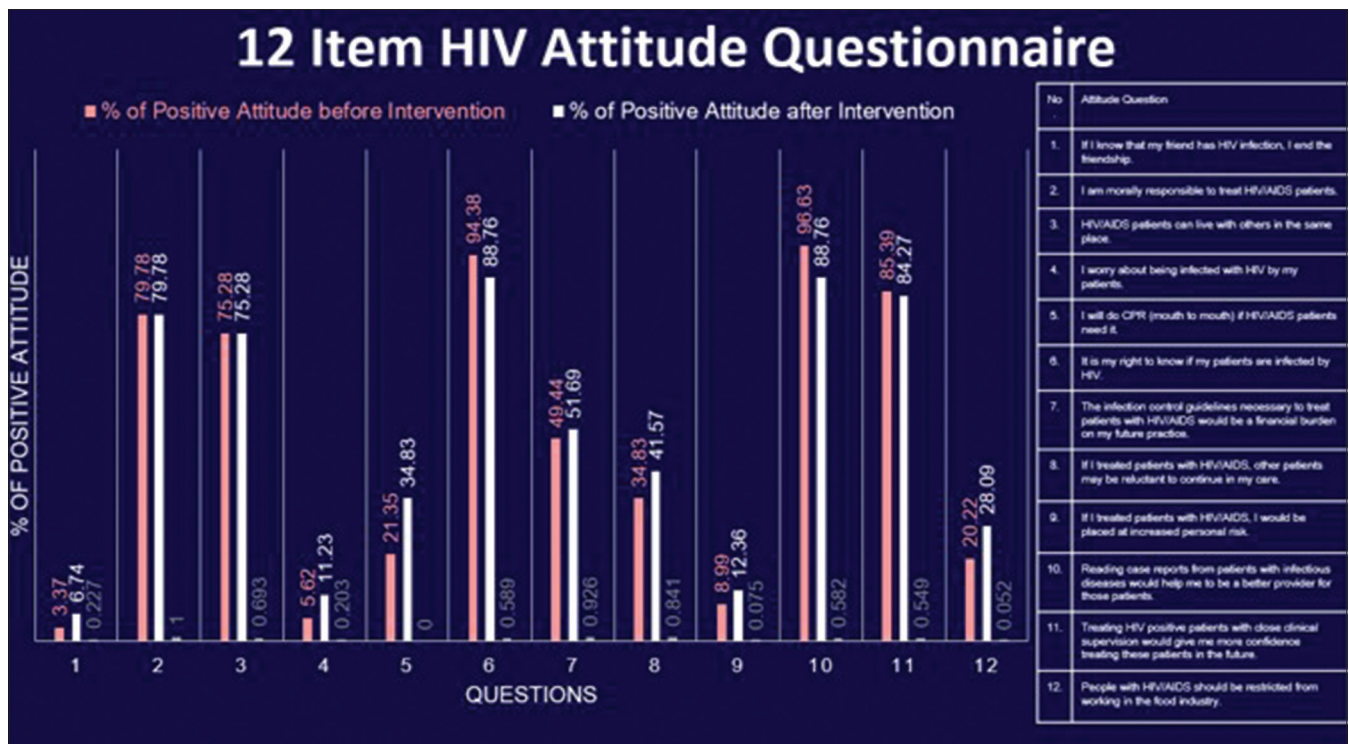


Figure 2: Responses of students on attitude while treating HIV/AIDS Patients

other educational methods should also be applied. It is possible that negative attitude will change through face-to-face contact with people having this stigmatising condition. Thus, efforts ought to be made to bring

patients with HIV/AIDS to universities so they can speak with students about their conditions. Following such talks, positive changes in student perceptions have been observed.<sup>[13]</sup>

**Table 3: Deals with the questions which had a decline in attitude after education intervention**

	Questions on attitude	Interpretation
Decline in attitude	"It is my right to know if my patients are infected by HIV." ( $n=4.6292$ ; $P=0.589$ ).	The education intervention had increased the students' knowledge on universal precautions, which helped them to be more cautious to treat every other patient as potentially infectious, irrespective of their diagnosis or presumed infectious status. <sup>[12]</sup>
Decline in attitude	"Reading case reports from patients with infectious diseases would help me to be a better provider for those patients" ( $n=4.4270$ ; $P=0.582$ )	Only reading case reports was not sufficient but having frequent update on knowledge (educational intervention) and examination of HIV patients are essential and would increase students' acceptability to attend to such patients' needs. <sup>[13]</sup>

In addition to scientific clinical knowledge and expertise, attitude towards giving treatment may also be influenced by cultural, societal, or religious considerations. Changing attitude is likely to be more complex than developing knowledge and understanding the concept in DS. A study evaluating recent graduates from three Arab dental schools' intentional refusal to treat patients with HIV/AIDS and the variables linked to this desire brought to light that changing the attitude is the challenge.<sup>[17]</sup> The participant students in the present study had no previous exposure to treating patients with HIV, and were worried about being infected with patients with HIV. This may explain the lack of confidence in dealing patients with HIV/AIDS, which contributes to the passive attitude of students both before and after intervention. However, a positive attitude was observed in their willingness to treat and understand the moral responsibility towards patients who are infected with HIV/AIDS after intervention.

It is easier to impart information and make the facts comprehensible through the traditional and conventional methods of teaching and examinations. Changing students' attitude is the challenging part as proved by our study. Therefore, educational intervention has to be implemented with other components to prepare students to ultimately "enhance access to healthcare."<sup>[18]</sup> This "how to teach" is critical in an area of clinical practice where it is essential to challenge and change attitude. Teaching in small groups that allow and promote candid conversation in a private, secure environment is likely to be more effective. Inviting HIV-positive individuals to talk with students and to share their perspectives as patients would be one of the essential components. Experiential problem-based work using role-play with actors, feedback, and discussion is likely to be more effective

than traditional learning, as described by Ranauta, Tappuni and Coulthard, 2020.<sup>[9]</sup> As students start seeing patients in the clinic, this role-play allows them to have the chance to apply what is learned in the classroom.<sup>[17]</sup> Additionally, Seacat *et al.*<sup>[8]</sup> also found that creating partnerships between local AIDS service organisations and dental schools helped remove stigmas associated with the disease.

An interventional study was done on the deans of dental institute of HIV/AIDS.<sup>[9]</sup> It is recommended to include all the above-mentioned ways in the educational curriculum during the study period. A brief educational intervention conducted on the deans of dental school in Indonesia showed effectiveness in improving the understanding/changing the views of dental school deans regarding the quality of the oral health and HIV/AIDS teaching and learning at their own institution and engaging a willingness to undertake a curriculum review as appropriate. While there was a willingness to undertake curriculum review, it is likely that ongoing educational support will be required. It will be important to undertake further research to confirm that a multifaceted curriculum produces professionals with compassionate non-judgemental attitude towards the HIV population. Students should be confident in the clinical care that they provide and knowledgeable about universal infection control precautions to prevent cross-infection and prophylaxis measures post exposure. The author included the curriculum of Barts and The London School of Medicine and Dentistry, as an example.<sup>[9]</sup> [Figure 3]

### Limitation and recommendation

The limitations of the study were that it had a shorter time. The control group was not present in the study. The response to the assessment by students can easily be biased due to the aspect of the internet and easy exchange of information.

The recommendations include to create partnerships between local AIDS service organisations and dental schools are to have conversation or camps, assign problem-based learning to include more on infectious diseases and infection control and conduction of more Observed Structured Clinical Examination (OSCE) (role-play) examinations on a periodic basis.

### Conclusion

The pre- and post-questionnaire data gathered had demonstrated that the intervention has been successful in increasing the students' knowledge. The expected changes in attitude were present but not statistically significant. This study helped to assess the existing



<b>Year 1</b>
<b>Human health and disease</b>
<b>Lectures</b>
<ul style="list-style-type: none"> <li>• Virus's, type, effect on immune system, routes of infection</li> <li>• HIV and AIDS disease</li> </ul>
<b>Professionalism teamwork &amp; social responsibility</b>
<b>Interactive lecture and discussion</b>
<ul style="list-style-type: none"> <li>• Fear and anxiety of students in preparing for undertaking patient care</li> <li>• "Are we obliged to treat?"—HIV and other infectious diseases</li> <li>• Hepatitis B, C and vaccines, prophylaxis measures postexposure</li> </ul>
<b>Year 2</b>
<b>Oral microbiology</b>
<b>Lecture</b>
<ul style="list-style-type: none"> <li>• Viral infections</li> <li>• Universal cross-infection control</li> </ul>
<b>Human health and disease</b>
<b>Interactive lecture and discussion</b>
<ul style="list-style-type: none"> <li>• Oral Manifestations of Systemic Disease</li> </ul>
<b>Professionalism teamwork &amp; social responsibility</b>
<b>Interactive lecture and discussion</b>
<ul style="list-style-type: none"> <li>• Professionalism</li> <li>• Duty of Care</li> <li>• Confidentiality</li> <li>• Discrimination</li> <li>• Ethical dilemmas e.g. "If patient discloses to student that they are HIV + ve and that their partner doesn't know?"</li> </ul>
<b>Years 3 and 4</b>
<b>Oral medicine</b>
<b>Lectures</b>
<ul style="list-style-type: none"> <li>• Viral infections involving the Oral Mucosa</li> <li>• Oral Cavity in Health and Disease</li> <li>• Pigmentary changes involving the Oral Mucosa</li> <li>• Oral manifestations of HIV disease</li> </ul>
<b>Professionalism teamwork &amp; social responsibility</b>
<b>Communication Skills Workshop</b>
<ul style="list-style-type: none"> <li>• How to break bad news</li> </ul>
<b>Years 4 and 5</b>
<b>Clinical experience</b>
<ul style="list-style-type: none"> <li>• Students are required to attend the Oral Medicine clinic which is a tertiary referral unit for a wide range of conditions including immuno-compromised patients</li> </ul>

**Figure 3:** Oral health and HIV/AIDS curriculum design at Bart's and The London school of medicine and dentistry. Adapted from 'Coulthard P, Tappuni AR, Ranauta A. Oral health and HIV: What dental students need to know. Oral Dis. 2020 Sep;26 Suppl 1:47-53. doi: 10.1111/odi.13389. PMID: 32862532

students' knowledge on the disease and attitude. However, there was a negative correlation between knowledge and attitude. This implies the need to include more collective effort in improving the knowledge and attitude of future clinicians towards patients with HIV/AIDS to provide the best possible oral healthcare. Along with educational intervention, interviewing patients with HIV/AIDS, role-playing, case discussions, and, particularly, direct patient care experiences for each student performed in small-group training sessions would improve their attitude as suggested by Rohn *et al.* 2006.<sup>[18]</sup> HIV/AIDS education will be more successful if education is performed using continuous and long-term strategies with realistic objectives.<sup>[9,18]</sup> The risk of HIV transmission in the oral healthcare setting is low. However, the emotional impact of being infected can be substantial, affecting

the attitude of a student. The only safe approach is to assume that any patient is a carrier of a blood-borne virus and carry out universal precautions. Safety practice stands as an important element of workplace safety and quality of healthcare.

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## Conflicts of interest

There are no conflicts of interest.

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