

# Evaluation of Knowledge, Attitude and Risk Perception about Human Immunodeficiency Virus Infection among Dental Students in Saudi Arabia

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## Abstract

**Introduction:** Globally the HIV/AIDS consider being the most serious infection/ disease in the recent decades. The health care workers are considered as a high risk group for diseases transmitted through body fluids. The present study was conducted to evaluate the knowledge and attitude of the dental students and interns regarding dental management of HIV infected patients. **Material and methods:** A cross-sectional survey was conducted among 722 (324 males, 398 females) dental students and interns at southern and central region of Saudi Arabia. The questionnaire comprised of 16 questions consists of three main domains. Chi-square test was executed to compare the descriptive data by using SPSS (version 20.0, IBM Corporation, USA) to assess the level of knowledge attitude and risk perception towards HIV positive patients. **Results:** The overall response rate was 91.6%. The overall knowledge and attitude of the participants was acknowledged as poor. The difference in knowledge between the academic levels was significant (p-value<0.05). Female shows more positive attitude and a good level of risk perception as compared to male participants (p-value<0.00). Gradual shift in risk perception was observed among the academic levels, and the difference was statistically significant (p-value<0.00). **Conclusion:** Over all this study showed a lack in the knowledge and attitude of dental students and interns about HIV infected patients. Extensive courses and training program should be implemented in the curriculum of dental collage to improve their knowledge and attitude.

**Keywords:** AIDS; Dental students; Knowledge; HIV; Risk perception

## Introduction

Human immune deficiency virus (HIV) was discovered in 1981 since then an epidemic infection has been spread all over the world. Globally, about 36.9 million people were living with HIV at the end of 2017, although the burden of the epidemic continues to vary considerably between countries and regions. <sup>[1]</sup> In Saudi Arabia, the total number of HIV-positive Saudi population in early 2010 was 4019 persons, with an annual incidence rate of 342 cases /year between 2001 and 2009. <sup>[2]</sup>

The HIV is the virus that causes AIDS. HIV attacks the CD4 positive (CD4+) T cells, destroying the immune system. The acquired immunodeficiency syndrome (AIDS) is the end stage of HIV infection. The management is based on monitoring of disease progression and involves the administration of antiretroviral therapy (ART). The health care workers are considered being at high risk for diseases transmitted through body fluids. Adding to that some infectious diseases have extended incubation periods or “window period” during which antibodies can’t be detected. <sup>[3]</sup> It may take 10 to 15 years for an HIV positive person to develop AIDS. <sup>[4]</sup> According to the CDC guidelines each patient is considered to be infected with a blood-borne pathogen irrespective of the known serostatus of the same. <sup>[5]</sup>

Currently, the survival rate of AIDS patients is much higher than previously, due to the improvement of health care facilities. <sup>[6]</sup> Accordingly, more AIDS patients are expecting to seek dental treatment, due to the fact that oral manifestations of HIV infection are an ultimate component of disease progression. Oral lesions are common (30–80%) in patients infected by the HIV <sup>[7]</sup> The oral lesion can be, oral candidiasis, hairy leukoplakia, Kaposi sarcoma, linear gingival erythema, necrotizing ulcerative gingivitis, necrotizing ulcerative periodontitis, and non-Hodgkin lymphoma, which are tremendously associated with HIV infection. <sup>[8]</sup> Oral manifestations appeared when CD4 count decreases below 500 cells/mm<sup>3</sup>. Moreover, oral lesions found at different stages showed a very strong correlation to their respective CD4 count. <sup>[9]</sup>

Infection can occur during exposure to the blood of an infected patient via needle stick or a splash to exposed mucous

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**How to Cite this Article:** Al-Qahtani SM, et al. Evaluation of Knowledge, Attitude and Risk Perception about Human Immunodeficiency Virus Infection among Dental Students in Saudi Arabia. *Ann Med Health Sci Res.* 2019;9: 558- 563

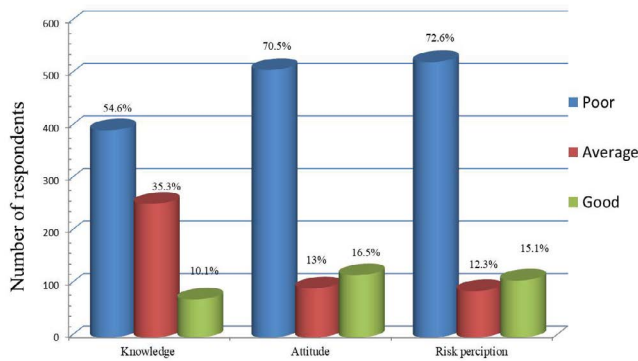
membranes. Invasive oral procedures frequently involve contact with saliva and blood that may contain HIV.<sup>[10]</sup> Dental health care situations necessitate specific strategies to prevent the disease transmission among oral health care workers, and from patient to patient.<sup>[11]</sup> Health care workers should have satisfactory knowledge of HIV/AIDS, and their attitude and behavior should be appropriate to take care of such patients.<sup>[12]</sup>

With an increasing number of survived HIV positive patients, who seek dental care, the knowledge of the dental care provider should maintain a high level and be assessed regularly. There are various studies documented in the literature about assessing the knowledge and attitudes of dental students on HIV/AIDS in the Middle East area. These studies indicate an average to a good level of knowledge among dental students, regardless of the level of knowledge most of the studies show a negative attitude towards HIV/AIDS positive patients.<sup>[13-18]</sup> Internationally, In U.S the student showed good knowledge and a positive attitude after a community-based rotation program.<sup>[19]</sup> Unfortunately, there are few studies available evaluating the knowledge of dental students and interns about HIV/AIDS across the southern and central region of KSA.

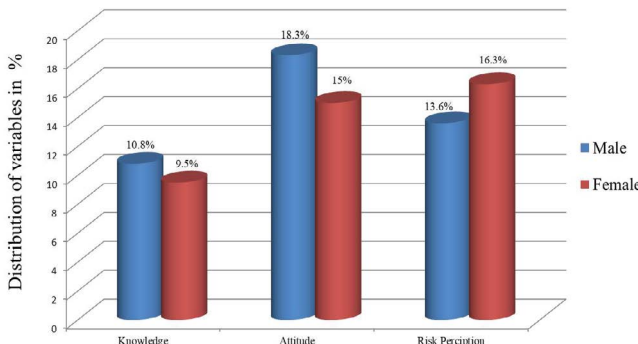
This study was conducted with an objective to determine the level of knowledge about HIV infection, virology, routs of transmission and their attitude towards HIV positive patients among a group of Saudi dental students and interns.

### Materials and Methods

The present cross-sectional questionnaire-based study was carried out from 20 July 2017 to 21 January 2018. A total of 791 dental students and interns were recruited in the survey from five dental institutes across southern (two dental institutes) and central (three dental institutes) region of Saudi Arabia.



**Figure 1:** Overall distribution of knowledge, attitude, and risk perception about HIV among participants.



**Figure 2:** Gender wise distribution of good levels of knowledge, attitude and risk perception.

A self-explanatory questionnaire comprising of 16 questions was designed to assess and compare knowledge, attitude and risk perception regarding HIV infection among a group of dental students and interns. Face validity and content validity was evaluated by professionals in the field of research and methodology.

The questionnaire instrument was consists of four parts: 1) Course year of the subjects, 2) Knowledge of the subjects, 3) Attitude of the subjects and 4) Risk perception of the subjects towards HIV infection. A pilot test was done on 20 subjects randomly selected from different faculty and colleges to evaluate the efficacy of the questionnaire. After completion of the pilot test on a number of subjects, investigators did the modification and adjustment in the questionnaire on the basis of suggestions and requests for clarification from the respondents. Only Saudi national students and interns were selected for the study, whereas other nationals were omitted.

The sample size was calculated depending on the following formula;

$$\frac{Z^2 \cdot p(1-p)}{e^2} \div \left( 1 + \left( \frac{Z^2 \cdot p(1-p)}{e^2 N} \right) \right)$$

Where:

Z = Z value (1.96 for 95% confidence level)

p = Percentage of picking a choice expressed as a decimal (0.5)

This was found to be 50% for the present study which was expressed as 0.50.

e = Confidence interval, expressed as decimal (0.05)

n = Total population of the region

By using the above formula the minimum sample size was calculated to be 397.

The study design was presented before the Institutional Ethics Committee (IEC), so as to get ethical clearance to conduct the survey. The significance of the survey was explained in detail to the respondents before obtaining written informed consent. The

**Table 1: Demographic characteristics.**

Variables	Number (n)	Frequency (%)
<b>Gender</b>		
Male	324	(44.8%).
Female	398	(55.2%)
<b>Age</b>		
19-22	342	(47.4%)
23-26	380	(52.6%)
<b>Year of Study</b>		
Fourth year	148	(20.6%)
Fifth year	220	(30.6%)
Sixth year	209	(29.0%)
Intern	145	(20.0%)
<b>Total</b>	<b>722</b>	<b>(100%)</b>

confidentiality of the subjects was maintained by keeping the questionnaire form completely anonymous. The questionnaire was distributed among the participants during their lecture and clinical hours; meanwhile, the research investigators were present to answer any doubt raised by respondents related to the survey.

All the hypotheses were formulated using two-tailed alternatives against each null hypothesis (hypothesis of no difference). The entire data was statistically analyzed using the Statistical Package for Social Sciences (SPSS version 20.0, IBM Corporation, USA) for MS Windows. Chi-square test was executed to compare the descriptive data. p-values < 0.05 were taken as statistically significant.

### Results

722 (324 males, 398 females) students and interns out of 791 completed the questionnaires with a response rate of 91%. The age was ranged between 19-26 years (mean 22.3±4.7). Table 1 shows complete demographic information about the participants.

#### Overall knowledge of the participants

The overall knowledge of the participants was recorded as poor (54.6%), with only 10.1% exhibited a good knowledge score. Although HIV and AIDS are different since one is the cause and the other is the result, about 40% of the participant did not realize the difference between the above terms. Less than half (45.6%) of the participants know the fact that HIV primarily attacks lymphocytes. Only 30% know the all possible ways for HIV spread; the majority of the participants (52.6%) presented limited knowledge about the routes of HIV transmission, and about (16.3%) didn't know about the route of spread. While questioning about critical value of CD4 cell count in the AIDS patients, 49% of the participants identify that it is below 200 cells/mm<sup>3</sup>. Surprisingly only 13.4% know about the confirmatory test to diagnose HIV positive patient and half

of the participants have an idea that antiretroviral therapy can cure HIV positive patient. The association of oral findings such as Kaposi sarcoma, candidiasis and linear gingival erythema to AIDS patients was recognized by only 6.6% of the respondents, but about three quarter (77%) gave a partial knowledge about the same [Figures 1 and 2].

While comparing between the groups, male and female showed a slight difference in the knowledge which was favoring the male, but with no statistical difference (p-value 0.065). While comparing participants according to the semester, the interns and the higher level students showed the poor level of knowledge as compared to lower level students. About two-thirds (66.4%) of the interns showed a poor level of knowledge, and only 3.5% of them revealed a good level of knowledge. About 10% of the higher level (6th year) showed a good level of knowledge, whereas a good score of knowledge was revealed by 13.6% and 11.4% of 5<sup>th</sup> and 4<sup>th</sup> -year students respectively. The difference in knowledge between the levels was significant with p-value 0.007 [Table 2].

#### Attitude and risk perception

Solid with the overall low level of knowledge, the participants reflected an average level of attitude, with only 16.5% showed a good level of attitude towards attending and treating HIV positive patients. Although, 50.5% stated that dentist belongs to the high-risk group, whereas 53.4% of the participants were agreed to treat HIV positive patients. When participants were asked about treating HIV patients in isolated special centers 40.5% provide a positive response, and 35.3% recorded a neutral response. Only 26.6% of the participants confirmed that they have adequate professional knowledge to work safely with HIV patients.

In view of risk perception, 56.2% of participants consider all patients to be potentially infectious. 41.1% agreed that they will be safe when using all type of personal protective equipment. About one-fifth of the participants expressed their disagreement

**Table 2: Knowledge, attitude, risk perception according to gender and semester.**

	Groups	Below Average	Average	Good	p value
<b>Knowledge</b>	<b>Gender</b>	<b>Female</b>	51.5%	39.0%	9.5%
		<b>Male</b>	58.5%	30.7%	10.8%
	<b>Semester</b>	<b>4<sup>th</sup> year</b>	51.0%	37.6%	11.4%
		<b>5<sup>th</sup> year</b>	54.3%	32.1%	13.6%
		<b>6<sup>th</sup> year</b>	49.5%	40.5%	10.0%
	<b>Intern</b>	66.4%	30.1%	3.5%	0.00*
<b>Attitude</b>	<b>Gender</b>	<b>Female</b>	67.3%	17.8%	15.0%
		<b>Male</b>	74.6%	7.1%	18.3%
	<b>Semester</b>	<b>4<sup>th</sup> year</b>	59.7%	19.5%	20.8%
		<b>5<sup>th</sup> year</b>	73.3%	10.9%	15.8%
		<b>6<sup>th</sup> year</b>	71.9%	17.1%	11.0%
	<b>Intern</b>	75.5%	3.5%	21.0%	<0.001***
<b>Risk Perception</b>	<b>Gender</b>	<b>Female</b>	67.5%	16.3%	16.3%
		<b>Male</b>	78.9%	7.4%	13.6%
	<b>Semester</b>	<b>4<sup>th</sup> year</b>	70.5%	14.1%	15.4%
		<b>5<sup>th</sup> year</b>	71.9%	11.3%	16.7%
		<b>6<sup>th</sup> year</b>	69.5%	19.0%	11.4%
	<b>Intern</b>	80.4%	2.1%	17.5%	<0.001***

\*No significant difference. \*\*Significant. \*\*\*Highly Significant.

to the statement that they should undergo HIV screening test every year. Meanwhile, 40.4% stated that they should undergo HIV screening test on a yearly basis. When considering the efficiency of the methods to sterilize instruments used on HIV patient, 41.9% of participants feel that the sterilization methods are effective in the prevention of cross-contamination.

Comparison between the gender for the attitude and risk perception showed a statistically significant difference, with female shows more positive attitude and a good level of risk perception as compared to male participants ( $p$ -value<0.00) [Table 2]. When groups were compared according to a year of the study, the highest positive attitude was recorded by interns (21%) towards treating the HIV patients when compared to other. The attitude increased gradually among the undergraduate students in direct proportion to the year of the study and the difference was statistically significant ( $p$ -value<0.00) [Table 2]. Regarding the risk perception, 17.5% of the intern showed a good level of risk perception which was highest among all the groups. Lower level students showed poor risk perception as compared to the higher level of students. The gradual shift in risk perception was observed with increasing year of education in the students, and the recorded difference was statistically significant ( $p$ -value<0.00) [Table 2].

## Discussion

To convey effective clinical management of the patients, dental professionals should be conscious and comprehend of the significance of HIV/AIDS. [20] Health care professionals gain their knowledge and behavior from their professional education. [12] In the present study, the overall knowledge was average among 45.4% participants, with only 10.1% showed a good knowledge score. Although the result of the present study is in accordance with the finding of the study conducted by Rani et al., [21] in which they found a good knowledge among a certain proportion of the participants. Still, the result of our study reported a lower level of knowledge when compared with the results of previous studies conducted by Singh et al., and Shreya et al., in which they found knowledge score of 72.7% and 73.6% respectively among dental students. [12,22] The male showed a better knowledge than female; this result was consistent with the result reported by a study conducted at the university hospital. [23] On the other hand, Manish et al., reported a contradictory result in a study conducted on the Indian dental students. [24]

Although one would expect that knowledge of student will increase by increasing in study level, this wasn't the case in the present study. The lower level students showed a higher level of knowledge than the higher level students. This could be because the subject of virology are taken during the early level courses, which indicate the need for advanced courses through the study years. This contradicts the result obtained by Shreya et al., [22] and Santhosh et al., [23] where the knowledge increased by as there is an increase in study level.

Bearing in mind that oral manifestation found at different stages of HIV infection showed a very strong correlation to respective CD4 count, [9] only 16.3% reported that they don't

have knowledge about the possible oral presentation for HIV positive patients. This was in the agreement with the result of the study conducted by Awad in a university hospital, Saudi Arabia. [25] Whereas result of the study conducted by Singh et al., contradict the finding of the present study in relation to the above knowledge. [12] If dental students are not self-confident of their level of knowledge about HIV and how to manage HIV positive patient, they do not consider themselves properly prepared to treat these patients. Consistent with the below average knowledge the participant showed an overall poor attitude towards HIV positive patients.

Although the World Health Organization (WHO) deliberates that all dentists have obligation to treat HIV-positive patients. [26] Only half of the participants (53.4%) from the present study stated that they would treat an HIV positive patient, which was reliable with the result reported by Santhosh et al., and Awad (45% and 41.3% respectively) in their study. [23,25] The result of the study conducted by Vijendra et al., was in disagreement with the current study, with the majority of the participants (71.5%) showed a willingness to treat the HIV positive patients. [12] Less than one third (26.6%) stated that their level of knowledge is enough to work with HIV patient. This was consistent with the result obtained by Kumar et al., [23] and slightly less than that reported by Vijendra et al. [12] In a study conducted by Kumar et al., [23] more than half of the participants submitted their agreement that the methods used for sterilization of instruments are effective against HIV infection, whereas in current study only 41.9% agreed to the same.

All infection control measures should be taken with every patient in dental clinic, this because some of the patients may not declare their medical status in order not to be rejected, adding to that the social stigma associated with the HIV. More than half of the participants' from the current study agreed that they consider all patients to be potentially HIV positive patients, which is consistent with the CDC regulation. This result was comparable with that reported by Rani et al. [21] The risk of transmission of HIV in healthcare services increases consistently with the prevalence of HIV infection and this is in compliance with infection control measurement. [27] Exposure to HIV has been reported by 0.5% dentists/year, whereas the risk of HIV infection to the dentists after percutaneous exposure is about 0.3%. [27] After all, it has been found that dental health care providers are at low occupational risk for HIV infection. [27,28] In the current study, almost half the participant believed that dentist belongs to the high-risk group. Dental staff is exposed to an infectious agent; nonfulfillment of the standard infection control protocol put the dentist at a higher risk of exposure. [29] 11.1% of the participants from the study group consider it unsafe even if using all protective equipment. On the other hand, 41.1% of the participants stated that they would be safe by following universal protection.

## Conclusion

Taken together, this study showed a lack in the knowledge of dental students and interns about HIV infection. The misconceptions in part of the information leading to a negative

attitude towards the HIV positive patients. Buildup a solid base of knowledge to guide the attitude into positive direction needs a continuous courses and workshop regarding the HIV infection, its transmission and the protective measurements to deal with such patients.

### Conflict of Interest

The authors disclose that they have no conflicts of interest.

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