Knowledge of human immunodeficiency virus, attitudes, and willingness to conduct human immunodeficiency virus testing among Indian dentists

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ABSTRACT

Context: India has the third-highest number of people living with human immunodeficiency virus (HIV) in the world. Early diagnosis can prevent HIV transmission and since a large proportion of the Indian population are likely to be seen in a dental setting, it may serve as an important site for early HIV diagnosis.

Aims: The aim of this study was to investigate the knowledge of HIV, attitudes, and willingness to conduct HIV testing among Indian dentists.

Settings: A cross-sectional survey of 503 Indian dentists was conducted in Delhi, Gandhinagar, Bhubaneswar, and Hyderabad (representing low, moderate, and high HIV prevalence areas).

Subjects and Methods: HIV knowledge was measured using the HIV-KQ-18, and attitudes and willingness were examined.

Statistical Analysis Used: Descriptive analysis and Chi-square test were performed using SPSS version 21.

Results: A third of the respondents had a high HIV knowledge score. High knowledge scores were positively associated with age group, level of education, and dental specialty. Over 73% were willing to deliver HIV-positive test results. Almost 80% of the respondents felt that rapid HIV testing was needed in a dental setting. Attitudes and willingness were found to be significantly related to the survey site suggesting cultural difference as an important factor in taking up HIV testing.

Conclusions: General awareness of HIV among this sample of Indian dentists appears to be low. The findings from this study however suggest that Indian dentists have expressed a need for rapid HIV testing in dental setting with a strong emphasis on the need for further education on HIV testing.

Key words: Dentists, human immunodeficiency virus, human immunodeficiency virus testing, India

India has the third-highest number of people living with human immunodeficiency virus (PLWH) in the world.1 In 2014, the estimated number of PLWH in India was 2,088,638 with an adult human immunodeficiency virus (HIV) prevalence rate of 0.27%.2 In the same year, the estimated number of new HIV infections was 116,459 with 147,729 acquired immunodeficiency syndrome (AIDS)-related deaths. The 90-90-90 - plan an ambitious treatment target to help end the AIDS epidemic proposed by United Nations...
Programme on HIV/AIDS (UNAIDS) proposes that by 2020, 90% of all PLWH will know their HIV status, 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy, and 90% of all people receiving antiretroviral therapy (ART) will have viral suppression.\(^3\) The endgame will involve a number of strategies, but the foremost is early testing which will lead to early treatment and thus calls for a scaling up of HIV testing at different settings. The free ART program has played an important role in reducing the number of deaths due to AIDS in India, with an estimated 840,000 lives being saved until 2014.\(^{2,4}\) Therefore, early diagnosis and timely treatment can prevent HIV transmission to unaffected communities. To maximize the process of early diagnosis, the involvement of health professionals from all levels is crucial\(^6\) and since a large proportion of Indian population are likely to be seen at an oral health setting, it can act as an important site for early HIV diagnosis.

National AIDS Control Organization (NACO) recommended that HIV testing can be undertaken as voluntary testing after counseling and a total of 13,030,000 people were tested for HIV in India during 2013–2014.\(^6\) At present, the HIV diagnostic kit market comprises of only four major segments; NACO laboratories, private and nongovernmental organization laboratories, major blood banks, and public and private hospitals. However, a number of rapid HIV tests have been validated in India for ease of performance and quick results which also increase their chance of being accepted at an oral healthcare setting.\(^6\) However, at the same time, knowledge and attitudes of dentists in relation to HIV are important determinants for their willingness to care and the quality of the care they will render to HIV patients.\(^7\)

In India, as in many other countries, it is illegal for clinicians, clinics, and hospitals to discriminate on the basis of HIV disease status as strict laws against discrimination against seropositive patients have been adopted.\(^8\) A number of studies from India show wide variability in the knowledge and attitudes of the dentists. In a study (sample size \(n = 600\)) conducted with dental students in national capital region (NCR), 67.6% of subjects believed that dentists are at high-risk group,\(^7\) and similar results were found in another study (\(n = 266\)) conducted in rural India.\(^9\) In a comparison-based study (\(n = 500\)) where the responses from the year 1999 were compared with the year 2010, over 90% of the dentists reported that HIV has a high potential of being transmitted in an oral health setting showing their reluctance in treating HIV patients.\(^8\)

In another study (\(n = 205\)), dentists reported fear of contracting the infection, resistance of support staff, and perceived lack of clinical skills as barriers to treating HIV-infected patients.\(^9\) In a study (\(n = 460\)) conducted in Uttar Pradesh, 87.2% of dental students agreed or strongly agreed with the statement, “I have a right to know if my patients are HIV-positive” which showed negative attitudes toward PLWH\(^10\) and similar findings were reported in another study (\(n = 191\)) conducted in Shimla among the dental students.\(^11\) In a national survey of Indian dentists (\(n = 450\)), one of the reasons for refusing treatment was the lack of knowledge of dentists that saliva cannot readily transmit HIV.\(^12\) Impact of an educational program was evident in a study (\(n = 106\)) where 65% of the dentists demonstrated improvement in terms of their HIV knowledge after attending an educational program on HIV.\(^13\) A study (\(n = 200\)) conducted in Bhopal showed that knowledge about diagnosis of HIV was only 33% among the respondents.\(^14\) An interesting finding from another study (\(n = 450\)) was that a large proportion of dentists surveyed did not know the location of the nearest ART center.\(^15\) In a study (\(n = 102\)) conducted in Tamil Nadu, it was seen that about 98% of the study sample felt that it was necessary to screen patients for HIV in oral healthcare settings, but only one dentist reported of having done any screening test for HIV on their patients in the past 12 months and the major reasons for not treating HIV patients were found to be lack of knowledge and training in handling a HIV patient and dealing with staff fears about HIV patients. In a study (\(n = 164\)) conducted in Kuala Lumpur, Malaysia, only about half of the final year dental students agreed that disclosure of HIV status of dental patients can help to prevent cross-infection.\(^15\) A recent study (\(n = 477\)) conducted in Xi’an region of China showed that younger age, shorter duration of clinical practice, having gained a postgraduate degree, working in a dental hospital, and having direct contact with infectious diseases by patients’ saliva or blood had a higher knowledge of HIV. Further, participants with higher knowledge were more likely to feel comfortable when advising a preliminary positive HIV test result.\(^16\) In the study (\(n = 1802\)) conducted among dentists practicing in the United States, it was shown that most of the dentists (67.1%) had expressed concern regarding patients’ acceptance over HIV screening.\(^17\) A cross-sectional study (\(n = 532\)) conducted in Australia showed that most dentists (78.1%) were uncomfortable advising a patient of a reactive rapid HIV test result and having treated PLWH and knowledge score stand as important predictors of their willingness.\(^18\) A qualitative study (\(n = 42\)) conducted among the Vietnamese dentists where four focus groups assessed their willingness to conduct saliva-based HIV testing, the majority were willing to provide rapid HIV testing; however, at the same time, need for additional training was needed.\(^19\)

Given the lack of prior research on willingness to conduct HIV testing in an oral health setting among Indian dentists, the aim of this study was to assess the knowledge of HIV, attitudes, and willingness to conduct HIV testing among dentists practicing at Delhi/NCR, Hyderabad, Gandhinagar, and Bhubaneswar (representing low, moderate, and high HIV prevalence areas) in India.
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SUBJECTS AND METHODS

Study design and participants
A cross-sectional study was conducted among dentists currently practicing in four major cities; Delhi/NCR, Gandhinagar, Bhubaneswar, and Hyderabad (representing low, moderate, and high HIV prevalence areas) in India. A sampling frame of dental hospitals, dental colleges, and dental clinics was developed. The surveys were conducted at private and government dental hospitals, dental colleges, and private clinics both electronically and in paper format.

To be eligible, the dentists were required to have (1) earned a Bachelor of Dental Science (or equivalent degree), and (2) currently practicing dentistry and/or a faculty member in a dental college in Delhi, Hyderabad, Gandhinagar, and Bhubaneswar. Dental professionals who were not dentists (hygienists, therapists, etc.) were excluded from the study. The study was explained to the eligible dentists, and written consent was obtained from each respondent prior to the survey.

Survey
The valid and reliable survey instrument based on a study with similar objectives in Seoul, South Korea,[17,20] was modified for the Indian context after being reviewed by an expert panel of 30 Indian dentists, public health, and HIV scholars. The survey instrument consisted of 33 questions, assessing demographics, knowledge on HIV, and experience in managing HIV patients, attitudes, and willingness to conduct HIV testing.

Analysis
Statistical Package for the Social Sciences (SPSS), version 21.0 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0, Armonk, NY: IBM Corp) was used for statistical analyses. Question about knowledge on HIV contained 18 items and each correct item was awarded one mark; the maximum score was 18. Individuals who answered 75% or more of the questions correctly were placed into a category of “high knowledge score group” while those who answered < 75% of the test questions correctly were placed into the “low knowledge score group.” Attitudes and willingness were examined. Differences and associations between knowledge score groups, attitudes, willingness, and experience in handling HIV patients were tested using Chi-squared statistic for categorical variables, and the statistical significance was set up at \( P < 0.05 \).

Ethics
Ethics approval was received from the Public Health Foundation of India and the University of Sydney.

RESULTS

Profile of the respondents
A total of 503 Indian dentists took part in the study, and 50.9% of the respondents were from Delhi/NCR region [Table 1]. Two hundred and seventy-five (54.7%) females and 228 (45.3%) males participated in the study. More than half (51.9%) of the respondents were from public sector and 43.8% had a postgraduate degree in dentistry.

Knowledge of human immunodeficiency virus
The participants were asked to answer true, false, or do not know to 18 statements regarding knowledge of HIV and an overall knowledge score was calculated by summing the scores for each statement. The average knowledge score was 11.7 (standard deviation = 3.213) and it was found that only 33.8% of the respondents had high HIV knowledge score (answered >75% or more of the test questions correctly). The correct response rate for each statement is shown in Table 2.

A minority of respondents (34.7%) reported prior experience in dealing with HIV patients and it was found to be significantly associated with low knowledge score (answered <75% of the test questions correctly) \( (P = 0.002) \) [Table 3]. High knowledge scores were positively associated with age group \( (P = 0.017) \), level of education \( (P = 0.008) \), and dental specialty \( (P = 0.006) \). Hesitance to deliver news of HIV-positive test to patients was negatively associated with level of knowledge score \( (P = 0.004) \). Of those hesitant to deliver news of positive test to patients, 44% were from the high knowledge score group compared to 56% in the low knowledge score group.

Attitudes toward human immunodeficiency virus testing
Dentists working in government sector showed an overall positive attitude toward HIV testing as compared to private

Table 1: Respondent characteristics

| Characteristics                     | Frequency (%) |
|------------------------------------|---------------|
| Sex                                |               |
| Male                               | 228 (45.3)    |
| Female                             | 275 (54.7)    |
| Age (years)                        |               |
| Up to 25                           | 133 (27.8)    |
| Above 25                           | 345 (72.2)    |
| Educational level                  |               |
| Graduate (BDS)                     | 281 (56.2)    |
| Postgraduate (MDS)                 | 219 (43.8)    |
| Type of dental specialty           |               |
| General practice                   | 250 (49.7)    |
| Specialist                         | 253 (50.3)    |
| Type of practice                   |               |
| Private                            | 242 (48.1)    |
| Public                             | 261 (51.9)    |
| Site                               |               |
| Delhi/NCR                          | 256 (50.9)    |
| Gandhinagar                        | 105 (20.8)    |
| Hyderabad                          | 76 (15.1)     |
| Bhubaneswar                        | 66 (13.1)     |
| Number of dental patients seen in a typical week | |
| 1-40                               | 276 (55.4)    |
| 41-80                              | 121 (24.3)    |
| 81 and above                       | 101 (20.3)    |

NCR=National capital region
Willingness of Indian dentist to conduct HIV testing

A majority of respondents (78.2%) reported feeling confident about asking their patients to undergo HIV testing although 35.2% of respondents believed that their patients would be unwilling to accept HIV testing in an oral health setting [Table 4]. Many (73.3%) of the respondents were willing to deliver HIV-positive test results to patients; however, 58.1% reported lacking proper knowledge to administer HIV test.

Number of dental patients seen in a week ($P < 0.05$) and type of practice ($P < 0.05$) made a statistically significant difference to having positive attitude toward HIV. Males (33.8%, $P = 0.001$) reported more reluctance to deliver HIV diagnostic information to patients. Having knowledge to administer an HIV test was found to be positively associated with level of education ($P = 0.003$) and dental specialty ($P = 0.021$). A majority of respondents (73.3%) were willing to deliver HIV-positive test results to patients and of these, 80% were from the government sector whereas 34% of the private practitioners showed reluctance in delivering the news of positive HIV test [Table 5].

Willingness to conduct human immunodeficiency virus testing

A total of 402 (79.9%) of the respondents felt that rapid HIV testing was needed in oral health setting, but only 30% of the respondents reported indifference to negative reactions from patients from offering to do HIV test [Table 6]. Willingness to undertake HIV testing in patients was positively associated with knowledge score ($P = 0.000$), the belief that their patient’s perception about them would improve ($P = 0.000$), and have had some training on management of HIV in dental school ($P = 0.001$) [Table 7].

No statistically significant relation was reported between knowledge score and survey site ($P = 0.06$), but attitudes ($P < 0.05$) and willingness ($P = 0.00$) were found to be significantly related to the survey site (data not shown), suggesting cultural difference as an important factor in taking up HIV testing. Further, no significant difference was found in the willingness to conduct HIV testing among dentists practicing in government (79%) and private (76.8%) sector.

**DISCUSSION**

This study has shown that the general awareness of HIV among this sample of Indian dentists appears to be low. The findings from this study suggest that prior experience in dealing with HIV-positive patients, level of education, and dental specialty have a significant impact on one’s knowledge of HIV. In contrast, a study conducted among the Chinese dentists showed that almost 70% of the respondents had high knowledge HIV scores; however, a similar study in Australia showed varied knowledge scores. [17,18]

Lack of education can be seen as the most important factor influencing one’s knowledge of HIV as similar results were seen in the studies conducted in the US, China, and Australia. [17,18] Overall, the participants showed positive attitudes toward HIV testing and are willing to conduct HIV testing in oral health setting; however, at the same time, they feel that they lack proper knowledge and skills to administer an HIV test which reduces their chance to uptake HIV testing in oral health setting.

In addition, possibility of a false-positive test result and referring a patient for follow-up of a positive test stand as major barriers in providing HIV testing in an oral healthcare setting. The study among the Australian...
dentists showed similar results where almost 80% of the respondents reported of not being comfortable giving a reactive test result.\textsuperscript{[18]} Therefore, information, education, and communication on HIV and HIV testing need to be scaled up and HIV can be made a part of dental health promotion materials.

A majority of the participants from the private sector were concerned about the negative reactions from their patients, a finding which was also seen in a US study\textsuperscript{[18]} where more than 60% of the dentists expressed concern regarding patient’s acceptance of HIV testing and might not be willing to conduct HIV testing. Therefore, it is clear that dentists need to be systematically made aware of their potential role in the implementation of UNAIDS prevention strategy which aims to improve access to HIV prevention, treatment, care, and support. There is also a need for the presence of counseling if the dentist feels the patient is at risk of HIV.

Limitations of the study included (a) participants were a convenience sample of dentists from only four cities in India, and it is unknown how representative this is of the dental profession in India and (b) lack of information on survey nonresponders. On the other hand, a major strength of this study was that the study population included dentists

| Question contents                                                                 | Knowledge score group (n, %) | $\chi^2$ | P       |
|----------------------------------------------------------------------------------|-----------------------------|---------|---------|
| Willingness to perform HIV test                                                   |                             |         |         |
| Do you think rapid HIV testing is needed in dental setting?                       | High score group\textsuperscript{a} | 152 (37.8) | 250 (62.2) | 14.415 | 0.000 |
| No                                                                               | Low score group\textsuperscript{b} | 18 (17.8)  | 83 (62.2)  |         |       |
| If you were to offer HIV testing, would you be concerned about negative reactions from your patients? |                             |         |         |
| Yes                                                                              | High score group\textsuperscript{a} | 84 (39.4)  | 129 (60.6) | 7.641  | 0.022 |
| No                                                                               | Low score group\textsuperscript{b} | 51 (33.8)  | 100 (66.2) |         |       |
| Do not know                                                                      |                             | 35 (25.2)  | 104 (74.8) |         |       |
| Experience                                                                       |                             |         |         |
| In the past 5 years, did you have any patients whom you knew had HIV?            |                             |         |         |
| Yes                                                                              | High score group\textsuperscript{a} | 75 (42.9)  | 100 (57.1) | 9.845  | 0.002 |
| No                                                                               | Low score group\textsuperscript{b} | 95 (29.0)  | 233 (71.0) |         |       |
| Have you ever had any training in HIV testing and counseling?                     |                             |         |         |
| Yes                                                                              | High score group\textsuperscript{a} | 51 (35.7)  | 92 (64.3)  | 0.311  | 0.577 |
| No                                                                               | Low score group\textsuperscript{b} | 119 (33.1) | 241 (66.9) |         |       |
| Do you know a place where you can refer a patient for HIV medical care?          |                             |         |         |
| Yes                                                                              | High score group\textsuperscript{a} | 105 (33.8) | 206 (66.2) | 0.000  | 0.983 |
| No                                                                               | Low score group\textsuperscript{b} | 65 (33.9)  | 127 (66.1) |         |       |
| General attitude                                                                 |                             |         |         |
| Most of my patients will accept HIV testing in the dental care setting            |                             |         |         |
| Agree                                                                            | High score group\textsuperscript{a} | 99 (30.4)  | 227 (69.6) | 4.869  | 0.027 |
| Disagree                                                                         | Low score group\textsuperscript{b} | 71 (40.1)  | 166 (59.9) |         |       |
| I do not want to deliver news of a positive test to a patient                    |                             |         |         |
| Agree                                                                            | High score group\textsuperscript{a} | 59 (44.0)  | 75 (56.0)  | 8.320  | 0.004 |
| Disagree                                                                         | Low score group\textsuperscript{b} | 111 (30.2) | 256 (69.8) |         |       |
| I lack proper knowledge to administer an HIV test                                |                             |         |         |
| Agree                                                                            | High score group\textsuperscript{a} | 96 (33.0)  | 195 (67.0) | 0.171  | 0.679 |
| Disagree                                                                         | Low score group\textsuperscript{b} | 73 (34.8)  | 137 (65.2) |         |       |

\textsuperscript{a}Answered 75% or more of the test questions correctly, \textsuperscript{b}Answered less than 75% of the test questions correctly. HIV=Human immunodeficiency virus, AIDS=Acquired immunodeficiency syndrome

| Statement                                                                 | Agree* frequency (%) |
|--------------------------------------------------------------------------|----------------------|
| Most of my patients will accept HIV testing in the dental care setting    | 326 (64.8)           |
| I do not want to deliver news of a positive test to a patient            | 134 (26.7)           |
| I lack proper knowledge to administer an HIV test                        | 291 (58.1)           |
| I am reluctant to offer HIV rapid testing because of the possibility of false-positive results and its consequences | 230 (45.9)           |
| I have the skills necessary to administer an HIV test                    | 211 (42.2)           |
| Referring a patient for follow-up of a positive test will be difficult   | 286 (57.1)           |
| I would feel comfortable asking my patients                              | 392 (78.2)           |

\textsuperscript{*}Responses for strongly agree and agree were combined for the analysis purpose. HIV=Human immunodeficiency virus

| Statement                                                                 | Agree* frequency (%) |
|--------------------------------------------------------------------------|----------------------|
| I am reluctant to offer HIV rapid testing because of the possibility of false-positive results and its consequences | 230 (45.9)           |
| I have the skills necessary to administer an HIV test                    | 211 (42.2)           |
| Referring a patient for follow-up of a positive test will be difficult   | 286 (57.1)           |
| I would feel comfortable asking my patients                              | 392 (78.2)           |

\textsuperscript{*}Responses for strongly agree and agree were combined for the analysis purpose. HIV=Human immunodeficiency virus

Table 4: Attitudes toward human immunodeficiency virus testing

| Statement                                                                 | Agree* frequency (%) |
|--------------------------------------------------------------------------|----------------------|
| Most of my patients will accept HIV testing in the dental care setting    | 326 (64.8)           |
| I do not want to deliver news of a positive test to a patient            | 134 (26.7)           |
| I lack proper knowledge to administer an HIV test                        | 291 (58.1)           |
| I am reluctant to offer HIV rapid testing because of the possibility of false-positive results and its consequences | 230 (45.9)           |
| I have the skills necessary to administer an HIV test                    | 211 (42.2)           |
| Referring a patient for follow-up of a positive test will be difficult   | 286 (57.1)           |
| I would feel comfortable asking my patients                              | 392 (78.2)           |

\textsuperscript{*}Responses for strongly agree and agree were combined for the analysis purpose. HIV=Human immunodeficiency virus

| Statement                                                                 | Agree* frequency (%) |
|--------------------------------------------------------------------------|----------------------|
| I am reluctant to offer HIV rapid testing because of the possibility of false-positive results and its consequences | 230 (45.9)           |
| I have the skills necessary to administer an HIV test                    | 211 (42.2)           |
| Referring a patient for follow-up of a positive test will be difficult   | 286 (57.1)           |
| I would feel comfortable asking my patients                              | 392 (78.2)           |

\textsuperscript{*}Responses for strongly agree and agree were combined for the analysis purpose. HIV=Human immunodeficiency virus
Willingness of Indian dentist to conduct HIV testing

CONCLUSION

It can be concluded that Indian dentists generally are willing to conduct HIV testing, but additional studies are needed to explore how rapid HIV testing can be incorporated into the oral healthcare setting. Future research will include qualitative study of Indian dentists' willingness to conduct HIV testing and to understand and broaden the role of other members of dental team (i.e., dental hygienists) and examining dental patients' attitudes toward being offered a rapid HIV test in the oral health setting.

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Table 5: Attitudes toward human immunodeficiency virus testing by sociodemographic characteristics

| Statements to indicate attitude                                                                 | Difference by sex of respondent | Male          | Female         | χ²      | P     |
|------------------------------------------------------------------------------------------------|--------------------------------|---------------|----------------|---------|-------|
| I do not want to deliver news of a positive test to a patient                                  |                                |               |                |         |       |
| Agree                                                                                           |                                | 77 (33.8)     | 57 (20.9)      | 10.54   | 0.001 |
| Disagree                                                                                        |                                | 151 (66.2)    | 216 (79.1)     |         |       |
| I have the skills necessary to administer an HIV test                                           |                                |               |                |         |       |
| Agree                                                                                           |                                | 110 (48.2)    | 101 (37.1)     | 6.28    | 0.012 |
| Disagree                                                                                        |                                | 118 (51.8)    | 171 (62.9)     |         |       |

Difference between age groups (%)

| Statements to indicate attitude                                                                 | Difference by sex of respondent | Male          | Female         | χ²      | P     |
|------------------------------------------------------------------------------------------------|--------------------------------|---------------|----------------|---------|-------|
| I do not want to deliver news of a positive test to a patient                                  |                                |               |                |         |       |
| Agree                                                                                           |                                | 23 (17.3)     | 103 (29.9)     | 7.895   | 0.005 |
| Disagree                                                                                        |                                | 110 (82.7)    | 241 (70.1)     |         |       |
| I would feel comfortable asking my patients if they would accept an HIV test                   |                                |               |                |         |       |
| Agree                                                                                           |                                | 117 (88.0)    | 261 (75.9)     | 8.535   | 0.003 |
| Disagree                                                                                        |                                | 16 (12.0)     | 83 (24.1)      |         |       |

Difference by level of education (%)

| Statements to indicate attitude                                                                 | Difference by sex of respondent | Male          | Female         | χ²      | P     |
|------------------------------------------------------------------------------------------------|--------------------------------|---------------|----------------|---------|-------|
| I lack proper knowledge to administer an HIV test                                              |                                |               |                |         |       |
| Agree                                                                                           |                                | 179 (63.9)    | 111 (50.9)     | 8.531   | 0.003 |
| Disagree                                                                                        |                                | 101 (36.1)    | 107 (49.1)     |         |       |
| I would feel comfortable asking my patients if they would accept an HIV test                   |                                |               |                |         |       |
| Agree                                                                                           |                                | 233 (83.5)    | 158 (72.1)     | 9.396   | 0.002 |
| Disagree                                                                                        |                                | 46 (16.5)     | 61 (27.9)      |         |       |

Difference between groups with different specialization (%)

| Statements to indicate attitude                                                                 | General dentistry | Specialty dentistry | χ²      | P     |
|------------------------------------------------------------------------------------------------|-------------------|---------------------|---------|-------|
| I lack proper knowledge to administer an HIV test                                              | 158 (63.2)        | 133 (53.0)          | 5.365   | 0.021 |
| Disagree                                                                                        | 92 (36.8)         | 118 (47.0)          |         |       |
| I would feel comfortable asking my patients if they would accept an HIV test                   | 208 (83.5)        | 184 (73.0)          | 8.14    | 0.004 |
| Disagree                                                                                        | 41 (16.5)         | 68 (27.0)           |         |       |

Difference by type of practice (%)

| Statements to indicate attitude                                                                 | Private practice | Government | χ²      | P     |
|------------------------------------------------------------------------------------------------|-----------------|------------|---------|-------|
| I do not want to deliver news of a positive test to a patient                                  | 81 (33.6)       | 53 (20.4)  | 11.165  | 0.001 |
| Disagree                                                                                        | 160 (66.4)      | 207 (79.6) |         |       |

HIV=Human immunodeficiency virus

Table 6: Willingness to conduct human immunodeficiency virus test in oral health setting

| Statements to indicate attitude                                                                 | Yes (%) | No (%) | Do not know (%) |
|------------------------------------------------------------------------------------------------|---------|--------|-----------------|
| Do you think rapid HIV testing is needed in oral health setting?                              | 402 (79.9) | 101 (20.1) | -               |
| If you were to offer HIV testing, do you think your patient’s perception of you as a healthcare provider would improve? | 286 (56.9) | 47 (9.3) | 170 (33.8)      |
| If you were to offer HIV testing, would you be concerned about negative reactions from your patients? | 213 (42.3) | 151 (30.0) | 139 (27.6)      |

Values are represented as frequency (%). HIV=Human immunodeficiency virus

practicing at different socioeconomic setups coming in contact with a broad range of patients.
Table 7: Willingness to conduct human immunodeficiency virus test: Difference between groups with different characteristics

| Characteristics/question contents                                                                 | Do you think rapid HIV testing is needed in dental setting? (n, %) | $\chi^2$ | P    |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------|-----|
|                                                                                                 | Yes (n)          | No (n)          |
| Knowledge score group                                                                                                                                     |
| High score group                                                                                                                                             |
| Do you think rapid HIV testing is needed in dental setting? (n, %)                                                                                           | 152 (89.4)       | 18 (10.6)       | 14.415 | 0.000 |
| Low score group                                                                                                                                              |
| Do you think rapid HIV testing is needed in dental setting? (n, %)                                                                                           | 250 (75.1)       | 83 (24.9)       |
| Most of my patients will accept HIV testing in the dental care setting                                                                                |
| Agree                                                                                                                                                       | 249 (76.4)       | 77 (23.6)       | 7.235  | 0.007 |
| Disagree                                                                                                                                                   | 153 (86.4)       | 24 (13.6)       |
| I lack proper knowledge to administer an HIV test                                                                                                          |
| Agree                                                                                                                                                       | 259 (89.0)       | 32 (11.0)       | 34.914 | 0.000 |
| Disagree                                                                                                                                                   | 142 (67.6)       | 68 (32.4)       |
| I have the skills necessary to administer an HIV test                                                                                                      |
| Agree                                                                                                                                                       | 142 (67.3)       | 69 (32.7)       | 35.393 | 0.000 |
| Disagree                                                                                                                                                   | 257 (88.9)       | 32 (11.1)       |
| If you were to offer HIV testing, do you think your patient’s perception of you as a healthcare provider would improve?                                      |
| Yes                                                                                                                                                        | 255 (89.2)       | 31 (10.8)       | 35.845 | 0.000 |
| No                                                                                                                                                         | 30 (63.8)        | 17 (36.2)       |
| Do not know                                                                                                                                                 | 117 (68.8)       | 53 (31.2)       |
| If you were to offer HIV testing, would you be concerned about negative reactions from your patients?                                                         |
| Yes                                                                                                                                                        | 181 (85.0)       | 32 (15.0)       | 33.557 | 0.000 |
| No                                                                                                                                                         | 133 (88.1)       | 18 (11.9)       |
| Do not know                                                                                                                                                 | 88 (63.3)        | 51 (36.7)       |
| In the past five years, did you have any patients whom you knew had HIV?                                                                                 |
| Yes                                                                                                                                                        | 156 (89.1)       | 19 (10.9)       | 14.224 | 0.000 |
| No                                                                                                                                                         | 246 (75.0)       | 82 (25)         |
| Have you ever had any training in HIV testing and counseling?                                                                                            |
| Yes                                                                                                                                                        | 101 (70.6)       | 42 (29.4)       | 10.748 | 0.001 |
| No                                                                                                                                                         | 301 (83.6)       | 59 (16.4)       |
| Have you ever had some training on management of HIV in dental school?                                                                                |
| Yes                                                                                                                                                        | 167 (87.9)       | 23 (12.1)       | 12.099 | 0.001 |
| No                                                                                                                                                         | 235 (75.1)       | 78 (24.9)       |
| Do you know a place where you can refer a patient for HIV testing and counseling?                                                                         |
| Yes                                                                                                                                                        | 272 (76.6)       | 83 (23.4)       | 8.02   | 0.005 |
| No                                                                                                                                                         | 129 (87.8)       | 18 (12.2)       |

HIV=Human immunodeficiency virus, AIDS=Acquired immunodeficiency syndrome

Conflicts of interest
There are no conflicts of interest.

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