Exploring educational and promotional opportunities for implementing oral rapid human immunodeficiency virus testing among dentists in India

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Abstract:

CONTEXT: Human immunodeficiency virus (HIV) is a public health problem in India. Dentist plays an important role in diagnosing since oral lesions are common in HIV-positive patients and have an ethical responsibility to provide treatment to them.

AIMS: This study aims to explore educational and promotional opportunities for implementing oral rapid HIV testing (ORHT) among dentists in Bengaluru, India.

SETTINGS AND DESIGN: A cross-sectional study was conducted among 300 dentists. Dentists were included from private practice, dental practice in general hospital, and dental teaching/hospitals.

SUBJECTS AND METHODS: A 43-item questionnaire was used to assess demographics, educational knowledge on HIV and ORHT, attitude toward HIV patients, and willingness to promote ORHT and perceived barriers of performing ORHT.

STATISTICAL ANALYSIS USED: The data were evaluated using SPSS 22. Student's t-test, Chi-square, Pearson correlation, and binary logistics were used keeping P value at 5%.

RESULTS: Mean age of the participants was 38.97 ± 7.69 years with equal distribution of gender and practice. Majority were postgraduates (63.0%) and having general practice (56.6%). Although two-thirds of the participants belong to high score category, the mean knowledge level is below 50%. Mean score of knowledge was 10.70 ± 2.5. One hundred and thirty (43.3%) dentists were aware of ORHT, and 228 (76%) thought that ORHT was needed in the dental clinic. Dentist having specialty practice felt more accepting of ORHT (odds ratio = 2.455, 95% confidence interval 1.186–5.463). The lack of knowledge and training was the main barrier (39%) to conduct ORHT.

CONCLUSIONS: The level of knowledge of the dentist about HIV/AIDS was acceptable. Majority of the dentist thought that ORHT is needed in a dental clinic. Overall, there was positive attitude toward HIV patients and ORHT.

Keywords: Dental setting, human immunodeficiency virus, India, oral rapid human immunodeficiency virus testing, promotional opportunity

Introduction

Human immunodeficiency virus (HIV)/AIDS is a major global public health issue, with 36.9 million people living with HIV at the end of 2017. Around 0.8% (0.6%–0.9%) of adults aged 15–49 years worldwide are living with HIV.[1] India is the third largest country having people living with HIV/AIDS, accounting for 2.2 million people.[2] AIDS virus is human T-lymphotropic virus type 3 or lymphadenopathy-associated virus, a retrovirus usually called HIV. It attacks the CD4+ T lymphocytes in infected humans, which results in immunosuppression.[3]

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HIV testing is not done on a routine basis in India whereas country like the US, its mandatory. Due to this, there was an improvement in early diagnosis, start of care on time and enabling patients to access for antiretroviral therapy, in the bargain, there was a reduction in infectivity, morbidity, and mortality.[4–6] Oral health is an essential aspect for overall medical care for HIV, and it is important for improving the quality of life among them.[7]

During dental clinical procedures, blood and saliva exposure occur frequently, hence both patients and dentist are at a risk of blood-borne infection such as HIV.[8] However, the possibility of HIV transmission is very low.[9] Furthermore, most of the lesions of HIV infection are present orally during initial stages, the dental setting can be considered as an ideal setting for testing of HIV.[9]

Various test kits are available that use blood for testing. Rapid tests for HIV gives result on the spot instead of sending the sample to the laboratory. However, rapid testing will depend on the type of practice, financial resources, patient acceptance, and staff support.[10] HIV testing using saliva is a new noninvasive method. This oral rapid HIV testing (ORHT) technology permits fast, simple, minimally invasive, cost-effective way to screen for HIV serostatus in which dental setting provide a perfect venue.[11]

There are ample of studies in literature regarding knowledge and willingness toward HIV/AIDS screening using blood in the dental setting.[7,12–16] However, very few studies have assessed willingness to use ORHT in the dental setting.[14,10] Dentist in couple of studies was willing to conduct ORHT[9,10] while other two studies reported that dentist was comfortable using blood test instead of saliva.[4,6]

Owing to the alarming increase spread of HIV in India, the present study aimed to explore educational and promotional opportunities for implementing ORHT among dentists in Bengaluru, India.

Subjects and Methods

Study design and participants
A cross-sectional questionnaire study was conducted among dentists in Bengaluru from February to April 2017. Ethical approval was obtained from Institutional Ethical Committee and was carried in full accordance with the World Medical Association Declaration of Helsinki. All participants signed an informed consent.

The sample size calculation was accomplished using an online database software program (Raosoft®, Inc., 6645 NE Windermere Road, Seattle, WA, USA; www.raosoft.com) with 95% confidence interval (CI) and study population size of 1078 and was found to be 284; it was rounded off to 300. Majorly, three types of dental practice are present in India: private practice, dental practice in the general hospital, and dental teaching/hospitals. Stratified cluster sampling was employed considering the type of practice as a cluster. List of dental teaching/hospitals,[17] dental practice in general hospital, and private clinic list[18] was prepared, from each cluster dental practices were selected randomly, and all dentists working in these practices were included till the sample size was met.

Data collection
The questionnaire was based on previous studies[4,10] with some modifications and the addition of new questions to suit the Indian scenario. Face validity and content validation were done with the help of panel of experts. Internal consistency was also assessed using Cronbach’s alpha, and it was found to be good (α = 0.82) during a pilot survey.

Questionnaire consisted of 43 questions, assessing demographics (6 items), dental practice (6 items), behavior toward HIV patients (2 items), educational knowledge on HIV/AIDS and ORHT (21 items), attitude toward HIV patients and willingness to promote ORHT (6 items), and perceived barriers of performing ORHT (2 items).

Self-administered questionnaires were distributed to the dentists in their respective practices. Questionnaires were collected immediately and checked for its completeness. It took 10–15 min for them to complete the questionnaire.

Statistical analysis
Data collected were entered into an Excel format, and statistical package for the social sciences, version 22 (IBM Corporation, SPSS Inc., Chicago, IL, USA) was used for statistical analysis. The correct answer in knowledge domain was allotted score of 1 (range 0–21), attitude questions responses were based on 3-point Likert scale (agree = 1, uncertain = 2, and disagree = 3) (range 6–18). Based on the median of knowledge domain, scores were dichotomized as “high score” and “low score.” Attitude scores were dichotomized as “yes” (agree) and “no” (disagree) based on responses of the necessity of oral rapid HIV in the dental setting.

Descriptive statistics with frequency, mean, and standard deviation were computed. Difference between the groups was tested using Student’s t-test for continuous variable and a Chi-square statistics for the categorical variable. Pearson’s correlation was used to explore the relationship between knowledge and attitude score. Unconditional logistic regression was used to analyze
factors affecting knowledge and attitude. A $P$ value was set at 5% using two-tailed test with 95% CI.

**Results**

The response rate was 100%. The mean age of the study participants was 38.97 ± 7.69 years (25–58 years) with equal distribution of gender and practice. Majority were postgraduates (63.0%) and having general practice (56.6%). Most of them reported up to 80 patients in a week in their practice. 18% reported that they had direct contact with blood; 31% had a sharp injury and 58.0% were injured once in the last year. 69% reported that they probably treated patients with HIV/AIDS and 70.3% knew their HIV status [Table 1].

Most of the questions were answered correctly by study participants (>80%) except questions related to virology, infection control measures, treatment, and about ORHT (04.7%–57.7%). Mean knowledge score was 10.70 ± 2.5; 98 (32.6%) were in the low-score group; 202 (67.3%) were in high-score group. Age, gender, educational level, dental specialty, type of practice, possibility to treat HIV patients, and knowing their HIV status was associated with knowledge score [Table 1].

More than half (57.0%) of the participants responded that if they come across HIV patient; they would treat patient cautiously in an isolated room after patient agreement; 22.3% will treat them like any other patient; 15.3% will refer them to a specialist and 5.3% will not be comfortable in treating HIV-positive patients. When asked how they feel while advising preliminary HIV test to their patient more than half (52.7%) reported comfortable [Table 2].

| Table 1: Participant characteristics and HIV knowledge scores |
|-------------------------------------------------------------|
| **Characteristics**                                         |
| **Total** ($n=300$)                                         |
| **HIV Knowledge Score**                                    |
| **P**                                                       |
| **Age in years, M (SD)**                                   |
| 38.97 (7.69)                                                |
| 37.29 (7.34)                                                |
| 39.81 (7.75)                                                |
| 0.008                                                      |
| **Gender**                                                  |
| Male                                                        |
| 150 (50.0)                                                  |
| 41 (27.33)                                                  |
| 109 (72.66)                                                 |
| 0.04                                                       |
| Female                                                      |
| 150 (50.0)                                                  |
| 57 (38.0)                                                   |
| 93 (62.0)                                                   |
| **Educational level**                                       |
| Graduate                                                   |
| 111 (37.0)                                                  |
| 46 (41.44)                                                  |
| 65 (58.55)                                                  |
| 0.01                                                       |
| Postgraduate                                                |
| 189 (63.0)                                                  |
| 52 (27.51)                                                  |
| 137 (72.48)                                                 |
| **Designation**                                             |
| Professor                                                  |
| 5 (1.7)                                                     |
| 1 (20.0)                                                    |
| 4 (80.0)                                                    |
| 0.15                                                       |
| Associate Professor                                        |
| 20 (6.7)                                                    |
| 5 (25.0)                                                    |
| 15 (75.0)                                                   |
| Assistant Professor                                         |
| 50 (16.7)                                                   |
| 5 (10.0)                                                    |
| 45 (90.0)                                                   |
| **Lecturer**                                                |
| 25 (8.3)                                                    |
| 1 (4.0)                                                     |
| 24 (96.0)                                                   |
| **Dental specialty**                                        |
| General practice                                           |
| 170 (56.66)                                                 |
| 78 (45.88)                                                  |
| 92 (54.11)                                                  |
| 0.001                                                      |
| Specialty                                                  |
| 130 (43.33)                                                 |
| 20 (15.38)                                                  |
| 110 (84.61)                                                 |
| **Type of practice**                                        |
| Private practice                                           |
| 100 (33.3)                                                  |
| 37 (37.0)                                                   |
| 63 (37.0)                                                   |
| 0.001                                                      |
| Dental practice in general hospital                        |
| 100 (33.3)                                                  |
| 49 (49.0)                                                   |
| 51 (51.0)                                                   |
| Dental teaching/hospitals                                  |
| 100 (33.3)                                                  |
| 12 (12.0)                                                   |
| 88 (88.0)                                                   |
| **Patients seen in a week**                                |
| 1-40                                                       |
| 136 (45.3)                                                  |
| 44 (32.35)                                                  |
| 92 (67.64)                                                  |
| 0.34                                                       |
| 41-80                                                      |
| 135 (45.0)                                                  |
| 48 (35.55)                                                  |
| 87 (64.44)                                                  |
| >80                                                        |
| 28 (9.3)                                                    |
| 6 (21.42)                                                   |
| 22 (78.57)                                                  |
| **Contact with blood**                                     |
| Yes                                                        |
| 54 (18.0)                                                   |
| 13 (24.07)                                                  |
| 41 (75.92)                                                  |
| 0.13                                                       |
| No                                                         |
| 246 (82.0)                                                  |
| 85 (34.55)                                                  |
| 161 (65.44)                                                 |
| **Sharp injury**                                           |
| Yes                                                        |
| 93 (31.0)                                                   |
| 25 (26.88)                                                  |
| 68 (73.11)                                                  |
| 0.15                                                       |
| No                                                         |
| 207 (69.0)                                                  |
| 73 (35.96)                                                  |
| 134 (64.73)                                                 |
| **Possibility to treat HIV patients**                      |
| Yes                                                        |
| 208 (69.3)                                                  |
| 57 (27.40)                                                  |
| 151 (72.59)                                                 |
| 0.003                                                      |
| No                                                         |
| 89 (31.0)                                                   |
| 41 (46.06)                                                  |
| 48 (53.93)                                                  |
| **Awareness about HIV status**                             |
| Yes                                                        |
| 211 (70.3)                                                  |
| 48 (22.74)                                                  |
| 163 (77.25)                                                 |
| 0.001                                                      |
| No                                                         |
| 89 (29.7)                                                   |
| 50 (56.17)                                                  |
| 39 (43.82)                                                  |
Mean attitude score was 13.03 ± 1.91 (score range 6–18). 45% of the participants were having a negative attitude toward HIV patients. Majority supported HIV testing in a dental setting (86.3%), willing to undergo training (89.7%), or conduct ORHT in their dental setting was 79%. In multiple logistic regression, participants knowledge about their HIV status (OR = 4.010, 95% CI 2.274–7.072) predicted high knowledge [Table 3].

There was statistically significant positive moderate correlation (r = 0.31, P < 0.001) between knowledge score and attitude score. 79% were willing to conduct ORHT in their practice. HIV testing keep community and staff safe (41.3%) was the main reason was supporting ORHT in dental clinic followed by its part of routine dental care (24%), doctor and patient will know the status (13.7%), result will come on the spot (11.7%), and convenience (9.3%).

21% were not willing to conduct ORHT. Lack of proper knowledge and training was major barrier (39.33%) followed by dealing with staff fear about HIV patients (23.66%), fear of nonacceptance by the patient (15.66%), financial burden in practice (14.0%), and increase in personal risk (07.33%) [Figure 1].

**Discussion**

HIV targets the immune system. As the proportion of HIV-positive people increase, their demand for dental
Very few were aware about HIV-infected patients may ask for treatment from them. HIV status of patients, regardless of their diagnosis or presumed infection status. The Centre for Disease Control and Prevention (CDC) recommends standard precautions for the care of all patients, regardless of their diagnosis or presumed infection status. Two-thirds of the participants belonged to high score category, the mean knowledge level is below 50%. This depicts the inadequate knowledge about HIV and ORHT among participants. HIV transmission is possible only if certain body fluids like blood, comes in contact with a damaged tissue or are directly injected into the bloodstream (from a needle or syringe). Most of them had knowledge about this which was in agreement with other studies. Majority had knowledge about this which was in agreement with other studies. Some participants believed that carrying anti-HIV antibodies indicates immunity against the disease. Inadequate knowledge may explain less emphasis on virology of HIV during their graduation.

Enzyme-linked immunosorbent assay detects HIV antibodies which the body starts producing between 2 and 12 weeks after becoming infected with HIV. Western blot is the most common test followed by indirect fluorescent antibody and HIV viral load measurements. Majority of the participants were aware of these tests. Postexposure prophylaxis (PEP) means taking antiretroviral medicines after being potentially exposed to HIV to prevent becoming infected. PEP must be started within 72 h after a recent possible exposure. Less than half of the participants knew about PEP.

The Centre for Disease Control and Prevention (CDC) recommends standard precautions for the care of all patients, regardless of their diagnosis or presumed infection status. Very few knew about standard precautions. There is limited scientific evidence to rule in or out a meaningful relationship between HIV status and ORHT in dental practice.

### Table 3: Predictors of HIV knowledge scores

| Predictors                        | B    | SE   | OR   | 95% CI Lower | 95% CI Upper | P    |
|-----------------------------------|------|------|------|--------------|--------------|------|
| Age                               | 0.357| 0.283| 1.430| 0.821        | 2.491        | 0.207|
| Gender                            | 0.278| 0.269| 1.321| 0.780        | 2.237        | 0.301|
| Educational level                 | 0.265| 0.319| 1.303| 0.698        | 2.434        | 0.406|
| Dental specialty                  | 0.133| 0.381| 0.875| 0.415        | 1.846        | 0.726|
| Type of practice                   |      |      |      |              |              |      |
| Private practice                  | 0.341| 0.383| 1.407| 0.664        | 2.983        | 0.373|
| Dental practice in general hospital| 0.147| 0.400| 1.158| 0.528        | 2.538        | 0.714|
| Possibility to treat HIV patients  | 0.384| 0.294| 1.468| 0.825        | 2.613        | 0.192|
| HIV status                        | 1.389| 0.289| 4.010| 2.274        | 7.072        | <0.001|

Although two-thirds of the participants belonged to high score category, the mean knowledge level is below 50%. This depicts the inadequate knowledge about HIV and ORHT among participants. HIV transmission is possible only if certain body fluids like blood, comes in contact with a damaged tissue or are directly injected into the bloodstream (from a needle or syringe). Majority had knowledge about this which was in agreement with other studies. Most of them had knowledge about this which was in agreement with other studies. Some participants believed that carrying anti-HIV antibodies indicates immunity against the disease. Inadequate knowledge may explain less emphasis on virology of HIV during their graduation.

Very few had direct contact with the patient’s saliva or blood during dental procedures, whereas earlier study reported a higher proportion. Less than one-third had a history of sharp injuries which was similar to a study whereas a study reported a higher proportion of gender which corroborated with four studies. There was an equal distribution of dentist working in dental teaching institutes, private practice, and public sector. Although two-thirds of the participants belonged to high score category, the mean knowledge level is below 50%. This depicts the inadequate knowledge about HIV and ORHT among participants. HIV transmission is possible only if certain body fluids like blood, comes in contact with a damaged tissue or are directly injected into the bloodstream (from a needle or syringe).

![Figure 1: Perceived barriers to rapid HIV testing by dental setting](image-url)
complications arising from invasive dental procedures. Most of the participants believed that invasive dental procedures would increase the complications in HIV patients.

For blood and saliva spills, absorbent material should be used to soak the spill followed by broad-spectrum disinfectants such as 10% bleach (1 part of bleach with 9 parts of water) and left on the material for 10–30 min. Hands should be washed for at least for 15 s. Less than one-third of the participants answered correctly. All infectious material should be disposed in puncture proof bag with a biological waste symbol. More than two-thirds of the participants were aware of this stipulation.

ORHT provides results in 20 min. Swab is used to collect the saliva sample between the teeth and upper and lower gingiva. Like other rapid tests, it is not reliable during the window period. Very few were having knowledge about ORHT compared to other studies. A regimen for pep for HIV with three drugs (the combination of transcriptase and protease inhibitors) are preferred. Less than one-third had knowledge about HIV treatment. In multiple logistic regression, awareness about their HIV status was the only factor found to be associated with knowledge. While other factors remained insignificant with their association with knowledge. Most of the participants were having favorable attitude toward HIV and ORHT testing and were willing to perform ORHT in their dental clinic. Results were similar to few studies. In multiple logistic regression, those who were having specialty practice had more positive attitude toward ORHT, this could be due to better knowledge, well-equipped practice and set up to handle the situation. However, participants those who had less blood/saliva exposure had a negative attitude depicting lack of confidence to tackle the situation. The main finding of this study was that higher the knowledge scores favorable was the attitude toward ORHT. This demands the need for improving knowledge about HIV and ORHT.

The main reason that prompted participants’ willingness for conducting ORHT was “it will keep community and staff safe.” Whereas lack of knowledge emerged as the main barrier for conducting ORHT in their dental setting and was similar to couple of studies.

To best of our knowledge, this study is the first of its kind in India to assess the knowledge, practice, and willingness to conduct ORHT by dentists. Although it was a questionnaire study where social desirability and response bias can be expected. Its clarity, simplicity, and comprehensiveness may be considered as its strength and would have achieved reasonable degree of validity. Moreover, selection of study participants was done carefully to include an equal number of participants with regard to gender and dentists from three major practices; coming in contact with a broad range of patients which will facilitate extrapolation of the research findings.

Overall, the educational knowledge and attitude of the dentists toward ORHT can be improved by CDE programs to update the recent advances in the field to boost their confidence and willingness to adopt newer technologies for providing safe and efficient dental treatment procedures. As this technique is still not practiced in India, perception of the dentist toward ORHT is only imaginary. Hence, further studies can be taken up among the dentists once the products are easily available and technique is in practice.

Conclusions

Although there was an acceptable level of knowledge among dentist, still there is a need to improve the knowledge in some areas such as virology, infection control, prophylactic drugs, and ORHT. Dentist with a positive attitude toward HIV patients and ORHT were willing to promote ORHT in their clinic.

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Conflicts of interest
There are no conflicts of interest.

References
1. Global Health Observatory Data. Available from: https://www.who.int/gho/hiv/en/. [Last accessed on 2019 May 16].
2. Joint United Nations Programme on HIV/AIDS. Available from: https://www.unaids.org/en/resources/presscentre/featurestories/2019/may/20190513_pmtct. [Last accessed on 2019 May 16].
3. Burt BA, Eklund SA, editors. Dentistry, dental practice and the community. The Healthy Dental Practice: Infection Control and Mercury Safety. 6th ed. Philadelphia, Elsevier Publishers; 2005. p. 138-53.
4. Wang L, Santella AJ, Huang R, Kou L, You L, Zhang X, et al. Knowledge of HIV and willingness to conduct oral rapid HIV testing among dentists in Xi’an China. PLoS One 2015;10:e0119274.
5. Siegel K, Abel SN, Pereyra M, Liguori T, Pollack HA, Metch LR. Rapid HIV testing in dental practices. Am J Public Health 2012;102:625-32.
6. Hutchinson MK, VanDevanter N, Phelan J, Malamud D, Vernillo A, Combichlck J, et al. Feasibility of implementing rapid oral fluid HIV testing in an urban university dental clinic: A qualitative study. BMC Oral Health 2012;12:11.
7. Li R, Dong W, He W, Liu Y. Chinese dental students’ knowledge and attitudes toward HIV/AIDS. J Dent Sci 2016;11:72-8.
8. Erasmus S, Luiters S, Brijal P. Oral hygiene and dental student’s knowledge, attitude and behaviour in managing HIV/AIDS patients. Int J Dent Hyg 2005;3:213-7.
9. Scully C, Greenspan JS. Human immunodeficiency virus (HIV) transmission in dentistry. J Dent Res 2006;85:794-800.
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10. Abe EO, Kolude B, Adeyemi BF. HIV testing in dental practice: Perception and attitude of dentists in Southwestern Nigeria. Afr J Med Med Sci 2014;43:201-8.
11. Malamud D. Salivary diagnostics: The future is now. J Am Dent Assoc 2006;137:284, 286.
12. Oberoi SS, Sharma N, Mohanty V, Marya C, Rekhi A, Oberoi A. Knowledge and attitude of faculty members working in dental institutions towards the dental treatment of patients with HIV/AIDS. Int Sch Res Notices 2014;2014:429692.
13. Ellepola AN, Sundaram DB, Jayathilake S, Joseph BK, Sharma PN. Knowledge and attitudes about HIV/AIDS of dental students from Kuwait and Sri Lanka. J Dent Educ 2011;75:574-81.
14. Khosravanifard B, Rakhshan V, Ghasemi M, Pakdel A, Baradar‑Eghbal S, Sheikhholeslami R, et al. Tehran dentists' self‑reported knowledge and attitudes towards HIV/AIDS and observed willingness to treat simulated HIV‑positive patients. East Mediterr Health J 2012;18:928‑34.
15. Patil PB, Sreenivasan V, Goel A. Knowledge of HIV/AIDS and attitude of dental students towards HIV/AIDS patients: A cross‑sectional survey. J Educ Ethics Dent 2011;1:59‑63.
16. Ngaihte PC, Santella AJ, Ngaihte E, Watt RG, Raj SS, Vatsyayan V, et al. Knowledge of human immunodeficiency virus, attitudes, and willingness to conduct human immunodeficiency virus testing among Indian dentists. Indian J Dent Res 2016;27:4‑11.
17. List of Dental Colleges in Karnataka. Available from: http://www.rguhs.ac.in/institutions_rguhs.html. [Last accessed on 2017 Jan 10].
18. List of Dental Clinics and Corporate Hospitals in Bangalore. Available from: https://yellowpages.webindia123.com/d‑py/Karnataka/bangalore/dental‑clinics‑369/1. [Last accessed on 2017 Jan 10].
19. Vučićević‑Boras V, Cekić‑Arambašin A, Alajbeg I. Dentist knowledge of HIV infection. Acta Stomatol Croat 2001;35:9‑13.
20. Kadeh H, Saravani S, Golzari P. Knowledge, attitude and practice of dentists towards patients with HIV, hepatitis B and hepatitis C infections. Avicenna J Dent Res 2014;6:e21348.
21. Ryalat ST, Sawair FA, Shayaib MH, Amin WM. The knowledge and attitude about HIV/AIDS among Jordanian dental students: (Clinical versus pre clinical students) at the university of Jordan. BMC Res Notes 2011;4:191.
22. Prabhu A, Rao AP, Reddy V, Krishnakumar R, Thayumanavan S, Swathi SS. HIV/AIDS knowledge and its implications on dentists. J Nat Sci Biol Med 2014;5:303‑7.
23. Magalhaes VC, Oliverira DL, Prado FO. Knowledge, risk perception and attitudes of dentistry students with regard to HIV/AIDS. Rev Gaúch Odontol Porto Alegre 2015;63:291‑300.
24. Guidelines for HIV Screening and Testing. Available from: https://www.cdc.gov/hiv/guidelines/testing.html. [Last accessed on 2017 Feb 25].
25. World Health Organisation. Factsheet about HIV/AIDS: The Infection. Available from: http://www.who.int/hiv/abouthiv/fact_sheet_hiv.htm. [Last accessed on 2017 Feb 25].
26. Patton LL, Shugars DA, Bonito AJ. A systematic review of complication risks for HIV‑positive patients undergoing invasive dental procedures. J Am Dent Assoc 2002;133:195‑203.
27. OSHA Guidelines and Standards. Available from: http://www.osap.org. [Last accessed on 2017 Feb 16].
28. Government of India. Ministry of Environment, Forest and Climate Change. Notification Published in the Gazette of India, Biomedical Waste Management Rule. Government of India; 2016.