

Original Article

Awareness, Knowledge, and Attitude of Dental Students toward Infection Control in Prosthodontic Clinic of a Dental School in India

SC Deogade, Suresan V, A Galav, J Rathod, SS Mantri, SM Patil

Department of Prosthodontics and Crown and Bridge, Hitkarini Dental College and Hospital, Jabalpur, Madhya Pradesh, India

ABSTRACT

Background: Infection control practices are crucial and important elements in clinical dentistry as there is an increase in the prevalence of infectious diseases among dental patients. This necessitates the application of recommended procedures for infection control in dental schools and clinics. **Objectives:** The aim is to evaluate the awareness, knowledge, and attitude of the undergraduate dental students toward infection control measures in the prosthodontic clinic and to assess their satisfaction toward applying these measures during prosthodontic treatment. **Materials and Methods:** A questionnaire-based study was conducted among 180 third, fourth and fifth year dental students (119 females and 61 males) in November 2015 in a private dental school of Rani Durgawati University, Jabalpur (Madhya Pradesh), India. It included 25 close-ended questions related to vaccination status and previous sharp injuries, awareness, knowledge, and attitude toward infection control in the prosthodontic clinic, previous education about infection control, and subjects' satisfaction with their knowledge and attitude. The questionnaire was distributed among 3rd, 4th, and 5th year students and informed consent were obtained before commencing the questionnaire. **Results:** A total of 180 participants responded to the questionnaire. Their perception toward infection control practices in the prosthodontic clinic varied from 14.4% to 100%, where former were regularly disinfecting dental cast before sending it to the laboratory and later ones were regularly using gloves while attending the patient. Most of the subjects responded "good" or "fair" to the questions related to the evaluation of their knowledge and policy implementation of infection control in prosthodontic clinic ($P < 0.0001$). Around 47.8% were almost satisfied, and 28.9% were fairly satisfied with their knowledge and performance. **Conclusions:** The study findings showed inadequate attitude and awareness of subjects toward infection control in prosthodontic practice. Their self-assessment and satisfaction reflect their performance toward infection control policy.

KEYWORDS: Awareness, dental students, infection control, prosthodontic

Date of Acceptance:
31-Aug-2017

INTRODUCTION

The human mouth is a fertile environment for the transmission, inoculation, and growth of various infectious and detrimental microorganisms.^[1,2] Blood and saliva are the common routes for transmission of such microbial agents in the dental operator.^[1,3] Transmission can be through direct contact with blood, saliva, and other secretions or indirect contact with contaminated instruments, equipment, and environmental

surfaces or contact with airborne contaminants. In dental clinics, dentists are often exposed to patient's blood and blood-contaminated saliva during dental procedures increasing the chances of transmission of

Address for correspondence: Dr. SC Deogade, Flat No-502, Block-d, Apsara Apartment, South Civil Lines, Pachpedi Road, Jabalpur - 482 001, Madhya Pradesh, India.
E-mail: dr_deogade@yahoo.co.in

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Deogade SC, Suresan V, Galav A, Rathod J, Mantri SS, Patil SM. Awareness, knowledge, and attitude of dental students toward infection control in prosthodontic clinic of a dental school in India. Niger J Clin Pract 2018;21:553-9.

Access this article online

Quick Response Code:



Website: www.njcponline.com

DOI: 10.4103/njcp.njcp_81_17

micro-organisms between members of the dental team and the patients.^[4,5] This necessitates the implementation of infection control measures as an integral part in dental clinical practice.

A considerable emphasis has been placed on standardized infection control measures, but unfortunately, only a few dentists seem to implement these procedures in their clinical practice.^[11,6-12] The other unfortunate thing is that in dental schools, future dentists have not adequately adhered to these protocols and hence, cross-contamination is more probable in them than the more experienced members of the dental team.^[13-19] Several studies^[6,13,14] have revealed that knowledge on infection control is higher than that implemented in dental clinical practice. This matter of worry necessitates a high-level of medical training, clinical skills, and knowledge in dental education worldwide.^[20] The importance of infection control should be taught meticulously to students in their undergraduate training so that they adopt their learned attitudes and behaviors when they become professionals.^[21] The next unfortunate thing is the absence of a comprehensive and well-planned institutional effort to teach infection control during undergraduate program. A lack of adequately structured programs to train the dental faculty contributes a poor implementation of infection control measures. Educational interventions are crucially important to create high standards in infection control so that comprehension and compliance with infection control principles and development of positive attitude can prove a significant benefit in controlling cross-contamination.^[19]

Prosthetic treatment involves various stages in the construction of removable and fixed prostheses. Therefore, prosthodontic clinic requires a high degree of concern regarding cross-contamination between the clinic and laboratory. Dental impressions, maxillomandibular registration bases and apparatus, trial and final prostheses are all exposed to contamination in the patient's mouth which can spread infectious agents to the clinician, other patients and the dental technicians.^[22-24] There are previous studies conducted on infection control, in general, dental clinic.^[2-4,16,19,21,22] However, these studies did not cover some of the important infection control procedures in the prosthodontic clinic. The aim of this study was to evaluate the awareness, knowledge, and attitude of the dental students toward infection control measures in the prosthodontic clinics. It also aimed to assess their satisfaction toward applying these measures in their prosthodontic clinic.

MATERIALS AND METHODS

A questionnaire-based study was conducted among 3rd, 4th, and 5th year dental students of a private dental school

of Rani Durgawati University (RDU), Jabalpur (Madhya Pradesh), India in November 2015. The decision evaluating 3rd year and 4th year dental students was because the former ones are just entering the clinical postings and the latter ones are in the last year of their under-graduation and should, therefore, have a more complete theoretical and practical background regarding infection control to become good professionals. Even, 5th year dental students are in internship phase before completion of their degree course. Furthermore, assessments at this phase of undergraduate program may indicate the adequacy of the dental curriculum in incorporating essential behavior toward infection control among future dentists. The sample comprised of 180 participants: seventy from 3rd year, 58 from 4th year, and 52 from 5th year dental students. The study was approved by the ethical committee of RDU, Jabalpur (Madhya Pradesh), India. It was a self-administered questionnaire including 25 close-ended questions related to the demographic data, hepatitis B virus (HBV) vaccination status, attitude, and awareness toward infection control in the prosthodontic clinic, previous education in infection control during the graduate training, and subjects' satisfaction with their knowledge and attitude. Informed consent was obtained from each student before responding the questionnaire. It was pretested on a random sample of 20 dental students to ensure practicability, validity, and interpretation of responses. Data were statistically analyzed using SPSS version 21.0 for windows (SPSS Inc, Chicago, USA). Descriptive statistics (mean, standard deviation and percentages) were used to describe the quantitative and categorical variables. Student's *t*-test for independent samples and one-way analysis of variance was used to compare the mean values of quantitative outcome variable (attitude score) in relation to the categorical study variables. *Post hoc* test (Tukey) was used to observe the significance of pairwise comparison. A $P < 0.05$ was used to report the statistical significance of the results.

RESULTS

A total of 180 study subjects participated in this study: 70 (38.8%) 3rd year students, 58 (32.2%) 4th year students, and 52 (29.0%) 5th year students [Figure 1]. The total number of females was 119 (68.6%), and males were 61 (31.4%) as shown in Figure 2. Among them, 93.4% were vaccinated for HBV, 2.8% were not vaccinated, and 3.8% were not sure whether they had it or not. In prosthodontic clinics, eye injury is more common because of foreign bodies, splatter and aerosols, arising during the use of rotary instruments. Almost 28.9% of the participants reported that they had

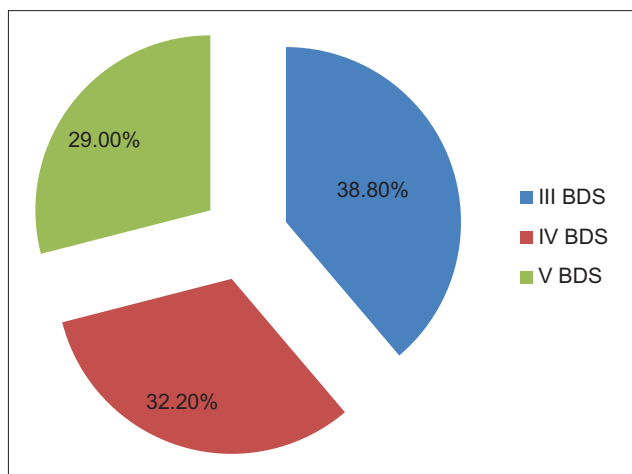


Figure 1: Distribution of participants according to their year of academic education (in percentage)

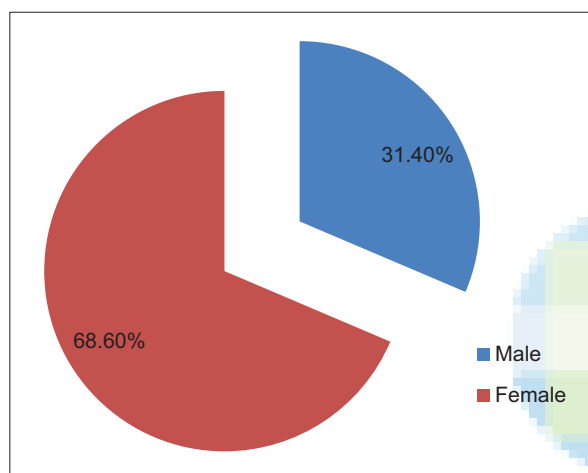


Figure 2: Gender-wise distribution of participants (in percentage)

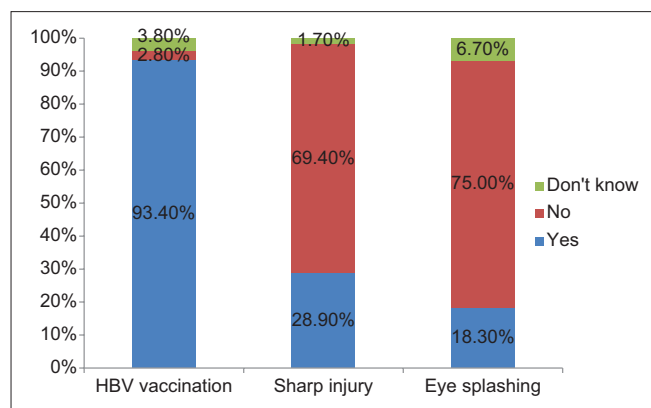


Figure 3: Distribution of participants according to types of vaccinations and types of injuries

a sharp injury at least once and nearly 18.3% reported about eye splashing injury [Figure 3].

Table 1 demonstrates the distribution of responses of participant's awareness and attitudes toward infection control practices in the prosthodontic clinic. It varies

Table 1: Distribution of responses of participant's awareness and attitude towards infection control practices in prosthodontic clinic

Questions related to awareness and attitude toward infection control practice	Distribution of responses (%)		
	Yes	No	I don't know
Do you regularly wear the following barrier during clinical procedures in prosthodontic clinic?			
Gloves	180 (100)	0	0
Face mask	176 (97.7)	4 (2.3)	0
Protective eye glass	67 (37.2)	113 (62.8)	0
Protective gowns	38 (21.1)	142 (78.9)	0
Head cap	174 (96.6)	6 (3.4)	0
Do you regularly disinfect the following items between patients?			
Rubber bowl	106 (58.9)	34 (18.9)	40 (22.2)
Alginate mixing spatula	112 (62.2)	41 (22.8)	27 (15.0)
Face bow	87 (48.3)	50 (27.8)	43 (23.9)
Shade guide	101 (56.1)	21 (11.7)	58 (32.2)
When making primary or final impression, do you			
Rinse the impression under running water immediately after being removed from patient's mouth?	172 (95.6)	3 (1.7)	5 (2.7)
Apply disinfectant on the impression after being rinsed with water?	108 (60.0)	38 (21.1)	34 (18.9)
Do you regularly disinfect the following items before sending it to dental laboratory?			
Dental cast	26 (14.4)	133 (73.9)	21 (11.7)
Denture prosthesis	157 (87.2)	13 (7.2)	10 (5.6)
Metal framework for removable or fixed prosthesis after try in	131 (72.8)	27 (15.0)	22 (12.2)
Bite registration or wax rim	103 (57.2)	39 (21.7)	38 (21.1)
Face bow and fork	98 (54.4)	35 (19.4)	47 (26.2)
Do you sterilize (or autoclave) the following items before being used with patient?			
Impression trays	157 (87.2)	7 (3.9)	16 (8.9)
Face bow fork	103 (57.2)	47 (26.2)	30 (16.6)
Fox occlusal plane	144 (80.0)	13 (7.2)	23 (12.8)

between 14.4% (those were regularly disinfecting dental casts before sending it to the dental laboratory) and 100% (those were regularly using gloves when attending patients). Almost 87.2% of respondents agreed that they sterilize (or autoclave) the stock metal impression

Table 2: Distribution of responses of participant's knowledge toward infection control and comparison of mean values of their attitude scores in relation to their knowledge responses

Questions related to knowledge toward infection control practices	Distribution of responses Total, n (%)	Comparison of mean value of their responses with their attitude scores		
		Mean±SD	F	P
Have you had a didactic (theory) lectures about infection control measures during your under graduation academicals?				
No, never had a lecture before	5 (2.8)	11.2±1.4	8.26	<0.0001
Yes, only few lectures during undergraduate program	152 (84.4)	14.1±2.9		
Yes, 1 weekly lecture during one semester	0	0±0		
Yes, 1 weekly lecture during 1 academic year	14 (7.8)	12.8±2.1		
More than that	9 (5.0)	11.2±2.9		
Have you attended a clinical demonstration/hands-on workshop about infection control during your undergraduate academicals?				
No, never had a training before	73 (40.6)	11.1±2.3	2.08	0.67
Yes, once during undergraduate program	95 (52.8)	12.6±2.2		
Yes, twice during undergraduate program	8 (4.4)	11.1±1.4		
Yes, every year	4 (2.2)	10.8±1.7		

SD=Standard deviation

Table 3: Distribution of responses to questions related to satisfaction of respondents with their knowledge and behavior toward infection control, and comparison of mean values of their attitude scores in relation to their responses of their satisfaction with their knowledge and behavior

Questions related to satisfaction with their knowledge and behavior toward infection control practices	Distribution of responses Total, n (%)	Comparison of mean value of their responses with their attitude scores		
		Mean±SD	F	P
How do you evaluate your knowledge about infection control practices in prosthodontic clinic?				
Very poor	0	0±0	9.12	<0.0001
Poor	7 (3.9)	14.1±4.7		
Fair	48 (26.7)	11.9±3.3		
Good	113 (62.8)	16.1±3.2		
Very good	12 (6.6)	15.1±2.1		
How do you evaluate your implementation of infection control in your prosthodontic clinical practice?				
Very poor	0	0±0	21.11	<0.0001
Poor	4 (2.2)	9.9±2.9		
Fair	73 (40.6)	12.7±3.2		
Good	95 (52.8)	14.9±2.8		
Very good	8 (4.4)	18.7±1.4		
Are you satisfied with your knowledge and your performance in infection control in your prosthodontic clinical practice?				
Not satisfied	7 (3.9)	15.7±4.1	9.06	<0.0001
Little satisfied	23 (12.8)	13.2±4.9		
Fairly satisfied	52 (28.9)	11.9±2.8		
Almost satisfied	86 (47.8)	15.7±3.6		
Totally satisfied	12 (6.6)	17.4±4.5		

SD=Standard deviation

trays before making impressions of the patient. Majority of respondents (95.6%) informed that they rinse the impression under running water immediately after being removed from patient's mouth. In response to the two questions related to the education in infection control practices during the under-graduation academics, about

84.4% of the participants responded positively for having only a few lectures during their undergraduate program. On the other hand, 52.8% responded positively for attending only one clinical demonstration or hands-on workshop about infection control during undergraduate program [Table 2]. Approximately 6.6% of study

subjects had evaluated their knowledge as “very good” toward infection control in the prosthodontic clinic, 62.8% of them as “good” and 26.7% as “fair” and 3.9% as “poor.” Toward implementation of infection control policy in their prosthodontic clinical practice, only 4.4% had evaluated it as very good, 52.8% as “good,” 40.6% as “fair,” and 2.2% as “poor.” About 6.6% of them were totally satisfied, 47.8% were almost satisfied, 28.9% were fairly satisfied and 12.8% were little satisfied with their knowledge and performance in infection control in the prosthodontic clinic practice [Table 3]. When comparing the mean values of attitude scores toward infection control across five-point nominal scale responses of having didactic (theory) lectures during undergraduate or internship program questions, it showed higher statistical significant for the subjects who responded positively to having only a few lectures during their undergraduate program comparing to the study subjects who had responded to other options ($F = 8.26$, $P < 0.0001$). However, there was no statistical significance across the four-point nominal scale responses toward the question related to attending a clinical demonstration/hands-on workshop about infection control during their undergraduate program ($F = 2.08$; $P = 0.67$). The comparison of mean values of attitudes scores toward infection control across the five-point ordinal scale responses of three satisfaction questions of infection control shows a statistical significant difference in the responses to all the three questions. The mean attitudes scores was highly significant in study subjects who had responded as “very good” to the two questions related to the evaluation of their knowledge and related to policy implementation of infection control in prosthodontic clinic ($F = 9.12$; $P < 0.0001$; $F = 21.11$; $P < 0.0001$), when compared with participants who had responded as “good,” “fair,” and “poor” to these two questions. For the mean value of subject’s attitude scores related to their satisfaction with their knowledge and performance toward infection control in the prosthodontic clinic, there was a higher significance for the subjects who had responded as “totally satisfied” comparing other subject’s responses ($F = 9.06$; $P < 0.0001$).

DISCUSSION

The results of the present investigation reveal student’s awareness, knowledge, attitude, and behavior toward infection control at a dental school in RDU, Madhya Pradesh (India). This is a survey with internal validity, which means these data cannot be applied to the entire country and/or other countries. Not all infection control procedures were investigated because of concerns that increased the number of questions would reduce the accuracy of response and response rate.

This questionnaire-based survey evaluated the awareness, knowledge, and attitudes of dental students toward infection control measures in the prosthodontic clinic. It also assessed student’s implementation of infection control practices in the prosthodontic clinic. Nearly two-thirds of the participants were females. HBV immunization among the respondents was 93.4%, whereas only 2.8% of subjects were not vaccinated, and 3.8% of subjects were not sure if they had it before. This drastic awareness of HBV immunization among students can be credited to the strong encouragement and recommendation of the dental school. This result was almost similar to those conducted in the dental schools of other countries. de Souza *et al.*^[16] showed that almost 90.8% of senior students were immunized against HBV in six dental schools in Rio de Janeiro state, Brazil. In their study, McCarthy and Britton^[25] reported 100% immunization among final year dental, medical, and nursing undergraduates at the University of Western Ontario, Canada. Rahman *et al.*^[26] reported that almost 95.8% of senior dental students were immunized against HBV at College of Dentistry, University of Sharjah in the United Arab Emirates. Moradi Khanghahi *et al.*^[27] reported 89.9% of vaccination for HBV among dental students at Mashhad Dental School in Iran. Ahmad *et al.*^[28] reported that about 80% of the dental students received an HBV vaccination in Riyadh College of Dentistry and Pharmacy, Riyadh. Alshiddi^[29] showed 94.2% of immunization against HBV among dental students at College of Dentistry, King Saud University, Riyadh, Saudi Arabia.

Previous research data had shown that 20% of the incidences of HBV developed after needlestick injuries.^[30] The occurrence of sharp injuries among dental care providers is likely to be more compared to other health-care professionals.^[31] The reason for such injuries may be due to small operatory fields and dealing with a variety of sharp dental instruments. McCarthy and Britton^[25] and de Souza *et al.*^[16] reported 82% and 31% of accidental injuries, respectively, among dental students in their studies. Rahman *et al.*^[26] showed that almost 53.8% of the undergraduates reported about accidental injuries. Alshiddi^[29] in his study found that almost 57% and 30.2% of the dental students had sharp injury and eye splashing, respectively. In the present study, almost 28.9% of respondents had sharp injuries, whereas, 18.3% of respondents had eye splashing injuries.

When evaluated their attitudes toward infection control in the prosthodontic clinic, the majority of the undergraduates (96.6%–100%) care about protective barriers such as gloves, face mask and head cap. However, a less concern was observed regarding the

use of other protective barriers such as protective eyeglasses (37.2%) and protective gowns (21.1%). These results support the previous studies^[13,26,28,29] where the similar disconcert was noted for other protective barriers among dental students. Almost, 48.3%–62.2% of the respondents were aware of disinfecting important items used commonly in the prosthodontic clinic such as rubber bowl, alginate mixing spatula, face bow and shade guide. This result was almost similar to the findings of Alshiddi^[29] who carried study in College of Dentistry, Saudi Arabia.

Cross-contamination control between dental offices and prosthetic laboratories is very crucial and important to maintain the health of patients and dental office staff. The risk of cross-infection of laboratory personnel by saliva or blood-borne infections has been reported.^[32-34] The items such as impressions, dental cast, denture prosthesis, cast metal framework, bite registration or wax rim should be properly disinfected before sending to the laboratory.^[35] The Centers for Disease Control and Prevention Guideline for infection control in dental health-care settings in 2003 recommended certain definite strategies to control cross-contamination in the dental clinic and dental laboratory.^[36] For infection control between the prosthodontic clinic and dental laboratory, few questions were asked to disinfecting items sent or received by the dental laboratory. In this study, 95.6% of the participants rinse the impression, and 60% apply disinfectant before sending it to the laboratory. In his survey, Alshiddi^[29] reported that almost 96.5% of the dental students and interns rinse and disinfect the impression before sending directly to the laboratory. Ahmad *et al.*^[28] documented around 87% of the undergraduates disinfects impression before it was sent to the laboratory. Yengopal *et al.*^[37] and Al-Omari and Al-Dwairi^[38] reported less than that, 53.7% and 18.1%, respectively. Nearly, 14.4%–87.2% of respondents disinfects other dental items such as dental cast, denture prosthesis, metal framework, bite registration or wax rim and face bow and fork before sending them to technicians. These findings suggest that an additional education is required to promote routine disinfection of impressions and prostheses.

When asked regarding their experience of previous education in infection control during the under-graduation program, almost 84.9% of them had only a few lectures about infection control measures. However, 40.6% of the respondents had not attended clinical demonstration/hands-on workshop about infection control during their academic program. These findings are in agreement with the previous studies reported by Askarian *et al.*,^[39] Abreu *et al.*^[2] and

Alshiddi^[29] on dental students in Iran, Brazil and Saudi Arabia, respectively. Lack of knowledge or interest may be one of the reasons that should have lead the students not to attend such educational programs. Even lack of opportunities for students from dental school in analyzing their own experiences in the clinics from the perspective of infection control could have contributed in their demotivation. Self-assessment is important parameter in evaluating self-satisfaction by students in regards to their attitude toward infection control practices in the prosthodontic clinic. Most of the subjects evaluated their knowledge and their implementation of infection control policy as “fair” or “good,” and most of them were fairly satisfied (28.9%) or almost satisfied (47.8%) with their knowledge and their performance toward infection control policy. These results indicate undergraduates’ responses toward infection control and suggest the need of additional educational efforts to improve their awareness and attitudes. The certain definite strategies to motivate students during their under graduation program may help them motivating to implement adequate infection control measures with their routine clinical and laboratory work. Furthermore, dental schools could offer opportunities for students to analyze their own experiences in the dental clinic from the perspective of infection control. Machado-Carvalhais *et al.*’s^[17] approach can be applied sensitizing students to their attitudes to change their behavior and consequently improve their quality of life. This survey was carried in only one dental school; hence, the results cannot be generalized to the undergraduates of other dental schools. However, the findings would be useful for planning and implementation of right strategies and interventions, including a national-based survey of dental schools across the country.

CONCLUSIONS

The findings of this study reveal inadequate awareness, knowledge, and attitude of dental undergraduates toward infection control, especially for the procedure related to prosthodontic practice. Students’ responses indicated deficiency of proper education to support infection control measures, and their self-assessment and satisfaction reflect their performance toward infection control policy.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Kohn WG, Collins AS, Cleveland JL, Harte JA, Eklund KJ, Malvitz DM; Centers for Disease Control and Prevention (CDC). Guidelines for infection control in dental health-care settings-2003. *MMWR Recomm Rep* 2003;52:1-61.
- Abreu MH, Lopes-Terra MC, Braz LF, Rimulo AL, Paiva SM, Pordeus IA. Attitudes and behavior of dental students concerning infection control rules: A study with a 10-year interval. *Braz Dent J* 2009;20:221-5.
- Taiwo JO, Aderinokun GA. Assessing cross infection prevention measures at the Dental Clinic, University College Hospital, Ibadan. *Afr J Med Med Sci* 2002;31:213-7.
- Scully C, Greenspan JS. Human immunodeficiency virus (HIV) transmission in dentistry. *J Dent Res* 2006;85:794-800.
- Taiwo O. Dental practice, human immunodeficiency virus transmission and occupational risks: Views from a teaching hospital in Nigeria. *Ann Med Health Sci Res* 2014;4 Suppl 2:S94-8.
- Hazelkorn HM. Do dentists have sufficient information about their patients to control infection? *J Dent Educ* 1990;54:149-52.
- Duffy RE, Cleveland JL, Hutin YJ, Cardo D. Evaluating infection control practices among dentists in Vâlcea, Romania, in 1998. *Infect Control Hosp Epidemiol* 2004;25:570-5.
- Elkarim IA, Abdulla ZA, Yahia NA, Al Qudah A, Ibrahim YE. Basic infection control procedures in dental practice in Khartoum-Sudan. *Int Dent J* 2004;54:413-7.
- Di Giuseppe G, Nobile CG, Marinelli P, Angelillo IF. A survey of knowledge, attitudes, and behavior of Italian dentists toward immunization. *Vaccine* 2007;25:1669-75.
- Mehtar S, Shisana O, Mosala T, Dunbar R. Infection control practices in public dental care services: Findings from one South African Province. *J Hosp Infect* 2007;66:65-70.
- Myers R, Larson E, Cheng B, Schwartz A, Da Silva K, Kunzel C. Hand hygiene among general practice dentists: A survey of knowledge, attitudes and practices. *J Am Dent Assoc* 2008;139:948-57.
- Utomi IL. Attitudes of Nigerian dentists towards hepatitis B vaccination and use of barrier techniques. *West Afr J Med* 2005;24:223-6.
- Freire DN, Pordeus IA, Paixão HH. Observing the behavior of senior dental students in relation to infection control practices. *J Dent Educ* 2000;64:352-6.
- Galli MG, Tesaro M, Bianchi A, Consonni M. Evaluation of Milan University Dental Students' knowledge of health and hygiene risks related to clinical work. *Minerva Stomatol* 2006;55:391-400.
- Qudeimat MA, Farrah RY, Owais AI. Infection control knowledge and practices among dentists and dental nurses at a Jordanian University Teaching Center. *Am J Infect Control* 2006;34:218-22.
- de Souza RA, Namen FM, Galan J Jr., Vieira C, Sedano HO. Infection control measures among senior dental students in Rio de Janeiro State, Brazil. *J Public Health Dent* 2006;66:282-4.
- Machado-Carvalho HP, Martins TC, Ramos-Jorge ML, Magela-Machado D, Paiva SM, Pordeus IA. Management of occupational bloodborne exposure in a dental teaching environment. *J Dent Educ* 2007;71:1348-55.
- Sofola OO, Folayan MO, Denloye OO, Okeigbemen SA. Occupational exposure to bloodborne pathogens and management of exposure incidents in Nigerian dental schools. *J Dent Educ* 2007;71:832-7.
- Acosta-Gío AE, Borges-Yáñez SA, Flores M, Herrera A, Jerónimo J, Martínez M, *et al.* Infection control attitudes and perceptions among dental students in Latin America: Implications for dental education. *Int Dent J* 2008;58:187-93.
- Milward MR, Cooper PR. Competency assessment for infection control in the undergraduate dental curriculum. *Eur J Dent Educ* 2007;11:148-54.
- Singh A, Purohit BM, Bhambal A, Saxena S, Singh A, Gupta A. Knowledge, attitudes, and practice regarding infection control measures among dental students in Central India. *J Dent Educ* 2011;75:421-7.
- Bhat VS, Shetty MS, Shenoy KK. Infection control in the prosthodontic laboratory. *J Indian Prosthodont Soc* 2007;7:62-5.
- Connor C. Cross-contamination control in prosthodontic practice. *Int J Prosthodont* 1991;4:337-44.
- Matalon S, Eini A, Gorfil C, Ben-Amar A, Slutzky H. Do dental impression materials play a role in cross contamination? *Quintessence Int* 2011;42:e124-30.
- McCarthy GM, Britton JE. A survey of final-year dental, medical and nursing students: Occupational injuries and infection control. *J Can Dent Assoc* 2000;66:561.
- Rahman B, Abraham SB, Alsalami AM, Alkhaja FE, Najem SI. Attitudes and practices of infection control among senior dental students at college of dentistry, university of Sharjah in the United Arab Emirates. *Eur J Dent* 2013;7 Suppl 1:S15-9.
- Moradi Khanghahi B, Jamali Z, Pournaghi Azar F, Naghavi Behzad M, Azami-Aghdash S. Knowledge, attitude, practice, and status of infection control among Iranian dentists and dental students: A systematic review. *J Dent Res Dent Clin Dent Prospects* 2013;7:55-60.
- Ahmad IA, Rehan EA, Pani SC. Compliance of Saudi dental students with infection control guidelines. *Int Dent J* 2013;63:196-201.
- Alshiddi IF. Attitude and awareness of dental students and interns toward infection control measures in prosthodontic clinics. *J Int Oral Health* 2015;7:10-5.
- Wood PR. *Cross Infection Control in Dentistry: A Practical Illustrated Guide*. London: Wolfe Publishing Ltd.; 1992.
- Younai FS, Murphy DC, Kotelchuck D. Occupational exposures to blood in a dental teaching environment: Results of a ten-year surveillance study. *J Dent Educ* 2001;65:436-48.
- Salvia AC, Matilde Fdos S, Rosa FC, Kimpara ET, Jorge AO, Balducci I, *et al.* Disinfection protocols to prevent cross-contamination between dental offices and prosthetic laboratories. *J Infect Public Health* 2013;6:377-82.
- Debattista N, Zarb M, Portelli JM. Bacterial cross-contamination between the dental clinic and laboratory during prosthetic treatment. *Malta Med J* 2010;22:12-4.
- Begum A, Ahmed R, Dithi AB, Islam MS, Shaikh MH. Infection control protocol in prosthetic laboratory. *City Dent Coll J* 2013;10:47-9.
- Kohn WG, Harte JA, Malvitz DM, Collins AS, Cleveland JL, Eklund KJ; Centers for Disease Control and Prevention. Guidelines for infection control in dental health care settings-2003. *J Am Dent Assoc* 2004;135:33-47.
- Centers for Disease Control and Prevention. 2003 CDC infection control recommendations for dental health-care settings. *Compend Contin Educ Dent* 2004;25 1 Suppl:43-8, 50-3.
- Yengopal V, Naidoo S, Chikte UM. Infection control among dentists in private practice in Durban. *SADJ* 2001;56:580-4.
- Al-Omari MA, Al-Dwairi ZN. Compliance with infection control programs in private dental clinics in Jordan. *J Dent Educ* 2005;69:693-8.
- Askarian M, Honarvar B, Tabatabaee HR, Assadian O. Knowledge, practice and attitude towards standard isolation precautions in Iranian medical students. *J Hosp Infect* 2004;58:292-6.