

Infection Control Practices among Undergraduate Dental Students: Case of a Private Dental Institution in North India

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Abstract

Objective: Transmission of infectious agents in a dental clinic is unavoidable. A considerable emphasis must be placed on observing a strict protocol for infection control. The present study assesses infection control practices undertaken by undergraduate dental students in a dental college in North India.

Materials and Methods: Along with the general information (age, gender and year of study), a self-applied questionnaire (15 questions with dichotomous response of yes/no) was administered to third- and fourth-year undergraduate students. Fisher exact test was used to assess the differences according to the student year of study and gender.

Result: Receiving an overall response rate of 94.2%, highest responses in “yes” were received for wearing and changing gloves and wearing face masks. Changing face masks, hand pieces and burs between patients was practiced more by the senior students, whereas using a special container for disposing of sharp objects was reported more by juniors ($p < 0.05$). No difference among genders was seen.

Conclusion: The present study reports unsatisfactory infection control practices, which calls for strict follow-up of infection control guidelines.

Introduction

The public expectations from a healthcare facility are zero risk.¹ Infection control is a dynamic and ever-changing subject and all health professionals must be aware of the most up-to-date procedures required to prevent the transmission of infection, of which dentists are no exception. Dentists should understand why these procedures are necessary.²

The oral cavity is a fertile environment for the transmission, inoculation and growth of various infectious agents. There are microorganisms in an individual that may not cause any harm to the particular host, but can be detrimental to others. Blood and saliva are the ideal means for transmitting such agents.³ Infections may be transmitted in the dental operatory through several routes, including direct contact with blood, oral fluids or other secretions; indirect contact

with contaminated instruments, operatory equipment, or environmental surfaces, or contact with airborne contaminants present in either droplet splatter or aerosols of oral and respiratory fluids.^{4,5}

Most exposures are accidental and can be avoided by adopting safety work practices and following infection control guidelines. However, because some exposures are not preventable, immunization and appropriate post-exposure management become key defense procedures.⁶ Despite the considerable emphasis that has been placed on standardized infection control procedures, it appears that few dentists adhere to these procedures in their clinical practice.⁷⁻⁹ Dental education, here, can play an important role in the training of dentists, helping them to adopt adequate attitudes related to infection control.¹⁰

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As healthcare students have increasing patient contact during their education and clinical training, they are at high risk for exposure to pathogens. It is the responsibility of academic institutions to facilitate appropriate preclinical immunization and provide infection control training to protect patients and students, and to educate the future healthcare professionals in safety work practices.⁶ There are very few longitudinal studies on infection control involving dental students.¹⁰ Studies monitoring occupational injuries and infection control practices among students and healthcare workers are necessary to assess the efficacy of infection control training and help to develop educational interventions to improve adherence to guidelines and reduce injuries.⁶ Keeping this in mind, the aim of this work was to study the infection control measures among dental students in a private dental institution in North India.

Material and Methods

A cross-sectional study was conducted among undergraduate dental students in their clinical years (third and fourth years) of Sudha Rustagi College of Dental Sciences and Research, Faridabad (enrolled under Pt. B. D. Sharma University of Health Sciences, India). The instrument used for the study was based on a self-applied questionnaire used in past surveys,^{6,11} which contained 15 close-ended items relating to infection-control practices; participants were asked to answer each questionnaire item as "yes" or "no."

Data collection took place in February in the middle of the academic term for the year 2010-11. All students that voluntarily took part in the study gave a verbal consent prior to the study. Questionnaires were distributed to the students present on the days of the

survey during one lecture for each year with prior permission and the aims of the study were explained. Problems if encountered in the understanding of the questionnaire were explained accordingly. No attempt was made to trace the students who remained absent on the survey days. Along with the questionnaire, students were asked to record data regarding age, gender and year of study.

Statistical Analysis

Data collected was analyzed using Statistical Package for Social Sciences (SPSS 11.5). Frequencies for each question were analyzed and Fisher exact analysis was used to assess the differences in infection control practices according to the student year of study and gender. A significance level of 0.05 was adopted for all tests.

Results

The present study showed an overall response rate of 94.2% (179 out of 190 students). Around 35.2% of the respondents were males and 64.8% were females. The overall response rate to various infection control procedures is depicted in Table 1. The highest compliance rates to infection control guidelines were reported for changing gloves after each patient (86.6%); wearing gloves while performing on a patient (81.0%); and wearing face masks (80.5%). However, very few subjects reported use of rubber dam while operating (18.4%); disinfecting impressions (22.9%); and changing hand pieces after each patient (24.0%). A majority of the respondents practiced changing saliva ejectors (72.1%) and extraction instruments (70.4%) among patients; 67.0% were vaccinated for hepatitis; and 62.6% were asked about medical history.

Table 1. Reported Adherence to Various Infection Control Procedures among Dental Students

Q. No.	Infection Control Practice	Yes (%)	No (%)
Q1	Asking about medical history	112 (62.6)	67 (37.4)
Q2	Vaccination for hepatitis	120 (67.0)	59 (33.0)
Q3	Gloves wearing	145 (81.0)	34 (19.0)
Q4	Changing gloves after each patient	155 (86.6)	24 (13.4)
Q5	Face mask wearing	144 (80.5)	35 (19.5)
Q6	Face mask changing between patients	103 (57.5)	76 (42.5)
Q7	Changing extraction instruments	126 (70.4)	53 (29.6)
Q8	Changing hand pieces	43 (24.0)	136 (76.0)
Q9	Changing saliva ejectors	129 (72.1)	50 (27.9)
Q10	Changing burs	50 (27.9)	129 (72.1)
Q11	Use of autoclave for sterilization of hand pieces	51 (28.5)	128 (71.5)
Q12	Use of plastic wrappings for sterilized instruments	48 (26.8)	131 (73.2)
Q13	Disinfect impressions	41 (22.9)	138 (77.1)
Q14	Use of rubber dam	33 (18.4)	146 (81.6)
Q15	Use of special container for disposal of sharp objects	71 (39.7)	108 (60.3)

Table 2. Adherence to Various Infection Control Procedures among Dental Students according to Gender and Year of Study (p<0.05)

S. No.	By Year of Study			By Gender		
	3 rd year	4 th year	p-value	Male	Female	p-value
Q1. Asking about medical history						
Yes	59 (64.1%)	53 (60.9%)	0.76	42 (66.7%)	70 (60.3%)	0.42
No	33 (35.9%)	34 (39.1%)		21 (33.3%)	46 (39.7%)	
Total	92	87		63	116	
Q2. Vaccination for hepatitis						
Yes	63 (68.5%)	57 (65.5%)	0.75	47 (74.6%)	73 (62.9%)	0.13
No	29 (31.5%)	30 (34.5%)		16 (25.4%)	43 (37.1%)	
Total	92	87		63	116	
Q3. Gloves wearing						
Yes	76 (82.6%)	69 (79.3%)	0.70	52 (82.5%)	93 (80.2%)	0.84
No	16 (17.4%)	18 (20.7%)		11 (17.5%)	23 (19.8%)	
Total	92	87		63	116	
Q4. Changing gloves after each patient						
Yes	84 (91.3%)	71 (81.6%)	0.08	56 (88.9%)	99 (85.3%)	0.65
No	8 (8.7%)	16 (18.4%)		7 (11.1%)	17 (14.7%)	
Total	92	87		63	116	
Q5. Face mask wearing						
Yes	68 (73.9%)	66 (75.9%)	0.86	52 (82.5%)	82 (70.7%)	0.10
No	24 (26.1%)	21 (24.1%)		11 (17.5%)	34 (29.3%)	
Total	92	87		63	116	
Q6. Face mask changing between patients						
Yes	44 (47.8%)	59 (67.8%)	0.01*	36 (57.1%)	67 (57.8%)	1.00
No	48 (52.2%)	28 (32.2%)		27 (42.9%)	49 (42.2%)	
Total	92	87		63	116	
Q7. Changing extraction instruments						
Yes	60 (65.2%)	66 (75.9%)	0.14	44 (69.8%)	82 (70.7%)	1.00
No	32 (34.8%)	21 (24.1%)		19 (30.2%)	34 (29.3%)	
Total	92	87		63	116	
Q8. Changing hand pieces						
Yes	16 (17.4%)	27 (31.0%)	0.04*	16 (25.4%)	27 (23.3%)	0.85
No	76 (82.6%)	60 (69.0%)		47 (74.6%)	89 (76.7%)	
Total	92	87		63	116	
Q9. Changing saliva ejectors						
Yes	64 (69.6%)	65 (74.7%)	0.51	44 (69.8%)	85 (73.3%)	0.73
No	28 (30.4%)	22 (25.3%)		19 (30.2%)	31 (26.7%)	
Total	92	87		63	116	
Q10. Changing burs						
Yes	19 (20.7%)	31 (35.6%)	0.03*	19 (30.2%)	31 (26.7%)	0.73
No	73 (79.3%)	56 (64.4%)		44 (69.8%)	85 (73.3%)	
Total	92	87		63	116	
Q11. Use of autoclave for sterilization of hand pieces						
Yes	25 (27.2%)	26 (29.9%)	0.74	18 (28.6%)	33 (28.4%)	1.00
No	67 (72.8%)	61 (70.1%)		45 (71.4%)	83 (71.6%)	
Total	92	87		63	116	
Q12. Use of plastic wrappings for sterilized instruments						
Yes	22 (23.9%)	26 (29.9%)	0.40	15 (23.8%)	33 (28.4%)	0.60
No	70 (76.1%)	61 (70.1%)		48 (76.2%)	83 (71.6%)	
Total	92	87		63	116	

Q13. Disinfect impressions						
Yes	25 (27.2%)	16 (18.4%)	0.21	15 (23.8%)	26 (22.4%)	0.85
No	67 (72.8%)	71 (81.6%)		48 (76.2%)	90 (77.6%)	
Total	92	87		63	116	
Q14. Use of rubber dam						
Yes	16 (17.4%)	17 (19.5%)	0.85	10 (15.9%)	23 (19.8%)	0.55
No	76 (82.6%)	70 (80.5%)		53 (84.1%)	93 (80.2%)	
Total	92	87		63	116	
Q15. Use of special container for disposal of sharp objects						
Yes	45 (48.9%)	26 (29.9%)	0.01*	22 (34.9%)	49 (42.2%)	0.42
No	47 (51.1%)	61 (70.1%)		41 (65.1%)	67 (57.8%)	
Total	92	87		63	116	

Table 2 provides information about adherence of various infection control practices and their significant relationship among both the years of study and between both the genders. Fischer exact test showed that there were only four infection control practices that differed significantly between the years of study. Changing face masks, changing hand pieces and changing burs between patients was significantly more practiced by senior students, whereas using a special container for disposal of sharp objects was reported significantly more by junior students.

When the gender differences were assessed, none of the infection control measures was found to be significantly associated with either sex. Although more males than females were reported to have been vaccinated for hepatitis and wearing face mask while operating, the difference was only close to statistical significance.

Discussion

Healthcare professionals are the most susceptible people to infectious diseases in their work environment; so are the dental professionals being repeatedly exposed to many microorganisms present in blood and saliva. As a consequence, the incidence of certain infectious diseases is higher among dental professionals than observed for the general population. Dental professionals are at a greater risk of acquiring and spreading infections, which requires the implementation of infection control guidelines.⁶

Dental students are the future dental professionals, who will provide oral healthcare for the population. They tend to practice the infection-control procedures they acquired during training at the dental school. Thus, the present study investigated the compliance with recommended infection control procedures by dental students pursuing their career at Sudha Rustagi College of Dental Sciences and Research, Faridabad, India. Also,

this study aims to help the development of educational interventions to improve infection control practices.

The undergraduate course in dentistry in India is of 5 years duration, the first two years being the preclinical years, next two are the clinical years and the last fifth year is the compulsory rotatory internship. The infection-control practices are taught theoretically in the second year of their education, while the clinical guidelines are taught in the clinical years.

The highest level of compliance rates were seen for wearing and changing gloves while performing on a patient and wearing face masks. The findings are consistent with Rai et al.¹² and with Al Shammery¹³ reporting similar percentages of infection control practices. However, other studies^{6,14} have even reported higher values, confirming the present results as a non-satisfactory percentage.

Medical history was regularly taken by most subjects, which is in accordance with a past study.¹⁵ Approximately two-thirds of the dental students were vaccinated against hepatitis B; this vaccination rate is similar to that reported among dentists in Saudi Arabia (63.5%),¹⁶ but lower than the rates in Scotland (88%)¹⁷ and in Canada (92.3%).¹⁸

Although majority of the dental students replaced sterilized extraction instruments, saliva ejectors, and face masks between patients to prevent cross contamination, the results were expected much higher as with other studies.¹⁴ Despite the fact that no significant gender differences were found for infection control procedures, more male subjects reported compliance to standard protocols than females, which differs from previous studies in other settings.¹⁹⁻²¹

Likewise, "changing face masks," "hand pieces" and "burs" between patients was practiced more by the seniors, implying that more exposure to clinical

knowledge has instilled more effective infection control measures in the senior students. But, “using a special container for disposal of sharp objects” was practiced more by juniors. This might be due to the fact that their exposure to clinical knowledge is recent which is built on the basis of theoretical knowledge, enforcing more as there is less clinical workload.

Findings of the present study cannot be generalized to all dental students in India as the survey was conducted in a single institution. However, these findings would be useful for planning additional educational interventions and improving the infection control protocol.

Conclusion

The dental undergraduate students in the present study reported unsatisfactory infection control practices, which calls for requirement of changes in organizational and administrative factors to enable students to follow a strict infection control protocol. The dental education system should be revised to evaluate the overall quality of care provided.

Conflict of Interest: Nil

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