Awareness Regarding Practices Related to Infection Control among Dental Students in Patna City

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ABSTRACT

Introduction: Cross infection control practice is essential to protect both the patient and the dentist from blood and saliva borne infectious agents, including hepatitis B, C and HIV by direct contact with contaminated instruments, fabrics and also by aerosols. Study aimed to assess the awareness regarding practices related to infection control among dental student in Patna city.

Material and Methods: This was a cross sectional study which was carried out in one of the dental teaching institutions in Patna City. The subjects comprised of 180 dental students. The study subjects were third year; final year and Intern students which were selected using convenience sampling technique. Their knowledge pertaining to infection control practices were assessed using a pretested self administered questionnaire. The questionnaire collected information on socio demographic characteristics, and knowledge regarding infection control practices. Data were analyzed using SPSS software v20. Frequency distribution analysis and Chi sq tests were performed. p value<0.05 was considered statistically significant.

Results: The dental student had adequate knowledge regarding personal protective measures and cross infection control but improvement was needed in areas of biomedical waste handling and disposal.

Conclusion: A dental surgeon must take adequate protection to prevent spread of harmful disease to self and other patients. Consequently inter-appointment disinfection of clinic surfaces is required to reduce the cross infection hazard.

Keywords: Infection Control, Dental Students, Personal Protective Measures, Patna.

INTRODUCTION

Infection is a major problem for health care systems in many countries and it continues to be subject of intensive research and debate. The infective agent can be transmitted through blood, droplets of saliva and contaminated instruments by way of direct contact, inhalation or inoculation. The major route of cross infection in dental surgery is via infection through intact skin or mucosa due to accidents involving sharps or direct inoculation onto cuts and abrasions in the skin.[1,2]

Cross infection control practice is necessary to protect both the patient and the operator from the contaminated blood or saliva.[3] Dentists may expose themselves and patients to potential infectious materials like body substances, equipments, environmental surfaces, water and air.[4] Pathogenic microorganism may be spread to clinical surfaces during dental procedures, not only by direct contact with contaminated instruments and fabrics but also by aerosols.[5] Management of bio medical waste has become a serious health issue in many countries including India. Careless and indiscriminate disposal of this waste by dental clinics and institutions can contribute to spread of diseases like hepatitis and human immunodeficiency virus (HIV). Hence a dental surgeon must take adequate protection to prevent spread of harmful disease to self and other patients.

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.[6,7] In order to create a protected environment the dentist needs thorough knowledge of cross infection control principles and practices before they begin their clinical training as undergraduates. Although, training pertaining to infection control practices have been provided in dental schools in India and also included in dental curriculum but limited data is available regarding the implementation of these concepts in dental clinics. Hence, this study was carried out with the aim to assess the awareness regarding practices related to infection control among dental student in Patna city. The study findings will help to assess the extent to which infection control guidelines are followed in clinical

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settings and will enable policy makers to further strengthen the protocols.

MATERIAL AND METHODS

This was a cross sectional study which was carried out in Buddha Institute of dental sciences located in Patna city. The study was carried out in the month of July- August, 2014 (3 months). A total of 180 dental students were selected using convenience sampling technique. A total of 124 boys and 56 girls participated in this study. In this study, only third year, Final year and Interns were selected as these students were the groups who are permitted to attend dental clinics as per BDS curriculum framed by Dental council of India. The students were verbally informed and those students who were willing to participate and signed the informed consent were included in the study. The students not willing to participate or absent on date of data collection were excluded from the study. The response rate obtained was 98%

Sample size calculation: A pilot study was conducted on a sample of 20 students and based upon the responses obtained and using the formula of sample size calculation recommended by WHO,[8] it was decided to include a minimum sample of 150 students. The study however, was carried out on a sample of 180 students in order to minimize non-response rate.

Ethical approval to conduct the study was taken from IEC of Buddha Institute of Dental Sciences, Patna. The official permission was sought from the related institution. The study subjects were mainly from Third year, Final year and Interns Batch. All the students present on date of conduct of study were briefed about study objectives and informed consent was sought from them.

Pretesting of Questionnaire: A self administered questionnaire was developed and it was pretested on a sample of 20 randomly selected students. Based upon their feedback after checking the overall acceptability of the questionnaire in terms of length and language clarity; no modifications were carried out. Internal reliability was assessed using Chronback alpha and it was found to be good (0.80). The questionnaire was also tested for face, content and criterion validity by an expert panel of five academicians. It was framed in English language and no translations to other languages were carried out. The first part of the questionnaire collected information on sociodemographic characteristics. The second part of the questionnaire collected information on awareness of infection control using a set of close ended questions.

Data collection: After official permission was sought, a date was fixed for conducting the study in this institution. On the fixed date, a single trained interviewer along with an assistant carried out the necessary data collection. The students were asked to remain in the Lecture hall after completion of their subject lecture for carrying out the study. The data from the Interns batch were collected while they were posted in their respective departments. The trained investigator distributed the pretested questionnaire to the students. After 15 minutes, the questionnaire was collected. It was checked that all responses were filled by the candidates. The students were not permitted to look into others responses and strict instructions were issued to fill the responses on own. In case, if it was found that the students had not filled any response, they were asked to do so immediately. All doubts pertaining to the study were clarified by the investigator there itself. The forms were collected back after the study for further analysis.

STATISTICAL ANALYSIS

All collected data were coded and entered in Spss v 20. Frequency distribution analysis, Chi square tests were performed. P value <0.05 was considered statistically significant.

RESULTS

A total of 180 students participated in the study that comprised of equal distribution (33.33%) of students in 3rd year, 4th year and interns. Majority of student (77%) were in the age group of 21-25 years.

Majority of females (97%) and males (88%) were aware that the gloves have to be worn on exposure to body fluid, blood and its products and in case of any excretion of patients. Also, majority of females (80%) and nearly two-third of the males

When do you wear gloves? On exposure to	**Male N=67**	**Female N=123**	**Total (N=180)**	**P value**
Body fluid	0 (0%)	3 (2%)	3 (2%)	0.001
Blood and its products	6 (11%)	0 (0%)	6 (3%)	
Any excretion of patients	0 (0%)	1 (1%)	1 (1%)	
All	50 (88%)	119 (97%)	169 (94%)	
None	1 (2%)	0 (0%)	1 (1%)	
When do you wear apron /gown? On exposure to	Male N=67	Female N=123	Total (N=180)	**P value**
Body fluid	1 (2%)	3 (2%)	4 (2%)	0.01
Blood and its products	4 (7%)	1 (1%)	5 (3%)	
Any excretion of patient	11 (19%'	20 (16%)	31 (17%)	
All	38 (67%)	99 (80%)	137 (76%)	
None	3 (5%)	0 (0%)	3 (2%)	
p value<0.05- statistical significant difference				

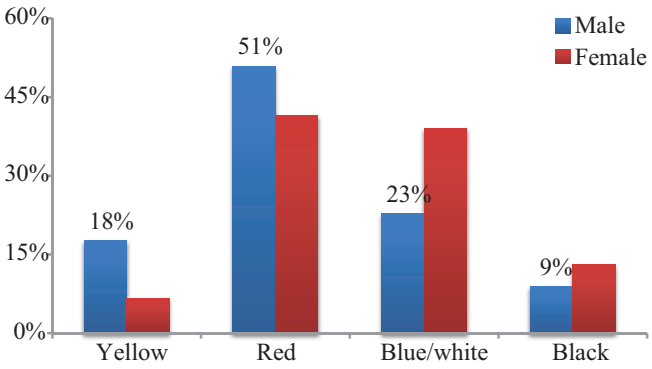
Table-1: Association between gender of the students and their awareness regarding use of protective device

(67%) were aware that the personal protective devices like apron /gown should be worn before exposure to infectious material. (Table 1).

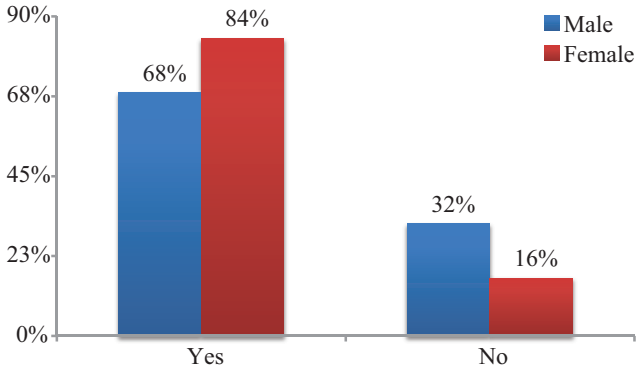
Nearly half of the males and females were not aware of correct disposal of sharps into blue /white bags and the differences were found to be statistically significant (P<0.01) (Graph 1).

Majority of females (83.7%) and nearly two-third of the males (68.4%) had awareness regarding prevention of cross infection from person to person. The differences were found to be statistically significant (P<0.027) (Graph 2)

All of the 3rd year students (100%) were aware regarding use of personal protective devices like wearing gloves before exposure to body fluid etc compared to 96.7% interns and 85% final year students. The differences were found to be statistically significant (P<0.012). More than two-third (70%) interns were aware regarding protecting their face from splash /spatter by wearing surgical mask, goggles, and face shield on apron compared to 23% of 3rd year and 15% final year students (P<0.0001). Majority of interns (95%) and final year students were aware regarding use of protective device like wearing apron/gown before exposure to any of



Graph-1: Association between gender and their awareness regarding disposal of sharp in dental practice



Graph-2: Association between gender and their awareness regarding prevention of cross-infection from person to person

When do you wear gloves? On exposure to	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Body fluid	0 (0%)	2(3%)	1(2%)	3(2%)	0.012
Blood and its products	0(0%)	5(8%)	1(2%)	6(3%)	
Any excretion of patient	0(0%)	1(2%)	0(0%)	1(1%)	
All	60(100%)	51(85%)	58(97%)	169(94%)	
None	0(0%)	1(2%)	0(0%)	1(1%)	
How do you protect your face from splash/splatter?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Surgical mask	45(75%)	50(83%)	15(25%)	110(61%)	0.0001
Goggles	0(0%)	0(0%)	0(0%)	0(0%)	
Face shield /Apron	1(2%)	0(0%)	3(5%)	4(2%)	
All	14(23%)	9(15%)	42(70%)	65(36%)	
None	0(0%)	1(2%)	0(0%)	1(1%)	
When do you wear apron/gown? On exposure to	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Body fluid	1 (2%)	2 (3%)	1 (2%)	4 (2%)	0.0001
Blood and its products	1 (2%)	3 (5%)	1 (2%)	5 (3%)	
Any excretion of patient	27 (45%)	3 (5%)	1 (2%)	31 (17%)	
All	31 (52%)	49 (82%)	57 (95%)	137 (76%)	
None	0 (0%)	3 (5%)	0 (0%)	3 (2%)	
Where do you remove your personal protective equipment?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Rest room	1 (2%)	7 (12%)	5 (8%)		0.0001
Particular designated more	44 (73%)	46 (77%)	52 (87%)		
Corridor	0 (0%)	3 (5%)	0 (0%)		
Wash room	15 (25%)	4 (7%)	3 (5%)		
p value<0.05- statistical significant difference					

Table-2: Association between education level and their awareness regarding use of protective device

the infectious agents. Majority of interns (86.7%), followed by final year students (77%), followed by third year students (73%) were aware of use of personal protective equipments to be removed in a particular designated room. (Table 2). Majority of interns (86.7%) were aware regarding putting used sharp articles into sharps boxes compared to 65% final year and 65% 3rd year students. Majority of interns (81.7%) were aware regarding recapping of used needles compared to 65% final year and 18.3% third year students. Majority of 3rd year students (86.7%) were aware regarding daily disposal of sharps from box compared to 68.3% final year and 50% interns. Majority of 4th year students (76.6%) were aware regarding disposal of human anatomical waste, animal wastes, microbiology, biotechnology wastes and solid

Do you put used sharp articles in to sharps boxes?	**3rd Year B.D.S N (%)**	**4th Year B.D.S N (%)**	**Intern N (%)**	**Total N (180)**	**P value**
Yes	12 (20%)	39 (65%)	52 (87%)	103(57%)	0.0001
No	48 (80%)	21 (35%)	8 (13%)	77(43%)	
After an injection do you recap the used needles?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Yes	11 (18%)	39 (65%)	49 (82%)	99 (55%)	0.0001
No	49 (82%)	21 (35%)	11 (18%)	81 (45%)	
When do you dispose the sharp box?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Full	0 (0%)	3 (5%)	8 (13%)	11 (6%)	0.0001
Half full	6 (10%)	6 (10%)	18 (30%)	30 (17%)	
Daily	52 (87%)	41 (68%)	30 (50%)	123 (68%)	
Weekly	2 (3%)	10 (17%)	4 (7%)	16 (9%)	
Human anatomical waste, animal wastes, microbiology and biotechnology wastes and solid wasted, contaminated with blood and body fluids are disposed in which?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Yellow	8 (13%)	46 (77%)	39 (65%)	93 (52%)	0.0001
Red	48 (40%)	10 (17%)	4 (7%)	62 (34%)	
Blue/white	3 (5%)	1 (2%)	3 (5%)	7 (4%)	
Black	1 (2%)	3 (5%)	14 (23%)	18 (10%)	
Microbiology and biotechnology wastes, solid wastes contaminated with blood and body fluid like linen, bedding and solid wastes like tubings catheters etc are disposed in to which colour bag contained?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Yellow	4 (7%)	12 (20%)	12 (20%)	28 (16%)	0.0001
Red	51 (85%)	22 (37%)	38 (63%)	111 (62%)	
Blue/white	5 (8%)	24 (40%)	8 (13%)	37 (21%)	
Black	0(0%)	2(3%)	2(3%)	4(2%)	
Waste sharps are disposed in to?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Yellow	6 (10%)	6 (10%)	6 (10%)	18 (10%)	0.0001
Red	41 (68%)	25 (42%)	14 (23%)	80 (44%)	
Blue/white	5 (8%)	22 (37%)	34 (57%)	61 (34%)	
Black	8 (13%)	7 (12%)	6 (10%)	21 (12%)	
Discarded medicine, cytotoxic drug, incineration ash, chemicals used in production of biological injecticides etc are disposed in to?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Yellow	5 (8%)	14 (23%)	12 (20%)	31 (17%)	0.0001
Red	7 (12%)	11 (18%)	3 (5%)	21 (12%)	
Blue/white	43 (72%)	5 (8%)	2 (3%)	50 (28%)	
Black	5 (8%)	30 (50%)	43 (72%)	78 (43%)	
p value<0.05- statistical significant difference					

Table-3: Association between educational level and their awareness regarding disposal of sharp in dental practice

Do you wash your hands between patient contacts?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Yes	27 (45%)	57 (95%)	58 (97%)	142 (79%)	0.0001
No	33 (55%)	3 (5%)	2 (3%)	38 (21%)	
Do you decontaminate your hands immediately after removal of gloves?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Yes	59 (98%)	33 (55%)	58 (97%)	150 (83%)	0.0001
No	1 (2%)	27 (45%)	2 (3%)	30 (17)	
What do you use for hand washing	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
only water	0 (0%)	2 (3%)	0 (0%)	2 (1%)	0.0001
warer+soap	38 (63%)	22 (37%)	20 (33%)	80 (44%)	
any disinfectants	22 (37%)	36 (60%)	40 (67%)	98 (54%)	
Do you use alcoholic hand rubs as an alternative if your hands are not visibly soiled?	3rd Year B.D.S N (%)	4th Year B.D.S N (%)	Intern N (%)	Total N (180)	P value
Yes	17 (28%)	41 (68%)	42 (70%)	100 (56%)	0.0001
No	43 (72%)	19 (32%)	18 (30%)	80 (44%)	
p value<0.05- statistical significant difference					

Table-4: Association between educational level and their awareness regarding prevention of cross-infection from person to person

wastes contaminated with blood and body fluids into yellow bags compared to 65% interns and 13.3% of the 3rd year. Majority of 3rd year students (85%) were aware regarding disposal of microbiology and biotechnology wastes, solid wastes contaminated with blood and body fluids like linen bedding and solid wastes like tubing catheters etc into red bags compared to 63.3% interns and 36.7% of the final year student. Majority of interns (56.7%) were aware regarding black colored box for disposal of waste sharp compared to 36.7% final year students. Majority of interns (71.7%) were aware regarding black colored box for disposal of medicine, cytotoxic drugs, incineration ash, chemicals used in the production of biological insecticides etc compared to 50% final year students and 8.3% 3rd year students. (Table 3)

Majority of interns (96.7%) were aware regarding prevention of cross infection from person to person with respect to washing hands between patient contact followed by 95% final year students and 45% 3rd year students. Majority of interns (98.3%) were aware regarding prevention of cross infection from person to person with respect to decontamination of hands immediately after removal of gloves followed by 96.7% third year and 55% final year students. Majority of interns (66.7%) were aware regarding prevention of cross infection from person to person with respect to hands washing with any disinfectants compared 60% final year and 36.7% 3rd year students. Majority of interns (70%) followed by 68.3% final year students were aware regarding prevention of cross infection from person to person with respect to use of alcoholic hand rubs as alternative if hands are not visibly soiled compared to only 28.3% final year students. (Table 4)

DISCUSSION

Dentists are at high risk of exposure to cross infection to pathogenic microorganism localized in oral cavity, respiratory tract including cytomegalovirus (CMV), HBV, HCV, herpes simplex virus and mycobacterium tuberculosis, streptococci and other viruses and bacteria.[3] Generally dentists are solo practitioner working in outpatient, ambulatory care facilities with no epidemiologists or other hospital infection control experts track possible health- care associated infections or monitor and recommend safe practice.[5] Hence there is need for greater knowledge of cross infection control measures among dentist which can best be imparted during their training period.

A total of 180 students participated in the study with majority of the students in the age group 21-25 years. In the present study, the use of gloves as a personal protective equipment (PPE) among dental students and internees was 94% which is comparable to studies done by Connor (1991) and Gordon et al (2004).[9,5] However the awareness regarding the use of surgical mask was remarkably less (61%) compared to other similar study (98.3%).[10] The awareness regarding use of apron /gown was also less (76%). Compliance with use of goggles was nil (0%) which is of great concern and is in contrast with the study carried out by Gillian et al (1997) and William et al (2003) who have reported the use of goggles to be ranged from 59.7% to 93.5% in their study.[11,12]

Biomedical waste has become a serious health hazard in many countries, including India. Careless and indiscriminate disposal of this waste by dental institution can contribute to spread of serious disease like hepatitis and human immunodeficiency virus (HIV) among people who handle

waste and also among general public.[13] In the present study, 57% of respondents were aware of the need to dispose used sharp articles in sharps box. This is contrast to a similar study by Singh et al in 2012[14] where a good number of the respondents (68.6%) reported disposal of sharp articles in dustbins.

Saini et al[15] in their study conducted concluded that 81.55% of the subjects had awareness regarding the practice of biomedical waste management and only 59.23% had correct knowledge regarding the disposal of different types of biomedical waste in the corresponding colored bag. In the present study, final year students (76.6%) had better knowledge regarding disposal of infectious material in yellow bag while third year students (85%) were more aware of handling of blood soaked wastes in red bags. Internees were more aware of the handling of other wastes (sharps, discarded medicines etc).

In our study internees (98.3%) showed high awareness level with respect to washing hands between patient contacts and decontamination of their hands. Mehtar et al[13] reported that 86.6% of the study group acknowledged that it was critical to wash hand before and after each patient contact. The most popular media used for hand washing was disinfectants (54%) followed by antimicrobial soap (44%) as found in other studies.[16]

Some of the limitations of this study includes cross sectional nature of study design. Further longitudinal studies should be carried out on a larger sample size and both private and government dental colleges should be included before the results could be generalized.

CONCLUSION

Infection control is an integral part of the practice to the extent that dental health workers no longer question its necessity. The results of our study suggests that the awareness of dental students was adequate in certain aspects like personal protection and cross infection control but significant improvement is needed in the areas of biomedical waste handling and disposal. Considering the high risk involved in dental practice, dental institutions should follow strict cross infection control procedures. Regular viva-voce or written exams should be conducted in the clinics/departments to emphasize the need for personal protection, cross infection control and biomedical waste management. Besides organizing continuing dental education (CDE) programs and short courses will also help to increase awareness on above.

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