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Assessment of knowledge, attitude and practice of infection control among dental students in a dental college of central India

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Abstract

Aim: Assessment of Knowledge, Attitude and Practice of Infection Control among Dental Students in a Dental College of Central India.

Material and Methodology: A Prevali dated questionnaire including 12 questions was circulated among 3rd Year, Final Year and Intern students, including 3 questions related to demographics, 1 knowledge based, 1 attitude based and 7 practice based clinical questions. Data Collection was done, data was entered in Microsoft Excel and statistical analysis was done using SPSS Version 20.

Results: Only 44.2% of the total sample size was Hepatitis B vaccinated while the rest of the sample was not vaccinated. Majority of students reported changing gloves between patients and washing their hands after each dental procedure. Majority of Students always remove their gloves upon leaving the immediate area of patients' care and report changing their gowns/lab coats if they were visibly contaminated. 68.1% of the students reported sterilizing their instruments and removing their watches and jewellery after each dental procedure. Majority of Interns, Third BDS and Final BDS students feel that dental clinics are more prone to infectious diseases than other medical fields.

Conclusion: In the present study, we found out that the overall infection control measures followed by the students was very low. The results of the study will help to plan and execute better teaching and learning methods for Third BDS, Final BDS and Intern students for improvement in Infection control practices and attitude.

Keywords: Dental Healthcare Professionals, Micro-organisms, Infection Protocols, Disease Transmission, Contamination.

Introduction

Dental healthcare professionals (DHPs) are at risk of infections caused by several microorganisms such as Mycobacterium tuberculosis, hepatitis B and C viruses, staphylococci, streptococci, herpes simplex virus, human immunodeficiency virus (HIV), mumps, rubella, and influenza. In the dental set-up, there are multiple circumstances and ways leading to transmission of such organisms. For example, high-speed dental instruments can create aerosols of water, saliva, and infectious droplets through the air/water irrigation infrastructure which are crucial to prevent pulpal overheating during dental procedure. [1] Paramount to the prevention of infections is the strict adherence to necessary precautions for all the patients. This includes, not only limited to, eye protection with face shields, facemask, and protective personal equipment (PPE), which will be facilitated on the premises or by appropriate management services. In 2003, the Center for Disease Control and Prevention of the United States of America (CDC) modified and updated their guidelines for infection control in dental set-up. [2] These guidelines consist of standard precautions which ensure a safe working ambiance and avoid potential transmission of occupational and nosocomial infectious organisms among Dental Healthcare Professionals and patients.

During dental procedures, transfer of infections could occur through direct contingence with blood, saliva or contaminated water from dental set-up, injury with an anaesthetic needle or splash exposure of the mucous membranes in oral cavity, droplets, aerosols as well as contact with grimy instruments and flat surfaces.[3] Direct involvement in patient treatment as part of their clinical training puts dental students at risk of exposure to pathogens. Since the majority of carriers of infectious diseases cannot be identified, implementation of standard universal precautions in dental schools is the prime effective way to control cross-infection. [4] It is an important, often under-recognized, less supported and at times 'taken -for- granted' part of the regulatory framework. The recent literature has featured multiple studies with the objective to explore the extent of public knowledge of cross-infection control in Dental Healthcare. In 1988, a telephone interview survey was held in the United States of America to assess concern about HIV and dentistry, and the findings related to dental attenders have been reported. [6] The study found out that 30 percent of active users of dental services had thought about the prospect of contracting HIV through dental instruments and treatment, and almost two-thirds of those shows worries about it. This was even higher among very frequent attenders, anxious patients, and those living in areas of high HIV prevalence. Most participants preferred that barrier control methods be used by their dentist or Dental Hygienist.

Dental schools are accountable for providing satisfactory infection control measures, proper education and training of dental students to protect patients from infections, and for the formulation of safer work conditions. Dental schools and institutions should provide their students and Dental Healthcare Professionals with the latest guidelines and training in infection control and facilitate apt immunization. Implementation can be achieved at all levels and is the first step toward changing the attitudes and habits of oral health-care professionals.[5] Unfortunately, regardless of the considerable emphasis placed on standardized infection control regulations, it appears that only a handful of dentists follow these protocols in their dental settings. Only a few studies enlighten findings on infection control practices on dental health care in Central India.

The purpose of this study was to investigate awareness, knowledge, attitude and compliance with recommended infection control procedures among clinical dental students at a Dental College in Nagpur, Maharashtra.

Materials and Methodology

A Prevali dated questionnaire including 12 questions was circulated among 3rd Year, Final Year and Intern students, including 3 questions related to demographics, 1 knowledge based, 1 attitude based and 7 practice based clinical questions.

The Present study is a Cross-sectional Questionnaire Based Study with samples including 3rd BDS, Final BDS and intern students. Total Sample size was 138 with subjects divided in each group. The present study was carried out in the Department of Conservative Dentistry and Endodontics in the month of March 2022 within an approximate duration of 1 month.

Approval from the Institutional Ethical Committee was taken prior to the start of the study and informed consent of all the participants was taken.

Data Collection was done, data was entered in Microsoft Excel and statistical analysis was done using SPSS Version 20.

Questionnaire

1. Gender:

Male

Female

2. Year of Education:

Intern

Final Year

3rd Year

3. Is Your Hepatitis B vaccination completed?

Yes

No

4. Do you change your gloves between patients?

Always

Sometime

Never

5. Do you wash your hands between each gloves change?

Always

Sometime

Never

6. Do you remove gloves/Mask while walking around.

Yes

No

7. Do you change gown/lab coat if visibly contaminated.

Yes

No

8. Do you sterilize instruments after each dental procedure?

Always

Sometime

Never

9. Do you remove watches and jewelry during dental procedures

Yes

No

10. Have you ever suffered percutaneous injuries with used instruments?

Yes

No

11. If yes, select the type of instrument causing the injury.

Explorer

Needle

File

Scaler

Burs

Wax knife

Miscellaneous

12. Are you willing to treat a patient with an Infectious disease?

Yes

No

13. Dental clinics are more prone to infectious disease than other medical fields. Do you agree with given statement

Yes

No

Results

According to Table 1, The sample consisted of an almost equal distribution of Third, Final and Intern students, with 34.8% Interns, 34.1% Final BDS and 31.2% Third BDS Students.

Table 1: Group Distribution.

	Frequency	Percent	Valid Percent	Cumulative Percent
Intern	48	34.8	34.8	34.8
Final BDS	47	34.1	34.1	68.8
Third BDS	43	31.2	31.2	100.0
Total	138	100.0	100.0	

Figure 1

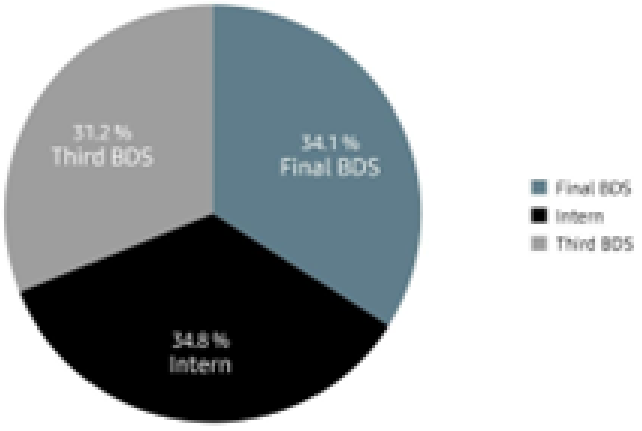
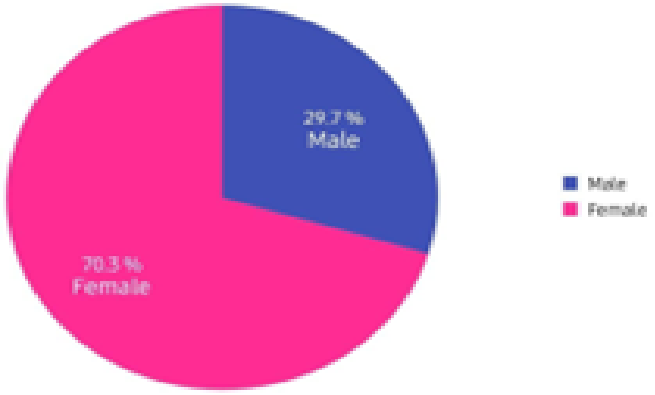


Table 2: Gender Distribution.

	Frequency	Percent
Male	41	29.7
Female	97	70.3
Total	138	100.0

Figure 2

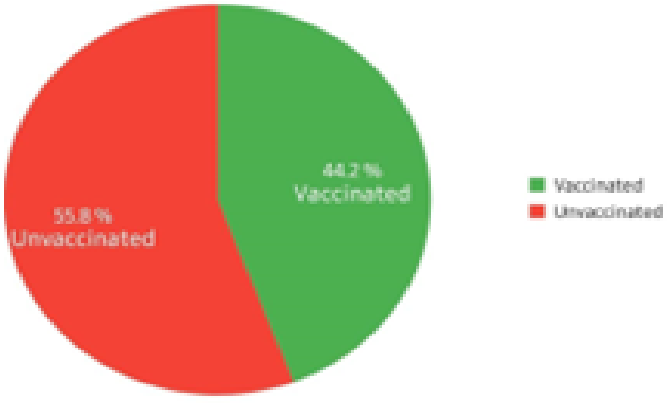


According to Table 2, 29.7% of the total sample size were Male, while the Majority of them, I e. 70.3% were Female.

Table 3: Hepatitis B Vaccination Percentage

	Year. Education			Total
	Intern	Final BDS	Third BDS	
Vaccinated	28	16	17	61
	45.9%	26.2%	27.9%	100.0%
Unvaccinated	20	30	26	77
	26.3%	39.5%	34.2%	100.0%
Total	48	46	43	138
	35.0%	33.6%	31.4%	100.0%

Figure 3

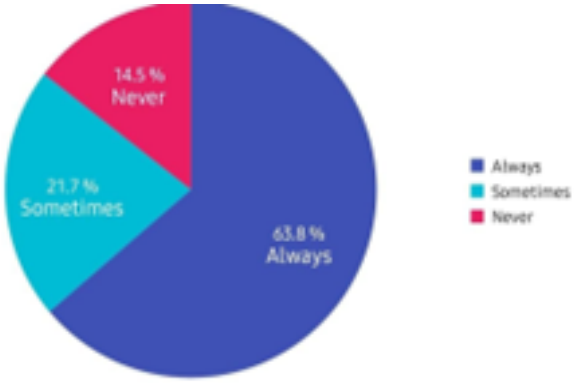


According to Figure 3 and Table 3, only 44.2% of the total sample size was Hepatitis B vaccinated while the rest of the sample was not vaccinated. Interns had the highest number of vaccinated participants, in contrast to that, Final BDS participants topped in unvaccinated percentage.

Table 4: Frequency of Changing Gloves after every Patient.

	Year. Education			Total
	intern	Final BDS	Third BDS	
Always	30	28	30	88
	34.1%	31.8%	34.1%	100.0%
Sometimes	11	11	8	30
	36.7%	36.7%	26.7%	100.0%
Never	7	8	5	20
	35.0%	40.0%	25.0%	100.0%
Total	48	47	43	138
	34.8%	34.1%	31.2%	100.0%

Figure 4

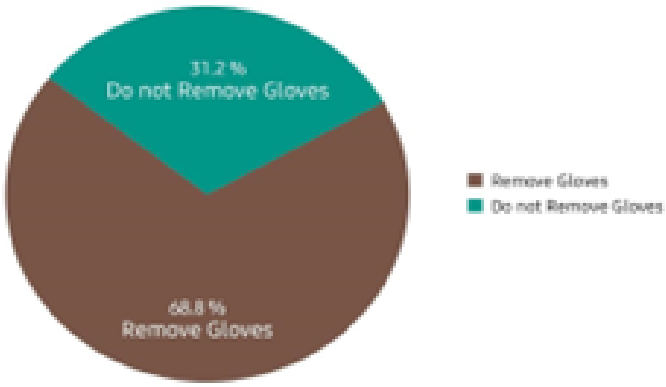


According to information given in Table 4, Majority of students I e- 63.8% reported changing gloves between patients and washing their hand after each dental procedure, with no significant difference between Third BDS and Fourth BDS and Intern students.

Table 5: Removal of Gloves upon Leaving the area of Patient Care.

	Year. Education			Total
	Intern	Final BDS	Third BDS	
Remove Gloves	33	31	31	95
	34.7%	32.6%	32.6%	100.0%
Do not Remove Gloves	15	16	12	43
	34.9%	37.2%	27.9%	100.0%
Total	48	47	43	138
	34.8%	34.1%	31.2%	100.0%

Figure 5.



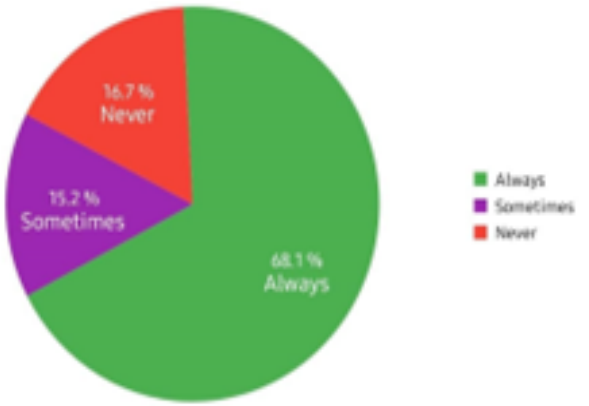
According to Table 5, Majority of Students always remove their gloves upon leaving the immediate area of patients care and reported changing their gowns/lab coats if they were visibly contaminated, with no significant difference between Third BDS and Fourth BDS and Intern students.

Table 6: Frequency of Instrument Sterilization after every Procedure.

	Year. Education			Total
	Intern	Final BDS	Third BDS	
Always	29	33	32	94
	30.9%	35.1%	34.0%	100.0%
Sometimes	11	4	6	21
	52.4%	19.0%	28.6%	100.0%
Never	8	10	5	23

	34.8%	43.5%	21.7%	100.0%
Total	48	47	43	138
	34.8%	34.1%	31.2%	100.0%

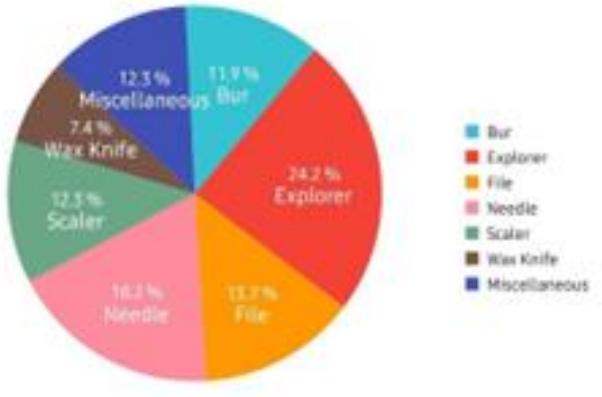
Figure 6



According to Table 6, 68.1% of the students reported sterilizing their instruments and removing their watches and jewellery after each dental procedure and 16.7% of the students reported to never sterilize their instruments. There was no significant difference among all three groups I e - Third BDS, Final BDS and Intern Students.

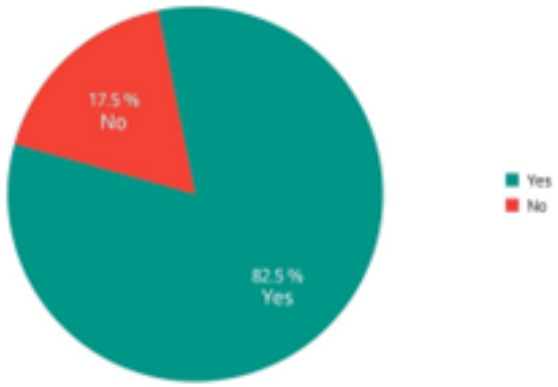
Figure 7 illustrates various instruments causing accidental injuries, with Dental Explorer reported to be causing the highest amount of accidental injuries followed by Needle, Dental File, Scaler Tip, Dental Bur and Wax knife.

Figure 7



As shown in Figure 8, Majority of Interns, Third BDS and Final BDS students feel that dental clinics are more prone to infectious diseases than other medical fields.

Figure 8



Discussion

Dental patients and Dental Healthcare Professionals can be exposed to infective microorganisms including cytomegalovirus (CMV), HBV, HCV, herpes simplex virus types 1 and 2, HIV, Mycobacterium tuberculosis, staphylococci, streptococci, and other bacteria and viruses that colonize or infect the oral cavity and respiratory tract. These organisms are contagious and can be transmitted in dental set-up through contact with blood, oral fluids, or other patient biomaterials, indirect contact with contaminated objects and instruments, contact of conjunctival, oral, or nasal mucosa with droplets containing Infective microorganisms generated from an infected person and propelled a short distance by coughing, talking, or sneezing and breathing of airborne microorganisms that can be suspended in the air for great periods.[13] Infection by any of these ways requires that all of the following requirements be present:

• a Infective microorganisms of sufficient virulence and satisfactory numbers to cause an Infection;

• a reservoir or origin that allows the microorganisms to survive and multiply;

• a mode of transmission from the source of inception to the host;

• an entry portal through which the microorganisms can enter the host body; and

• a susceptible, non-immune host. These following events provide the fuel for infection. Effective infection-control measures prevent disease transmission by blocking one or more mentioned links in the chain of this infection cycle. [14]

In the Present Study, conducted at Dental College in Nagpur, Maharashtra (Central India), we found out that 63.8% of the total participants changed a pair of gloves for each patient after every Procedure. The reported percentage was much lower than the other studies Conducted across the globe. A study conducted in Yemen reported 96.5% of its total participants to be changing gloves after each patient. [7] In our study, 65.2% of the total participants washed hands between each gloves change, which was marginally higher than other studies conducted elsewhere. A study conducted in Yemen[7] found that only 43% of its participants washed hands and others conducted in UAE by Rahman et al.[8] reported 47.9% and in Europe by de Amorim-Finzi[9] reported 45%. 68.8% of our participants reported removal of gloves and mask while walking around, which was significantly higher than other studies reporting a lesser percentage for the same. A study in Canada Conducted by McCarthy GM[10] found out that only 51% of its participants removed masks and gloves while walking around, and a study in Yemen reported 53.1% for the same. [7] 68.8% of our participants reported to change gown/lab coat, if visibly contaminated, which was lower than findings from other studies.

68.1% of our total participants reported to Sterilize instruments after each use. The reported figure was lower than studies conducted in Yemen and Canada, but to our surprise, the reports of present study were significantly higher than studies conducted in Brazil by De Souza RA[11] and in Iran conducted by Alavian SM[12] which were 31.1% and 48.5% respectively. Of our total participants, 67.6% reported Removal of watches and jewellery during the procedure. The findings were satisfactory, when compared with findings of other studies. 54% of our participants were willing to treat patients with infectious diseases, which was marginally higher than reporting's of other studies conducted worldwide. 82.5% of our participants believed that Dental clinics are more prone to infectious diseases than other medical fields, these findings were in accordance with other studies.

Table 7: Comparison of Reported Findings with other studies published worldwide.

Questions	Present study	Reference study
Change of gloves between patients	63.8% much lower than reported in other studies	Halboub Sana's university Yemen 96.5%. [7]
Hand wash between each gloves change	65.2% was satisfactorily or higher than other studies	Hal boub Sana's university Yemen (43%), [7] Rahman et al. UAE[8] (47.9%) and de Amorim-Finzi Europe[9] (45%).
Removal of gloves/mask while walking around	68.8% was satisfactorily high	Halboub Sana's university Yemen (53.1%) [7] McCarthy GM Canada

		(51%) [10]
Change gown/lab coat if visibly contaminated	68.8% - reported lower than other studies	Halboub Sana's university Yemen (87.5%) [7]

Table 8: Comparison of Reported Findings with other studies published worldwide.

Instruments sterilization after each dental procedure	68.1% contrast to other studies	McCarthy GM Canada (82%) [10] Halboub Sana's university Yemen (97.9%) [7] De Souza RA Brazil (31.1%) [11] Alavian SM Iran (48.5%) [12]
Removal of watches and jewellery during procedure	67.6% was satisfactory than other studies	Halboub Sana's university Yemen (44.9%) [7]
Willingness to treat patients with infectious diseases	54% was satisfactory than other studies	Halboub Sana's university Yemen (45.1%) [7]
Dental clinics are more prone to infectious diseases than other medical field	82.5% as accordance with other studies	Halboub Sana's university Yemen [7]

Conclusion

Dental Healthcare practices should form a written infection-control program to prevent or reduce the levels of risk of disease transmission and contingency.

Such programs should include infrastructure and implementation of policies, procedures, and practices to avoid work related illness and injuries among Dental Healthcare Professionals (DHPs) as well as healthcare associated infections among patients visiting the settings. It is crucial to clearly communicate to students the associated risks and necessity of avoidance of transmission of infections and exposures during dental procedures. Much efforts are required to improve attitudes, to implement protocols and motivate students for the routine use of infection-control protocols. With all infection control regulations already implemented in dental schools and institutions, the challenge remaining ahead is on improving compliance with infection control measures and regulations.

In the present study, we found out that the overall infection control measures followed by Third BDS is 61.4%, Final BDS is 62.5% and Interns is 62%. The results of the study will help to plan and execute better teaching and learning methods for Third BDS, Final BDS and Intern students for improvement in Infection control practices and attitude.

The present study concludes that the dental practitioner must adhere to the acceptable standards in their dental clinic setups as well as hospitals regarding infection control and safety of them and patients. And, neglecting to implement effective precautionary measures of infection control and safety, places the patients, dental practitioners as well as others, including the dental practitioner's family and other patients in indirect

contact, at a high risk of infection transmission.

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