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Original Research

Awareness, Knowledge and Practice towards sterilization protocol and infection control among clinical dental students in Hazaribag district, Jharkhand

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***ABSTRACT*:**
Aim: The present study was conducted to assess the awareness, knowledge and practice towards sterilization protocol and infection control among clinical dental students in Hazaribag district, Jharkhand, India. **Methods and Material:** The study population comprised of total 175 clinical dental students of Hazaribag College of Dental Sciences and Hospital, Hazaribag, Jharkhand. Data was obtained using a prefabricated questionnaire comprising of 30 multiple choice questions, based on Likert scale. These consisted of questions for assessing awareness (10), knowledge (10) and practice (10) regarding sterilization protocol and infection control. **Results:** The present survey based study on awareness, knowledge and practice towards sterilization protocol and infection control revealed that the majority of clinical dental students showed positive level of awareness, knowledge, and practice for questions based on a sterilization protocol and infection control. **Conclusion:** In our study, clinical dental students showed a positive level of awareness, knowledge, and practice towards the sterilization protocols and infection control in their day to day practice. However, the more updated and recent advances in sterilization protocols must be administered to the clinical students through educational programs. An additional subject for sterilization protocols must be incorporated in the B.D.S. curriculum so that upcoming dental surgeons must be aware about the various health hazards which can occur by avoiding proper infection control and sterilization protocols.
Key words: Sterilization, infection control, Autoclave, Dental students.

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INTRODUCTION:
Sterilization is the procedure that kills any living organism, pathogenic, and nonpathogenic; either it is in a vegetative form or spore, which is present on the surface of the material to be sterilized.[1] Proper sterilization and disinfection procedure benefits in preventing cross infections and reduce the microbiological degree of contamination in the surrounding operative area.[2] While performing dental procedures, transmission pathways for infectious diseases are of the horizontal type, as the infections can be transmitted from dental surgeons to patients, patient to the dental surgeon, or from patient to patient.[3-5] Transmission of infection occurs when the pathogens come into direct contact with the exposed tissues either via a wound, blood, or any secretions. Infected instruments, when indirectly gets in contact with the tissues and sometimes aerosol formation from air rotors, ultrasonic headpieces, or water contamination by the creation of biofilm in water pipes, also leads to the transmission of infection.[6, 7] Dental surgeons are at high risk of exposure to cross-infection with blood-borne pathogens such as hepatitis B virus, HIV, and other viruses. Some pathogenic bacteria present in the oral cavity and upper respiratory tract can also be easily transmitted while working. [8] Most of the

instruments used in dentistry are in direct contact with the mucosa, infected sites, oral tissues (in contact with blood during surgical procedures). Therefore it is a must for the clinician to clean and sterilize contaminated reusable instruments and monitor them regularly. The instruments which are not reusable must be discarded and be assured not used again. [9] Awareness and knowledge regarding proper sterilization protocols among dental students are very less as they are in the learning period and are at high risk of exposure to infections with pathogens (blood-borne). As they are continually exposing themselves to blood and saliva, they are more prone to needle punctures.[9] Therefore knowledge and awareness among dental students regarding sterilization and disinfection are utmost and must be added in the DCI (Dental Council of India) syllabus. Time to time short courses and conferences must be organized by dental colleges and the local Indian Dental Association (IDA) branch, for updating the proper way of sterilizing instruments after use. This will help the dental students to follow sterilization protocols when they will independently practice after the degree. This requires the involvement of dental students in playing an important role in recognizing the importance of maintaining proper sterilization protocols, which will yield the greatest public benefit in the future by them. Therefore this study was conducted to check the knowledge, awareness, and practice of dental students towards sterilization protocols. Education and training regarding proper sterilization must be provided to the dental students throughout the training in both theoretical and clinical context.

SUBJECTS AND METHODS:

A questionnaire-based survey was conducted among dental students (Third year BDS, Final year BDS and Intern students) of Hazaribag College of Dental Sciences and Hospital; Hazaribag, Jharkhand, India. The dental students present on the day were approached directly by the researchers. Before conducting the survey among dental students, the ethical clearance was obtained from the Institutional Ethical Committee of the college. Informed consent was taken from participating students.

Inclusion criteria

All the clinical dental students (Third year BDS, Final year BDS and Intern students) and researchers were present on the day of the survey.

Exclusion criteria

1. Students absent on the day of the survey.
2. First-year students and second-year students as they are not yet exposed to clinical work.

Questionnaire

The prefabricated questionnaire consisted of 30 multiple choice questions based on the Likert scale. These consisted of questions for assessing awareness (10), knowledge (10) and practice (10) regarding sterilization protocols. The questions used in the study were mainly close-ended.

RESULTS:

Awareness towards sterilization protocol and infection control among clinical dental students: (Table 1)

All the participating dental students agreed that the sterilization of dental students is a must for starting any dental procedures. 97.14% of the total clinical dental students agreed that diseases like AIDS, Hepatitis can be transferred to the person from one another i.e., dentist to the patient, patient to the dentist, or patient to patient. Only a few of them (22.25%) thinks that patient coming for dental treatment is not aware of instrument sterilization. Only 20.57% of the clinical dental students think proper sterilization of instruments makes wound healing better. Only 48% of the clinical dental students were aware that dental surgeons might get an infection while performing dental procedures with unsterilized instruments. In contrast, the majority of them (52%) were unaware of this. 97.72% of the total dental students were aware of the myths that sterilization weakens the strength of the instruments.

73.71% of the students think all the surgical and dental instruments must be sterilized by an autoclave. Most of the patients (93.15%) thinks courses and demonstration (hands-on) in the conferences should be conducted for knowing proper methods of sterilization of the dental equipment. 90.28%of the total students are aware of using single-use instruments (disposable) for treating patients suspected with HIV and Hepatitis.

Knowledge towards sterilization protocol and infection control among clinical dental students: (Table 2)

The response of study subjects based on knowledge towards sterilization protocol. The majority of participating clinical dental students (91.42%) responded that they dispose of the used pair of gloves, whereas 5.14% of the students responded that gloves could be used after washing. 70.85% of the total dental students agreed that they cleaned their hands with soap/ liquid hand wash after treatment. The majority of them (91.42%) responded that they use cheatle forceps to pick the sterilized instruments.54.28% of the total study subjects agreed that Tuberculosis has the highest rate of transmission via. saliva followed by Hepatitis (43.42%) and AIDS (2.28%) respectively. The knowledge of clinical dental students about the rusted instrument, 58.85 % of the total subjects agreed that the rusted instruments should be discarded. Majority of the total clinical dental students was having the knowledge about the autoclave that it is sterilization by moist heat, and 85.14% of them know that the ideal temp of autoclave is 121°C for 15 minutes. Only 44.57% of them use the ultrasonic washer to wash their contaminated instruments. A substantial number of students (37.71%) only knows that ultrasonic scaler tips are sterilized using an autoclave. Surprisingly, only 3.42% of them were having knowledge that working room area should be sterilized by fumigation. 90.85% was having no idea of sterilization of the working area.

Practice towards sterilization protocol and infection control among clinical dental students: (Table3)
Only 46.85% of the total clinical dental students responded that they sterilize the operative chair before starting a new patient. 72% of them wear a head cap while dealing with the patients. When we asked about whether they wear protective eyewear while performing oral prophylaxis, only 37.14% of the total study population opted for yes the wear. 88% of the total clinical dental students agreed that they do not touch a pen or any other objects once they were gloves. It was good to observe that the majority of the students (97.15%) wear a face mask while examining any of their patients.71.43% of the total clinical dental students only sterilize Patients drapes for every new patient. It was good to see that the majority of the clinical dental students (91.43%) agreed that proper sterilization could not be achieved through the boiler. 98.28% of the total clinical dental students use sterilized sets of mouth mirror and probe while diagnosing each patient. However, 82.85% sterilized their air rotors, burs, and files before treatment. When they were asked about waste disposal, it was surprising to see the majority of the dental students (74.29%) do not follow colour coding of the dustbins while disposing of the waste.

Q.No.	Questions	Responses	
		Yes	No
1	Do you think sterilization is must for starting any dental treatment?	100% (n=175)	0% (n=0)
2	Do you think certain diseases like AIDS, Hepatitis can be transferred through unsterilized instruments?	97.14% (n=170)	2.85% (n=5)
3	Do you think patients are aware about sterilization of instruments?	77.14% (n=135)	22.85% (n=5)
4	Do you think surgery with proper sterilized instruments makes the wound healing better?	79.42% (n=139)	20.57% (n=36)
5	Do you think dental surgeons can get infected with the use of unsterilized instruments?	48.0% (n=84)	52.0% (n=91)
6	Do you think single use syringes can be used again after sterilization with any means?	2.28% (n=4)	97.72% (n=171)
7	Do you think sterilization weakens the strength of instruments?	4.57% (n=8)	95.42% (n=167)
8	Do you think all surgical or dental instruments is must to be sterilized with autoclave?	73.71% (n=121)	26.29% (n=46)
9	Do you think courses and conferences are to be conducted for demonstrating proper methods of sterilization?	93.15% (n=163)	6.85% (n=12)
10.	Do you think single use instruments must be used for HIV and Hepatitis suspected patients?	90.28% (n=158)	9.79% (n=17)

Table 1: Awareness towards sterilization protocol and infection control among clinical dental students.

	What do you do with used pair of gloves?	Dispose them 91.42% (n=160)	Reuse after washing 5.14% (n=9)	Reuse after sterilization: 3.42% (n=6)
12	With what do you clean your hands after treatment?	Plain tap water 19.42% (n=34)	Soap/Liquid handwash 70.85% (n=124)	Disinfectant solution 9.71% (n= 9)
13	What do you use to pick up sterilized instruments to keep them in your tray?	Cheatle forceps 91.42% (n=60)	Hands 3.42% (n=6)	Twizzer 5.14% (n=9)
14	Which of the following has highest rate of transmission via saliva?	Hepatitis B 43.2% (n=76)	AIDS 2.28% (n=4)	Tuberculosis 54.28% (n=95)
15	What should ideally be done with rusted instruments?	Use them 9.71% (n=17)	Discard them 58.85% (n=103)	Clean with sandpaper and reuse 31.42% (n=55)
16	Sterilization via autoclave is an example of?	Dry heat sterilization 2.85% (n=5)	Moist heat sterilization 96.57% (n=169)	Chemical methods of sterilization 0.57% (n=1)
17	What is the ideal temperature/time of an autoclave?	10℃ for 15 minutes 1.14% (n=2)	121℃ for 15 minutes 85.14% (n=147)	125℃ for 15 minutes 13.71% (n=24)
18	How do you wash your instruments after use?	Using hand and water 6.28% (n=11)	Using brush and water 49.14% (n=86)	Using ultrasonic washer 44.57% (n=78)
19	How did you sterilize your ultrasonic scaler tips?	Washing with water 12.57% (n=22)	Dipping in Ethyl Alcohol 49.71% (n=87)	Autoclave 37.71% (n=66)
20	How did your working room area sterilized?	Cleaning the floor with phenyl 5.71% (n=10)	Fumigation of room 3.42% (n=6)	No idea 90.85% (n=159)

Table 2: Knowledge towards sterilization protocol and infection control among clinical dental students

Q. No.	Questions	Responses	
		Yes	No
21	Do you sterilize your operative chair before starting a new patient?	46.85% (n= 82)	53.15% (n = 93)
22	Do you always wear a head cap while dealing with your patient?	72.0% (n=126)	28.0% (n=49)
23	Do you wear protective eyewear while performing oral prophylaxis?	37.14% (n = 65)	62.86% (n= 110)
24	Do you touch a pen or any other object with gloved hands?	12.0% (n=21)	88.0% (n=154)
25	Do you wear a face mask while examining any patient?	97.15% (n=170)	2.85% (n=5)
26	Do you use sterilized patient drapes for every new patient?	71.43% (n=125)	28.57% (n=50)
27	Can proper sterilization be achieved through boilers?	91.43% (n=160)	8.57 % (n = 15)
28	Do you use sterilized sets of mouth mirror and probe while diagnosing each patient in the OPD?	98.28% (n=172)	1.72% (n=3)
29	Do you sterilize your air – rotor, burs, Files?	82.85% (n=145)	17.15% (n=30)
30	Do you follow color coding of dustbins while disposing waste?	25.71% n=45	74.29% n=130

Table 3: Practice towards sterilization protocol and infection control among clinical dental students.

DISCUSSION:

Proper sterilization and effective infection control is an essential step toward safe dental care practice. A variety of sterilization and infection control methods are practiced in dentistry for sterilizing the contaminated dental instruments. Dental professionals have to provide protection of the health and safety of patients. This survey yielded interesting findings regarding knowledge, awareness, and practice among clinical dental students. Primary sources of infection in dentistry are caused by hands. Wearing of gloves by dental surgeons had been essential for controlling cross-infection.[10] Two types of gloves are mainly used i.e., single-use-disposable non-sterile examination gloves or single-use-disposable sterile surgical gloves. All the participating students, in our study, reported routine use of gloves and in examining and treating patients. Microorganisms under the gloves rapidly multiply due to the humid and warm environment.[11] Only 70.85% of the clinical dental respondents said that they wash their hands before and after treating a patient, which is lower than compared to (92.9%) a study conducted by Suresh *et al*.[12] In our study majority of clinical dental students wear a face mask (97.15%), which was higher than the study reported from Davangere[12] (85%) of wearing a face mask. The use of a boiler as a method of sterilization is not acceptable in dentistry now. Boiling for 30 minutes or more only kills nearly all the vegetative cells but is not able to kill the spores. Therefore, the use of boilers is an insufficient method to achieve sterilization.[13] In our study, 91.43 % of the total clinical students do not use the boiler to sterilize their instruments, which is a good sign for maintaining proper infection control.Sterilization of the instruments with autoclave was the method of choice for about 73.71% of the respondents in this study. Study conducted by Al-Omari and Al-Dwairi (Jordan) [14] and Suresh *et al*.[12] reported that 63% and 78.4% of respondents were using an autoclave for sterilization. Transmission of the infections to the dental surgeons may occur through direct contact with blood of the infected patient, indirect contact with unsterilized instruments (prick of needles and sharp instruments), contact with airborne contaminants present in aerosols of oral and respiratory fluid specially while using air rotor or ultrasonic scalers. Learning clinical students are even more prone to these occupational hazards. Dental health care professionals are at high risk of getting infections by various microorganisms such as *Mycobacterium tuberculosis*, hepatitis B virus (HBV) and hepatitis C virus, staphylococci, streptococci, herpes simplex virus (HSV), human immunodeficiency virus (HIV), influenza, mumps and rubella. In our study, only 54.38 % of the total respondents had knowledge that Tuberculosis has the highest rate of transmission via saliva.

An educational program on infection control, proper sterilization methods for all dental health practitioners, especially clinical dental students, is a must to reduce infectious hazards among not only dental practitioners but also their patients.

CONCLUSIONS:

In our study, clinical dental students showed a positive level of awareness, knowledge, and practice towards the sterilization protocols and infection control in their day to day practice. However, the more updated and recent advances in sterilization protocols must be administered to the clinical students through educational programs. An additional subject for sterilization protocols must be incorporated in the B.D.S. curriculum so that upcoming dental surgeons must be aware about the various health

hazards which can be occurred by avoiding proper infection control and sterilization protocols.

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REFERENCES:

1. N. Sheth, Y. Rathod, P. Shenoi, D. Shori, R. Khode, and A. Khadse, "Evaluation of new technique of sterilization using biological indicator," Journal of Conservative Dentistry. 2017;20;346–50.
2. N. K. Ibrahim, H. A. Alwafi, S. O. Sangoof, A. K. Turkistani, and B. M. Alattas, "Cross-infection and infection control in dentistry: knowledge, attitude and practice of patients attended dental clinics in King Abdulaziz University Hospital, Jeddah, Saudi Arabia," Journal of Infection and Public Health, vol. 10, no. 4, pp. 438–445, 2017.
3. McCarthy GM. Risk of transmission of viruses in the dental office. J Can Dent Assoc 2000;66:554-57.
4. Muralidaran S, Muralidaran NP. Evaluation of efficacy of 2% glutaraldehyde for disinfection of hand pieces used in dentistry.J Pharm Sci Res 2016;8:832-34.
5. G Smith and A Smith Microbial contamination of used dental handpieces," American Journal of Infection Control. 2014;42;1019–21.
6. V. Barbot, A. Robert, M.-H. Rodier, and C. Imbert, "Update on infectious risks associated with dental unit waterlines," FEMS Immunology and Medical Microbiology, vol. 65, no. 2, pp. 196–204, 2012.
7. C. L. Pankhurst and W. A. Coulter, "Do contaminated dental unit waterlines pose a risk of infection?" Journal of Dentistry, vol. 35, no. 9, pp. 712–720, 2007.
8. Rahman B, Abraham SB, Alsalami AM, Alkhaja FE, Najem SI. Attitudes and practices of infection control among senior dental students atcollege of dentistry, university of Sharjah in the United Arab Emirates. Eur J Dent 2013;7(Suppl 1):S15-9.
9. Ogden GR, Bahrami M, Sivarajasingam V, Phillips G. Dental students' knowledge and compliance in cross-infection control procedures at a UK dental hospital. Oral Dis 1997;3:25-30.
10. 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.
11. Centers for Disease Control and Prevention. Guideline for hand hygiene in health-care settings: Recommendations of the healthcare infection control practices advisory committee and the HICPAC/ SHEA/APIC/IDSA hand hygiene task force. MMWR Morb Mortal Wkly Rep 2002;51:1-45.
12. Suresh S, Chandu GN, Prashant GM, Nagendra J, Shafiulla MD, Subba Reddy VV. Basic infection control practices of dentists in Davangere City, Karnataka. J Indian Assoc Public Health Dent 2006;8:51-6.
13. Littleton PA Jr., Kohn WG. Dental public health and infection control in industrialized and developing countries. Int Dent J 1991;41:341-7.
14. Al-Omari MA, Al-Dwairi ZN. Compliance with infection control programs in private dental clinics in Jordan. J Dent Educ 2005;69:693-8.