

Clinical Audit On Infection Control Among Dental Students in a Teaching Hospital, Telangana: A Cross-Sectional KAP Study

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Abstract: Background: Over the past few decades, public opinion and involvement in modern health care has been increasing continuously due to which the negligence cases in the health care were being accounted. Although these cases represent a very small proportion, a quality improvement process is required to improve patient care. This can be achieved through clinical audit.

Aim: The aim of the present study is to conduct clinical audit on infection control among dental students in a teaching hospital, Telangana, according to the institution prescribed infection control guidelines.

Materials and Methods: A cross-sectional study was conducted among 318 dental students in a teaching hospital, Khammam, Telangana, using a knowledge, attitude and practice questionnaire. Descriptive statistics and Chi-square test were applied. The statistical significance was considered at $p < 0.05$.

Results: Out of 318 students who filled up the questionnaire, 82.4% participants were females and 17.6% participants were males. The post graduates were about 30.2%, interns were 36.5% and IV BDS Students were 33.3%. A statistically significant difference was found among the study participants regarding the knowledge, attitudes and practices of infection control.

Conclusion: The present clinical audit showed an overall good adherence with the “institution recommended infection control guidelines,” among the clinical dental students.

Keywords: Clinical audit, Dental students, Infection control.

1. Introduction

The oral cavity is a natural habitat for micro-organisms, where it possesses a high risk for cross-contamination and infection in the dental practice. Infection is considered as one of the most important cause of morbidity and mortality associated with clinical, diagnostic and therapeutic procedures [2].

Centres for Disease control and prevention in 2005 has defined infection control as “Measures practiced by health care personnel to reduce the risks of transmission of infectious agents to patients and employees.”

During the dental procedures, transmission of infections can occur through direct blood contact /saliva or contaminated water from dental units, needle stick injuries, indirect contact with contaminated instrument surfaces and aerosols [2]. Many

dental negligence cases were accounted, in various parts of the developing world as public opinion and involvement in modern health care has been increasing continuously [3]. So, Centres for Disease control and prevention has adopted the term “standard precautions,” for the prevention and transmission of infectious diseases [2].

As the dental students are the future health care providers, the incorporation of infection control guidelines in their curriculum and continuous education on infection control practices will provide an evidence-based guidance in the updated resources. The Dental Students can be assessed and reviewed on infection control practices, prescribed by the institution by Clinical Audit. Clinical audit is defined as “a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria, where indicated changes are implemented and further monitoring is used to confirm improvement in healthcare delivery” (Principles for Best Practice in Clinical Audit (2002, NICE/CHI)) [4].

So, the purpose of the present study is to conduct clinical audit by assessing and comparing the knowledge, attitudes and practices on infection control among dental students in a teaching hospital, Telangana, according to the institution prescribed infection control guidelines.

2. Materials and Methods

A. Study Design and Participants

A cross-sectional questionnaire based study was conducted among 318 dental students (IV BDS, Interns, Post graduates) in a teaching hospital, Khammam, Telangana, in the month of September 2019. Out of 318 participants, 106 were IV BDS, 116 were Interns and remaining 96 students were post graduate students.

B. Study Instrument

A closed ended questionnaire was prepared according to the institution prescribed infection control guidelines. The questionnaire comprised of 19 questions pertaining to knowledge (6 questions), attitude (7 questions), practice (6 questions) towards its application in infection control.

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C. Ethical Clearance and Informed Consent

Ethical Clearance was obtained from Ethical Committee of Mamata Dental college and Hospital, Khammam, before the commencement of the study.

After explaining the purpose and procedure of the study, a written informed consent was obtained from every study participant.

D. Data Collection

Prior to the start of the study, pilot study was conducted to assess the reliability of the questionnaire, which was found to be good (Cronbach's alpha 0.8).

The questionnaires were distributed among the IV BDS, Interns, Post graduate students during their clinical posting hours. The study participants who were willing to participate and present on the day of the study were included in the study.

There were about 320 dental students (IV BDS, Interns, Post graduates), out of which data was collected on 318 dental students. Each participant had taken a time of 10-15 mins to fill the questionnaire.

E. Data Entry and Statistical Analysis

The data collected was arranged systematically and the information from the collected questionnaires was transferred to the Microsoft Excel Work Sheet 2016. All the statistical analysis was performed using the Statistical Package for Social Sciences Software (SPSS) version 20.0. (IBM Corporation, SPSS Inc., Chicago, IL, USA). Descriptive analysis was calculated and Chi-square test was used to know the significant difference between the groups. The level of significance was set at $p < 0.05$.

3. Results

Table 1 shows the distribution of study participants. Out of 318 students who filled up the questionnaire, 82.4% participants were females and 17.6% participants were males. The post graduates were about 30.2%, interns were 36.5% and IV BDS Students were 33.3%.

Table 2 shows the knowledge of study participants regarding the infection guidelines. 85.5% of study participants reported that the aim of sterilization is the destruction of both spore forming and non-spore forming microorganisms.

Table 3 shows the attitudes of study participants regarding infection guidelines. 95.9% of study participants felt that isolation is important for infection control.

Table 4 shows the practice of study participants regarding infection control guidelines. 73.6% of study participants had always practiced hand washing before and after patient examination.

A statistically significant difference was found among the study participants regarding the knowledge (method of sterilization for instruments and for dental office; immediate action should be taken in direct blood contact with HIV patients and for the biomedical waste management); attitudes (pre-procedural mouth rinse, disinfection of dental office between patients) and practice of infection control (sterilization of instruments, personal protective equipment and hand hygiene).

Table 1

Distribution of study participants according to gender and year of study

Variables		No. of Participants (n=318)
Gender	Females	262 (82.4%)
	Males	56 (17.6%)
Year of Study	Post graduates	96 (30.2%)
	Interns	116 (36.5%)
	IV BDS	106 (33.3%)

Table 2

Knowledge of dental students regarding infection guidelines

Knowledge questions	Correct response	Incorrect response
(K 1) The aim of sterilization in Dentistry is the destruction of	85.5%	14.5%
(K 2) The most reliable method of sterilization: (i) For instruments: (ii) For Dental office	24.5%	75.5%
	56.9%	43.1%
(K 3) Which of the following has the highest rate of transmission via saliva?	21.1%	78.9%
(K 4) What immediate action should be taken in case of direct blood contact with HIV patient	13.2%	86.8%
(K 5) What do you use to wash your soiled hands?	49.4%	50.6%
(K 6) White coloured bins are used for the disposal of	49.7%	50.3%

Table 3

Attitude of dental students regarding infection guidelines

Attitude questions	Yes	No
(A 1) Does the ineffective sterilization during clinical practice can transmit infection from one patient to another?	90.6%	9.4%
(A 2) Is it always necessary to wear personal protective equipment?	88.4%	11.6%
(A 3) Is it necessary to remove personal protective equipment before leaving dental office ?	94.7%	5.3%
(A 4) Do you prefer oral mouth rinse for the patient before the commencement of oral examination and treatment procedure ?	81.1%	18.9%
(A 5) Do you think isolation is important in infection control?	95.9%	4.1%
(A 6) Is it necessary to dispose the gloves after every use?	95.3%	4.7%
(A 7) Is the disinfection of dental chair and dental office required between patients?	88.4%	11.6%

4. Discussion

On 23rd September 2010, "the patient safety first" initiative was launched with one of its primary objectives as "the use of clinical audit to improve patient care and outcome. The clinical audit is a process of assessing clinical practice against the standards [5]. So, the present clinical audit was conducted as a follow-up assessment regarding the infection control guidelines recommended by the institution using a knowledge, attitude and practice questionnaire.

The present study showed an acceptable levels of knowledge, attitudes and practices among the dental students. It is not in accordance with the study conducted by G. Alharbi *et al* (2019).

Among the study participants, 95.9% of the dental students believed that isolation is important in infection control. It is similar to a study conducted by Alharbi *et al* (2019). This could be due to the continuous lectures and training on infection control.

Table 4
Practice of dental students regarding infection guidelines

Practice questions	Always	Often	Sometimes	Rarely	Never
(P 1) Do you sterilize semi-critical instruments	35.2%	35.2%	20.1%	6.3%	3.1%
(P 2) Do you change your personal protective equipment for every patient?	62.3%	21.4%	8.8%	3.5%	4.1%
(P 3) Do you wash your hands before and after patient examination?	73.6%	18.9%	5.0%	0.6%	1.9%
(P 4) Do you request for new instruments, if the used instrument was accidentally dropped on the floor?	69.2%	19.8%	6.6%	1.3%	3.1%
(P 5) Do you dispose the waste according to clinical and non-clinical waste?	54.4%	25.2%	12.9%	5.0%	2.5%
(P 6) Do you disinfect the equipment and sterilize all the instruments before leaving the dental office?	64.2%	21.4%	12.3%	0.3%	1.9%

Table 5
Comparison of Knowledge, Attitudes and Practices on Infection Control among Dental Students

QUESTIONS	POST GRADUATES	INTERNS	IV BDS	p-value
(K1) Aim of sterilization is the destruction of	11 (11.4%)	13 (11.2%)	15 (14.1%)	0.384
a) Spore forming micro-organisms	0 (0)	1 (0.9%)	3 (3%)	
b) Non-spore forming micro-organisms	84 (87.5%)	102 (87.9%)	86 (81.1%)	
c) Both of the above	1 (1.1%)	0 (0)	2 (1.8%)	
(K 2) Most reliable method of sterilization:				0.00*
(i) For instruments				
a) steam sterilization	72 (75.1%)	59 (51%)	67 (63.2%)	
b) Chemical Sterilization	0 (0)	19 (16.3%)	6 (5.7%)	
c) Ultra-sonic vibrations	4 (4.1%)	12 (10.3%)	1 (0.9%)	0.00*
d) Heat Sterilization	20 (20.8%)	26 (22.4%)	32 (30.2%)	
(ii) For Dental Office:	2 (2%)	7(6%)	12(11.3%)	
a)Tyndallisation	60 (62.6%)	84 (72.4%)	37 (35%)	
b) Fumigation	33(34.4%)	23 (19.9%)	49 (46.2%)	0.098
c) Disinfection	1 (1%)	2 (1.7%)	8 (7.5%)	
d) Incineration	80 (83.3%)	93 (80%)	84 (79.2%)	
(K 3) Highest rate of transmission via saliva	4 (4.2%)	7 (6.0%)	13 (12.2%)	
a) Hepatitis B	2 (2%)	2 (1.9%)	6 (5.7%)	0.00*
b) AIDS	10 (10.5%)	14 (12.1%)	3 (2.9%)	
c) Tuberculosis	38 (39.6%)	43 (37.1%)	51 (48.1%)	
d) Don't know	22 (23%)	13 (11.2%)	7 (6.6%)	
(K 4) What immediate action should be taken in case of direct blood contact with HIV patient	29 (30.2%)	45 (38.7%)	22 (20.8%)	0.449
a) Anti- HIV immunoglobulins	7 (7.2%)	15 (13%)	26 (24.5%)	
b) Anti- HIV Drugs	47 (49%)	55 (47.4%)	55 (51.9%)	
c) Blood tests to be carried out	12 (12.5%)	25 (21.6%)	19 (18%)	
(K 5) What do you use to wash your soiled hands?	4 (4.2%)	7 (6%)	7 (6.6%)	0.00*
a) Anti-microbial soap	33 (34.3%)	29 (25%)	25 (23.5%)	
b) Alcohol based hand rub	65 (67.8%)	46 (39.7%)	47 (44.3%)	
c) Detergent	10 (10.4%)	6 (5.2%)	4 (3.8%)	
(K 6) White coloured bins are used for the disposal of	12 (12.5%)	28 (24.1%)	31 (29.2%)	0.094
a) Sharps	9 (9.3%)	36 (31.0%)	24 (22.7%)	
b) Cotton	92 (95.8%)	106 (91.4%)	90 (8.5%)	
c) Syringes without Needles	4 (4.2%)	10 (8.6%)	16 (15%)	
(A 1) Transmission of infection due to ineffective sterilization	85 (88.5%)	103 (88.7%)	93 (87.8%)	0.496
a) Yes	11 (11.4%)	13 (11.2%)	13 (12.2%)	
(A 2) Is it always necessary to wear personal protective equipment?	92 (95.8%)	108 (93.1%)	101 (95.3%)	0.638
a) Yes	4 (4.2%)	8 (6.9%)	5 (4.7%)	
(A 3) Is it necessary to remove personal protective equipment before leaving the dental office?	86 (89.6%)	96 (82.8%)	75 (70.8%)	0.015*
a) Yes	10 (10.4%)	20 (17.2%)	31 (29.2%)	
(A 4) Do you prefer oral mouth rinse for the patient before the commencement of oral examination and treatment procedure?	95 (99%)	111 (95.7%)	99 (93.3%)	0.398
a) Yes	1 (1%)	5 (4.3%)	7 (6.7%)	
(A 5) Do you think isolation is important in infection control?				
a) Yes				
b) No				

(A 6) Is it necessary to dispose the gloves after every use?				
a) Yes	95 (99%)	109 (94%)	99 (93.3%)	0.304
b) No	1 (1%)	7 (6%)	7 (6.7%)	
(A 7) Is the disinfection of dental chair and dental office required between patients?				
a) Yes	91 (94.8%)	94 (81%)	96 (90.6%)	0.034*
b) No	5 (5.2%)	22 (19%)	10 (9.4%)	
(P 1) Sterilization of semi-critical instruments				
a) Always	50 (52.1%)	26 (22.4%)	36 (34%)	0.001*
b) Often	31 (32.3%)	46 (39.7%)	35 (33%)	
c) Sometimes	11 (11.5%)	27 (23.4%)	26 (24.5%)	
d) Rarely	3 (3.1%)	11 (9.5%)	6 (5.6%)	
e) Never	1 (1%)	6 (5.1%)	3 (2.9%)	
(P 2) Do you change your personal protective equipment for every patient?				
a) Always	67 (69.8%)	67 (57.8%)	64 (60.3%)	0.042*
b) Often	17 (17.7%)	32 (27.6%)	19 (18%)	
c) Sometimes	6 (6.3%)	10 (8.6%)	12 (11.3%)	
d) Rarely	3 (3.1%)	6 (5.2%)	2 (2%)	
e) Never	3 (3.1%)	1 (0.8%)	9 (8.4%)	
(P 3) Do you wash your hands before and after patient examination?				
a) Always	73 (76%)	85 (73.2%)	76 (71.8%)	0.00*
b) Often	18 (18.8%)	18 (15.5%)	24 (22.7%)	
c) Sometimes	4 (4.2%)	8 (6.9%)	4 (3.7%)	
d) Rarely	0	1 (0.9%)	1 (0.9%)	
e) Never	1 (1%)	4 (3.4%)	1 (0.9%)	
(P 4) Do you request for new instruments, if the used instrument was accidentally dropped on the floor?				
a) Always	70 (72.9%)	82 (70.7%)	68 (64.2%)	0.303
b) Often	21 (21.9%)	19 (16.4%)	23 (21.7%)	
c) Sometimes	4 (4.2%)	8 (6.9%)	9 (8.5%)	
d) Rarely	0	1 (0.8%)	3 (2.8%)	
e) Never	1 (1%)	6(5.2%)	3 (2.8%)	
(P 5) Do you dispose the waste according to clinical and non-clinical waste?				
a) Always	67 (69.8%)	55 (47.4%)	51 (48.1%)	0.059
b) Often	18 (18.8%)	35 (30.2%)	27 (25.5%)	
c) Sometimes	7 (7.3%)	16 (13.8%)	18 (17%)	
d) Rarely	3 (3.1%)	6 (5.2%)	7 (6.6%)	
e) Never	1 (1%)	4 (3.4%)	3 (2.8%)	
(P 6) Do you disinfect the equipment and sterilize all the instruments before leaving the dental office?				
a) Always	71 (74%)	69 (59.4%)	64 (60.4%)	0.220
b) Often	17 (17.7%)	25 (21.6%)	26 (24.5%)	
c) Sometimes	8 (8.3%)	18 (15.6%)	13 (12.3%)	
d) Rarely	0	0	1 (0.9%)	
e) Never	0	4 (3.4%)	2 (1.9%)	

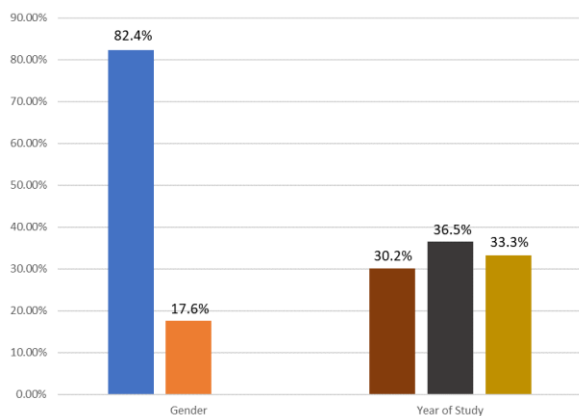


Fig. 1. Distribution of study participants according to gender and year of study

About 73.6% of the study participants always practiced the hand washing protocol before and after patient examination. This is in accordance with the study conducted by Prema S et al (2017) [6]. The probable reason could be that the dental students are aware that hands are considered as a major source of cross-infection.

A marginal difference was observed among the dental students, where a slightly higher knowledge, attitudes and practices in post graduate students regarding the infection control guidelines recommended by the institution. This could be due to vast clinical exposure for post graduate students when compared with IV BDS students and Interns.

One of the limitations of the present study was the clinical method of assessing the practice of infection control guidelines through clinical supervision. Another limitation was not conducting an audit of resources available that supports the use of appropriate infection control guidelines.

5. Conclusion

The present audit showed an overall good adherence with the “institution recommended infection control guidelines,” among the clinical dental students due to continuous guidance by the clinical supervisors of the institution.

References

[1] Dagher J, Sfeir C, Abdallah A, Majzoub Z. Infection control measures in private dental clinics in Lebanon. International journal of dentistry, May 31; 2017.

- [2] Alharbi G, Shono N, Alballaa L, Aloufi A. Knowledge, attitude and compliance of infection control guidelines among dental faculty members and students in KSU. *BMC Oral Health*. 2019, 19(1):1-8.
- [3] Muhammad Humza Bin Saeed, Shakeel Kazmi, Faisal Moeen, Yusuf Bhatti. Clinical Audit and Its Role in the Practice of Dentistry. *J. Islam. Int. med. Coll.* 2013; 8(3):110-114.
- [4] What is clinical audit? 2009 UH Bristol Clinical Audit team.www.uhbristol.nhs.uk.
- [5] A Practical Guide to Clinical Audit. QPSD-D-0291 www.researchgate.net.
- [6] Sukumaran P, Pin CW, Hong OZ, Mariam A. An audit of infection control practices amongst dental students in University of Malaya, Malaysia. *Archives of Orofacial Science*, 12(1), Jan. 2017.