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Study of Infection Control Procedures among Dental Clinics: A Pilot Study

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Abstract

Aim: To analyze the level of knowledge, attitude, and practice among dental practitioners working in dental clinics towards standard infection control protocol.

Materials and methods: This pilot study was a cross-sectional survey conducted on 42 dental practitioners working in Jaipur, Rajasthan. A questionnaire with three parts (knowledge, attitude, and practice) was filled by direct interview or by email to the participants. The answers was compiled and subjected to analysis.

Results: The survey was completed by 42 (70%) of 60 potential respondents. The mean ± SD scores of knowledge, attitude, and practice towards standard isolation precautions were 8.24 ± 1.39, 39.45 ± 3.76, and 4.19 ± 2.46 from the maximum scores of 10, 50, and 10, respectively.

Conclusion: Isolation protocol is loosely followed among dental professionals. Having knowledge and positive attitude towards infection control guidelines did not guarantee that the same were followed.

Introduction

Cross-infection is defined as the transfer of micro-organisms like bacteria and viruses between patient and clinician in a working area. This transfer of infection can occur between individuals, or through the instruments. There is no question about the necessity of infection control protocol among dental clinicians [1,2].

Dentists are exposed to a variety of infectious materials like saliva or blood contaminations, operating instruments and environment including air and water. Dental clinicians, support staff and patients are constantly at risk of hepatitis B, C and HIV cross infection. Studies show that the percentage of patients developing hepatitis B and HIV following needle stick injuries is 20.0% and 0.4% respectively [3]. Dental practitioners are, therefore, at high risk while treating patients. Many infections can be transmitted in the dental set up because of contact, aerosol formation, or contaminated instruments [4].

Therefore, the aim of this questionnaire study was to assess the knowledge, attitude and practice of infection control protocol among dental practitioners.

Materials and Methods

This cross sectional study was started as a questionnaire study of infection control protocol followed in various dental clinics in Jaipur city, Rajasthan, India. To understand the procedures employed in the dental practice, to prevent cross contamination and to judge the knowledge and attitude towards the same, a questionnaire was prepared. The study population included dentists (60) working in Jaipur, Rajasthan in a clinical set up. The questions were divided into 5

different sections and responses were collected from dentists either by direct interview or by emailing the questionnaires.

- I section: Knowledge, attitude and practice protocol.
- II section: Time since last servicing of sterilization devices.
- III section: Important Infectious agents.
- IV section: Time of use of sterilized instruments.
- V section: Preferred method of sterilization.

Once the responses were received, the data was compiled and subjected to statistical analysis.

Statistical Analysis

All statistical analyses was performed using the SPSS software package (SPSS for Windows 10, IBM SPSS Statistics 20.Ink, Chicago). Descriptive data that included arithmetic mean, standard deviation and range values were calculated for each variable as well as for each group.

Method of assessment

Answers	Yes	No	I don't know
Scores	1	0	0

Table 1: Questions on knowledge had 3 possible answers.

Thus, zero (no correct answers) to ten (all answers correct) was the range for final scores of knowledge (Table 1).

Similarly, Attitude assessment questions had 5 possible answers (very high, high, intermediate, low, and no importance), with scores 5 to 1 respectively. Therefore, the total score ranged from ten (all

questions regarded as "not important") to 50 (all questions regarded as "very important"). Responses "very high" or "high" were regarded as a positive attitude.

Similarly, practice assessment had 5 possible answers (always, often, sometimes, seldom, and never). One point was given to correct and zero points for all other answers. Hence, final scores for practice ranged from zero (no correct answers) to ten (all answers correct).

Results

The response rate was 70%. Out of the 60 questionnaires mailed and interviewed, response could be obtained from 42 respondents. The gender statistics showed 16 female and 26 male respondents (Table 2A).

Gender	Frequency	Percent
Female	16	38.1
Male	26	61.9
Total	42	100.0

Table 2A: Gender distribution of study sample.

Response from the questionnaire (Table 2B) showed that mean score for knowledge was 8.24 ± 1.39 (on a scale of 10). Mean score for attitude was 39.45 ± 3.76 (on a scale of 50). Mean score for practice was 4.19 ± 2.46 (on a scale of 10).

Questions	Practice	Knowledge	Attitude
Washing hands before and after using gloves			
Washing hands when unwanted contact with blood, body fluids, excretions, and contaminated items had occurred			
Wearing gloves before touching mucous membranes and non-intact skin			
Wearing goggles to protect mucous membranes of the eyes during procedures that are likely to generate splashes or sprays of blood and body fluids			
Washing hands with povidone iodine (Betadine) after contact with patients during procedures and activities that are likely to generate splashes or sprays of blood and body fluids			
Wearing a surgical mask and gown to protect nose, mouth and body during procedures and activities that are likely to generate splashes or sprays of blood and body fluids			
Bending needles before disposal			
Preoperative and operative mouth rinses, use of high volume suction and rubber-dam.			
Improving the quality of dental unit waterlines			

Table 2B: Questionnaire (knowledge, attitude and practice of dentists).

Time since the last servicing of the sterilization devices:

- 1 week
- 4 weeks
- 6 weeks
- 12 weeks

Table 2C shows the difference between knowledge, attitude and practice among the male and female practitioners. Results showed statistically significant difference in the knowledge between males and females (M>F; p=0.000). The attitude and practice of female practitioners was found to be better than males, though, statistically insignificant.

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Knowledge	8.776	0.005	-4.308	40	0	-1.596	0.37	-2.345	-0.847
Attitude	0.378	0.542	-0.95	40	0.348	-1.135	1.195	-3.55	1.28
Practice	21.557	0	0.121	40	0.904	0.096	0.792	-1.504	1.696

Table 2C: Comparison of questionnaire scores vs. gender.

The frequency of correct answers was lowest for question 6 in all the 3 categories.

45.2% of dentists serviced the sterilization devices in a week. 66.7% of the respondents considered HIV, HBV, HCV and *Mycobacterium tuberculosis* as the infectious agent to prevent cross contamination and

infection during the treatment. Almost 91% of the respondents were of the opinion that the sterilized instruments should be used within a week of packaging. 54.8% of dentists considered autoclaving and disinfectant treatment of the instruments whereas 26.2% preferred running the water line for 30 seconds before starting the treatment in addition to autoclaving and disinfection. However, 19% of work place had no preferred protocol for disinfection (Tables 3-6).

	Frequency	Percent	Valid Percent	Cumulative Percent
1 week	19	45.2	45.2	45.2
4 weeks	8	19	19	64.3
>12 weeks	15	35.7	35.7	100
Total	42	100	100	

Table 3: Time since last servicing of sterilization devices.

	Frequency	Percent	Valid Percent
HIV, HBV, HCV, MT	42	100	100
NG, TP, PA, LP	14	33.3	33.3
Total	42	100	100

Table 4: Infectious agents considered important by the participants.

Week	Frequency	Percent	Valid Percent	Cumulative Percent
1	38	90.5	90.5	90.5
4	4	9.5	9.5	100
6	-			
12	-			
>12	-			
Total	42	100	100	

Table 5: Time of use of sterilised instruments.

	Freque ncy	Perce nt	Valid Percent	Cumulative Percent
Autoclaving	15	35.7	35.7	35.7
Disinfectant	8	19.1	19.1	54.8
Run water 30 sec	-			-
Run water 30 sec^{+} autoclave $^{+}$ disinfection	11	26.2	26.2	81
No preferred procedure	8	19	19	100
Total	42	100	100	

Table 6: Use of dental hand piece and other devices attached to air and waterlines.

Discussion

This study showed that infection control protocols were not followed properly among the dental practitioners. Though, the knowledge and attitude was good, the compliance was poor. Similar results have been obtained in other studies [5-12]. The discrepancy between knowledge and attitude could be due to inadequate supply of protective gear, lack of protocol for biomedical waste disposal and carelessness [13,14].

No correlation was found between levels of knowledge and practice. This suggests that in spite of the knowledge and positive attitude towards infection control protocol, the same is not put to practice. Attitude and practice of female practitioners was better than males. However, the result was not statistically significant. This finding is similar to that of Askarian et al. [6] Rai et al. [15] concluded from his study that there is a clear need to prepare a protocol for instrument sterilization, proper and safe disposal of waste and immunization of dentist against hepatitis B. Similar conclusions were made by Elkarim et al. [16].

Cytomegalovirus (CMV), HBV, HCV, herpes simplex virus (HSV) type 1 and 2, HIV, *Mycobacterium tuberculosis*, *Staphylococci*, *Streptococci* and other viruses and bacteria [5] are infectious agents of concern in a clinical set up. The transmission can be direct through patient's saliva, blood or contact with skin, or indirect through injuries caused by sharp instruments, or by droplet infection from aerosols or splatter [17,18]. Thus, wearing gloves is very important because transmission of infection from the operator's hands to the patients, and from patient's blood or saliva to operator's hands can be prevented [7].

In this present study, 66.7% of the participants attributed importance to HIV, *Mycobacterium tuberculosis* and Hepatitis B-C viruses, respectively. However, all the microorganisms, listed in Table 3, are very important in dental practice. The dentists who participated in this survey, had inadequate knowledge of these microorganisms.

Most of the respondents used the sterilized instruments within a week of packaging. However, a significant aspect of this study was that 19% of work place had no preferred protocol for disinfection suggesting lack of proper sterilization protocol.

This study can be considered as a pilot study and further responses can be collected to have a bigger sample which can be more representative of Indian dental practitioners. A limitation of this study is the method of assessment of the dental practice. As work ethics of respondents could not be supervised, therefore, responses may not be true indicator of knowledge and attitude and, therefore, at real level practice protocol might be even poorer.

Our study shows that just having knowledge and positive attitude towards infection control protocol does not conform a good work. A structured program tailored for infection control needs of clinicians to be prepared and strict infection control policies to be formulated to reduce such hazards. Hepatitis B immunization should be made mandatory for all the health care professionals and booster dose should also be taken at required intervals after checking antibody titre. Needle stick injuries should be recorded and a proper protocol should be followed in such situations. Tetanus toxoid injections should be considered for patients, dental clinicians and support staff who deal with sharp instruments and wires. An important aspect highlighted by this study is lack of uniform sterilization protocol among the dentists. A strict and regular check by the governing bodies can bring about the change in the present status of infection control.

Conclusion

Infection protocol is loosely followed among dental professionals. Having knowledge and positive attitude towards infection control guidelines did not confirm that the same were followed. Efforts should be made by dental professionals to improve the standard of oral care.

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