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Knowledge and attitude about infection control in dental practice among dental undergraduate students in Davangere city: A cross sectional survey

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Abstract

Background: Dental clinic is an environment which poses potential risk for disease transmission both for dentists and their patients. Hence a study was planned to assess knowledge and attitude of undergraduate dental students in Davangere city about infection control in dental practice.

Methods: A descriptive cross-sectional survey was conducted among 258 undergraduate dental students in Davangere city. A 21-item prevalidated structured close ended questionnaire was administered to the participants. Data was analyzed using chi-square test. Statistical significance was set at $p \leq 0.05$.

Results: Out of 258 participants, 62% were females and belonged to third year (54%). Majority of them had good knowledge (>90%) about infection control in dental practice and more than 90% believed that dentists had a risk of acquiring HIV and Hepatitis infection and felt hepatitis vaccination was mandatory. More than 80% of them used gloves, face masks, head cap and gown, washed hands before and after examining patient and were willing to implement and follow the infection control procedures in clinical practice. However, majority did not wear eye protective glasses (>80%) and 90% had experienced non-sterile occupational percutaneous injury which was a cause of concern.

Conclusion: The knowledge of dental undergraduate students about infection control measures in dental practice was good. However, many reported non-sterile occupational injuries during clinical practice.

Keywords: Infection control, dental, knowledge, undergraduates, attitude

1. Introduction

The dental clinic is an environment where disease transmission occurs easily. Dentists are more prone to infection due to their direct contact with blood and saliva on a daily basis in their offices. Cross infection can be defined as the transmission of infectious agents between patients and staff in a clinical setting^[1]. Infection can be established when subsequent factors are present like a patient having active viral or bacterial diseases, individuals without any prior vaccination or no immunity against pathogen and a path through which the causative microorganism can easily enter the host^[1]. Transmission of pathogens can be of two types: Direct or Indirect. Direct transmission of pathogens to host can occur during examining of the oral cavity with bare hands and when contact is made with blood/serum of infected patients. Indirect transmission can occur through contact with contaminated needle, dental units, surfaces, or improperly sterilized instruments^[1]. Dental health care professionals (DHCPs) are at risk of infections caused by various microorganisms Such as Mycobacterium tuberculosis, hepatitis B and hepatitis C viruses, staphylococci, streptococci, Herpes simplex virus types 1, human immunodeficiency virus (HIV), mumps, influenza, and rubella.¹Infection transmission can easily occur in routine dental practice. Therefore, protection from cross infection in the dental setup is a critical aspect of dental practice^[2]. Infections can be prevented using safety precautions and implementing infection control guidelines in addition to vaccination and proper post-exposure management. Dental schools are responsible for providing appropriate infection control measures, proper training of dental students to protect patients, and for the establishment of safer work conditions. Dental education can play a significant role in the training of dentists by helping them to adopt adequate knowledge and attitudes related to

infection control procedures. Literature search revealed no study which has tried assess the knowledge and attitude towards infection control among undergraduate dental students in Davangere city. Hence an attempt was done to assess the knowledge and attitude towards infection control among undergraduate dental students in Davangere city.

2. Methodology

A Descriptive, Cross-sectional questionnaire survey was done involving 258, third and final year undergraduate students of dental colleges in Davangere city. The data was collected from the participants at their college premises. All third year and final year dental undergraduates of Davangere city who consented to participate were involved in the study. Ethical approval was obtained from the Institutional Review Board of college where the study was conducted. Voluntary written informed consent was obtained from the study participants after explaining them about the purpose of conducting the survey and procedure of collecting the data through participant information form.

2A. Details of questionnaire

A pre-validated questionnaire was selected from studies done previously. Questionnaire consisted of two sections. First section was designed for collecting demographic characters. Second section consisted 21 closed-ended items to assess the knowledge (8 items) and attitude (13 items). The responses were put on 3 point scale as yes, no and don't know.

2B. Administration of questionnaire

The self-administered questionnaire was distributed to third year and final year undergraduate students by an investigator in their respective lecture classes. They were instructed not to discuss any answers with their friends or colleagues and were instructed to approach investigator if they had any doubts pertaining to questionnaire. They were given 30 minutes to answer the questionnaire after which, the questionnaire was collected back by checking for the complete response.

2C. Statistical analyses: The data obtained was compiled systematically in Microsoft Excel sheet and subjected to statistical analysis using Statistical Package for Social Sciences Software version 20. Descriptive statistics was used to summarize the demographic information in terms of frequencies or percentages. Chi-square test was used to compare categorical variables. Statistical significance was set at $p < 0.05$.

3. Results

Majority of them had good knowledge (>90%) about infection control in dental practice and majority (>90%) believed that dentists had a risk of acquiring HIV and Hepatitis infection. More than 90% of them responded that hepatitis vaccination was mandatory for all dental practitioners, disinfection of dental clinic was important to prevent cross-infection among patients and dental practitioners, were aware of the universal/standard precautions and use of personal protective barriers during clinical procedures and proper isolation during treatment was important for infection control during dental treatment procedures. Gender-wise and year-wise comparison revealed no significant differences ($p > 0.05$) in the responses. (Table 1) (Table 2) More than 80% of them used gloves, face masks, head cap and gown, washed hands before and after examining patient and were willing to implement and follow the infection control procedures in private practice however, majority did not wear eye protective glasses (>80%) which was a cause of concern. More than 50% were not sure of treating patients with infectious diseases. Majority of females (>45%) had experienced more blood or saliva splashes to eyes compared to male students. Many students reported of being vaccinated for Hepatitis B ($n > 60%$) Many students responded that they were not tested for post-HBV immunization. Around 30 % reported of not being vaccinated and they did not take a thorough history of the patient to rule out HIV/HBV status (>40%). They had experienced non-sterile occupational percutaneous injury (around 90%) which was a cause of concern. (Table 3) (Table 4).

Table 1: Gender -wise distribution of knowledge related responses

Item no	Question	Gender	Percentage of response			Chi square value (χ^2) (p-value)
			Yes	No	Not sure	
1	Do you think hepatitis vaccination is mandatory for all dental practitioners?	Male	100	0	0	0.85 (0.15)
		Female	99	1	0	
2	Do you think disinfection of dental clinic is important to prevent cross-infection among patients and dental practitioners?	Male	97	3	0	0.12 (0.08)
		Female	99	1	0	
3	Dentists are at risk of acquiring which of the following diseases while treating patients?	Male	HBV 105	HIV 85	TB 3	0.22 (0.2)
		Female	90	76	59	
4	Which of the following diseases has the highest risk of transmission in the dental setting?		HBV	HIV	TB	7.12 (0.7)
		Male	61	68	6	
		Female	72	67	4	
5	Are you aware of the universal/standard precautions and use of personal protective equipment's?	Male	97	3	0	1.7 (0.6)
		Female	93	7	0	
6	Do you agree that all patients to be treated as potentially infectious?	Male	91	9	0	1.62 (0.12)
		Female	97	3	0	
7	Do you think proper isolation during treatment is important for infection control in dentistry?	Male	91	9	0	8.7 (0.13)
		Female	99	1	0	
8	Are you aware of Post Exposure Prophylaxis (PEP)?	Male	95	5	0	0.95 (0.3)
		Female	98	2	0	

HBV-Hepatitis B Virus, HIV- Human Immuno deficiency virus, TB -Tuberculosis

Table 2: Student-wise distribution of knowledge related responses

Item No	Question	Year of Under graduation	Number of Responses			Chi square value (χ^2) (p-value)
			Yes	No	Not sure	
1	Do you think hepatitis vaccination is mandatory for all dental practitioners?	3 rd Year	97	1	2	2.57 (0.27)
		4 th Year	95	0	5	
2	Do you think disinfection of dental clinic is important to prevent cross-infection among patients and dental practitioners?	3 rd Year	98	2	0	0.7 (0.4)
		4 th Year	98	2	0	
3	Dentists are at risk of acquiring which of the following diseases while treating patients?	3 rd Year	HBV	HIV	TB	0.8 (0.6)
			98	67	35	
4 th Year	97	95	27			
	46	67	10			
4	Which of the following diseases has the highest risk of transmission in the dental setting	3 rd Year	46	67	10	11.1 (0.12)
		4 th Year	88	73	10	
5	Are you aware of the universal/standard precautions and use of personal protective equipment's?	3 rd Year	91	9	0	16.6 (0.11)
		4 th Year	99	1	0	
6	Do you agree that all patients to be treated as potentially infectious?	3 rd Year	94	6	0	3.1 (0.3)
		4 th Year	94	6	0	
7	Do you think proper isolation during treatment is important for infection control in dentistry?	3 rd Year	97	2	0	3.27 (0.29)
		4 th Year	93	8	0	
8	Are you aware of Post Exposure Prophylaxis (PEP)?	3 rd Year	97	3	0	0.9 (0.37)
		4 th Year	96	4	0	

HBV-Hepatitis B Virus, HIV- Human Immuno deficiency virus, TB -Tuberculosis, *statistically significant

Table 3: Gender-wise distribution of attitude related responses

Item no	Question	Gender	Number of Responses			Chi square value (χ^2) (p-value)
			Yes	No	Not sure	
9	Have you been vaccinated for HBV	Male	61	39	0	3.12 (0.2)
		Female	92	8	0	
10	Have you been tested for post-HBV immunization?	Male	58	42	0	2.12 (0.3)
		Female	37	63	0	
11	Do you take a thorough history of the patient to rule out HIV/HBV status?	Male	21	79	0	1.5 (0.5)
		Female	50	50	0	
12	Do you use gloves, face masks, head cap, gown?	Male	83	17	0	5.49 (0.13)
		Female	94	6	0	
13	Do you use eye protection wears?	Male	18	82	0	3.02 (0.08)
		Female	4	96	0	
14	Do you change your gloves between patients?	Male	89	11	0	6.05 (0.12)
		Female	80	20	0	
15	Do you wash your hands before and after examining patient?	Male	100	0	0	5.16 (0.16)
		Female	100	0	0	
16	Did you have any non-sterile occupational percutaneous injury?	Male	91	9	0	2.45 (0.28)
		Female	97	3	0	
17	Did you have any blood or saliva splashes to your eyes?	Male	10	90	0	9.31 (0.03) *
		Female	49	51	0	
18	Do you bend used needles before disposal?	Male	76	24	0	2.77 (0.4)
		Female	87	13	0	
19	Do you follow proper biochemical waste disposal methods? (Colour coded bins)	Male	90	10	0	2.87 (0.57)
		Female	94	6	0	
20	Are you willing to treat patients with infectious diseases?	Male	13	7	80	2.77 (0.4)
		Female	63	7	30	
21	Are you willing to implement and follow the same infection control procedures which are taught in your college in your private practice?	Male	91	9	0	2.77 (0.4)
		Female	95	5	0	

HBV-Hepatitis B Virus, statistically significant

Table 4: Year-wise distribution of attitude related responses

Item no	Question	Year of under graduation	Number of Responses			Chi square value (p-value)
			Yes	No	Not sure	
1	Have you been vaccinated for HBV	3 rd Year	67	33	0	10.4 (0.11)
		4 th Year	86	14	0	
2	Have you been tested for post-HBV immunization?	3 rd Year	40	60	0	25.3 (0.00)
		4 th Year	55	45	0	
3	Do you take a thorough history of the patient to rule out HIV/HBV status?	3 rd Year	43	57	0	5.9 (0.01)*
		4 th Year	28	72	0	
4	Do you use gloves, face masks, head cap, gown?	3 rd Year	89	11	0	18.1

		4 th Year	88	12	0	(0.12)
5	Do you use eye protection wears?	3 rd Year	10	90	0	0.01
		4 th Year	12	88	0	(0.92)
6	Do you change your gloves between patients?	3 rd Year	80	20	0	20.9
		4 th Year	89	11	0	(0.13)
7	Do you wash your hands before and after examining patient?	3 rd Year	100	0	0	0.05
		4 th Year	100	0	0	(0.81)
8	Did you have any non-sterile occupational percutaneous injury?	3 rd Year	90	10	0	3.26
		4 th Year	88	12	0	(0.07)
9	Did you have any blood or saliva splashes to your eyes?	3 rd Year	35	65	0	3.4
		4 th Year	24	76	0	(0.06)
10	Do you bend used needles before disposal?	3 rd Year	85	15	0	1.58
		4 th Year	78	22	0	(0.2)
11	Do you follow proper biochemical waste disposal methods? (Colour coded bins)	3 rd Year	96	4	0	3.41
		4 th Year	88	12	0	(0.06)
12	Are you willing to treat patients with infectious diseases?	3 rd Year	46	4	50	1.35
		4 th Year	30	10	60	(0.24)
13	Are you willing to implement and follow the same infection control procedures which are taught in your college in your private practice?	Male	91	9	0	2.77
		Female	95	5	0	(0.4)
HBV-Hepatitis B Virus, *statistically significant						

4. Discussion

The results of the study indicated that majority of undergraduate third and final year students had good knowledge about infection control in dental practice and many believed that dentists had a risk of acquiring HIV and Hepatitis infection. Similar findings were seen in a study [3]. However contradictory findings were observed in some studies where knowledge of dental undergraduate students was poor [4, 5, 6, 7]. Many of them responded that hepatitis vaccination was mandatory for all dental practitioners, disinfection of dental clinic was important to prevent cross-infection among patients and dental practitioners, were aware of the universal/standard precautions and use of personal protective barriers during clinical procedures and proper isolation during treatment was important for infection control during dental treatment procedures. Gender-wise comparison revealed no significant differences in knowledge and attitude related responses.

Immunization: Around 30% reported of not being vaccinated which was a cause of concern. In a similar study, 61.2% of undergraduate students in a dental school in central India were not vaccinated for HBV even though it was mandatory [4]. Many were not tested for post immunization results through serology in the present study. Similar result was observed in a study [8]. A study done by McCarthy *et al.* and Britton's study, highlighted a significant proportion of participants who failed to confirm the adequacy of post immunization anti-HB titer [9]. Since HBV immunization does not always lead to a sufficient response, students might have a false feeling of safety even if they did not have an adequate antibody titre in them.

Protective barriers: Majority wore protective barriers like mouth mask, head caps and gowns. However, the compliance in wearing protective eye wears was less. Similar result was observed in a study [8]. However use of PPE was high among all the students which was in accordance with study done by Freire *et al.* [10]. Students should be reminded that avoidance of protective eyewear puts them at risk of transmission of infectious diseases through exposed membranes. Studies have shown that aerosol and splatter containing pathogens can contaminate clinical wear, targeting the chest and forearms and remain alive for several days [11, 12]. It has been recommended that dental uniforms be worn only in dental

clinics, changed daily and immediately after a blood splatter to prevent cross contamination and uniforms should be washed separately. If possible, disposable gowns should be preferred [13].

Exposure to infection: Many students had experienced blood or saliva splashes to eye and had experienced non-sterile occupational percutaneous injury in the present study. Similar results were observed in studies done by McCarthy and Britton who reported 82% accidental injuries [9]. Recapping the needles with both hands was found to be the most common cause of percutaneous injuries [14]. Non-sterile occupational injuries may pose a risk of transmission of bloodborne pathogens especially HBV, C and HIV [15]. Post exposure management program for non-sterile occupational injuries during the students' clinical training may bring down the risk of infection among students.

The subjective assessment method of the survey limited us in not supervising the responders' practice hence, responses might have not accurately reflected the true knowledge, attitude, and compliance of students. There was absence of qualitative data that could have aided in understanding the thoughts and feelings of the research participants. The study at best provided the baseline data to help design educational programs for dental students to practice infection control measures and assess its effectiveness.

4. Conclusion

The knowledge of dental undergraduate students about infection control measures in dental practice was good. Many suffered Non-sterile injuries during clinical practice which was a cause of concern.

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