


Research Article

Infection Control Knowledge and Practices among Dentists in the Outpatient Department of a Dental College Hospital

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Abstract

Background: Dental surgeons are vulnerable to infection caused by various microorganisms. The outpatient department is the most important place, as here come many infected patients, so there is a chance that the infection will spread very easily. Taking precautions to control infection in this department plays an important role to prevent spreading infections.

Methods: A cross-sectional study was conducted from January to December 2020 to evaluate the infection prevention and control in Dhaka Dental College and Hospital. A convenient sampling technique was used, and data was collected from 209 dental surgeons. The sample was calculated using the Cochran formula for sample for calculation in a smaller population. All the questions of knowledge had been modified and developed from the Infection Prevention and Control National Guideline and the Centre for Disease Control and Prevention Guideline in Dental Settings. All the questions regarding practice had been modified and developed from the World Health Organization Infection Control Guideline and 5 pillars of infection control practice.

Results: Most respondents (52.2%) were in the 20–24-year age group, with an average age of 24.77 years (± 1.250). Among the respondents, 51.4% of female dental surgeons had good knowledge in comparison to males, which was 48%. Among male respondents, only 51.0% had fair knowledge in comparison to female respondents, which was 48.6%. An association between the level of education and level of knowledge was statistically significant ($X^2 = 10.168$, $p = 0.006$). Among the respondents 25.7% of post graduate had good knowledge. On the other hand, 54.6% graduate had good knowledge. Among 209 respondents, only 48.3% respondents were good $\geq 80\%$ in infection control practices and significantly associate between knowledge level and practices level, $p < 0.05$. Participants with good knowledge of infection control also demonstrated good practice scores. However, only 16.2% respondents scoring fair according to knowledge level but according to practice level each of them was poor about infection control practice. Among respondents practices score was significantly higher in female and in graduate than male and post-graduate.

Conclusion: Study findings indicate that awareness and practice of current infection management among dental surgeons in this hospital was good and most likely right. Simple specific prevention measures can minimize the occurrence and prevalence of any infections.

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Introduction

Different microorganisms can cause infection in dental specialists. Presently, it is really testing that the patient must be recuperated and furthermore, he must be kept from infection and other disease. They become much more significant as a general medical condition with expanding financial and human effect on account of expanding numbers and swarming of individuals, more incessant hindered invulnerability, new microorganisms, expanding, bacterial, and protection from anti-toxins. Contamination control is a logical methodology and commonsense arrangement intended to forestall hurt brought about by disease to patients and wellbeing laborers. World Health Organization (WHO) gauge that over 1.4 million individuals experience the ill effects of nosocomial disease at any one time, with the extent of these planned contamination being up to multiple times higher in low and middle-income pay nation [1]. Approximately 1.7 million healthcare-associated infections (HAIs) occur in the United States each year. Hospital infection control programs are nearly universal in developed nations and have significantly lowered the risk of acquiring a HAI since their inception in the mid-20th century. As we debate the preventability of HAIs, as well as the ethical and logistic aspects of patient safety, it is important to recall the historical context of hospital infection control. Public health infectious disease contexts are relevant to hospitalization and we examine 4 time periods in the last half-millennium: medieval, early modern, progressive and post-World War II. For each time frame, hospitalization-associated infectious diseases are discussed, and a hypothetical infection control agenda is presented. The selection of time periods is arbitrary but is designed to provide a representative overview of infections in hospitals through the century [2]. The outpatient department is the most important place, so taking precautions to control infection in this department plays an important role to prevent spreading infections.

Transmission of infection in health care facilities can be prevented and controlled through the application of basic infection control precautions which can be grouped into standard precautions, which must be applied to all patients at all times, regardless of diagnosis or infectious status, and additional (transmission based) precautions which are specific to modes of transmission (airborne, droplet and contact). Standard precautions treating all patients in the health care facility with the same basic level of "standard" precautions involves work practices that are essential to provide a high level of protection to patients, health care workers and visitors. These include the following: Hand washing and antisepsis (hand hygiene) Use of personal protective equipment when handling blood, body substances, excretions and secretions. Proper handling of patient care equipment and soiled linens, prevention of needle stick and sharp injuries, effective environmental cleaning and spill management, and

correct waste disposal [3]. In hospital setting utilization of 5 pillars regarding infection control can play an important role to establish standard precautions and additional precaution that includes: Isolation of patients and barrier precautions,

Decontamination of items and equipment's, prudent use of antibiotic, hand hygiene, decontamination of environment, infection control prevents or stop the spread of infection in dental settings. This site includes an overview of how infections spread, ways to prevent the spread of infection, and more detailed recommendation by type of healthcare settings [4].

Methods and Materials

The descriptive cross-sectional study design was used to explore the dental surgeon's knowledge and practice regarding Infection Control in Dhaka Dental College Hospital, Dhaka, and study period was extended from January 2020 to December 2020. The study was conducted in Dhaka Dental College Hospital. Dhaka Dental College is the largest dental educational institution in Bangladesh. It was the first dental college of East Pakistan, established in August 1961, and it is the only government dental college in Bangladesh with a 200-bed hospital situated at Mirpur 14, Dhaka. According to the calculation, 209 respondents (dental surgeons) were required to collect data from Dhaka Dental College Hospital. Respondents completed and returned 209 out of 209 questionnaires (100% response rate). A convenient sampling technique was used to collect information. For this, a pretested semistructure questionnaire was used. Inclusion criteria were BDS doctors working as a dental surgeon in the outpatient department of Dhaka Dental College and Hospital for at least 6 (six) months earlier than the data collection period, having roles and responsibilities connected with direct patient care, and dental surgeons who are willing to participate and giving informed written consent. The exclusion criteria were dental surgeons who were not willing to participate in the study. Data were obtained through a pretested, semi-structured questionnaire. Convenient sampling technique was used and BDS doctors working as dental surgeon in outpatient department of Dhaka Dental College and Hospital for at least 6 (six) months earlier than data collection period had roles and responsibilities connected with direct patient care. Dental surgeons who were willing to participate and gave informed written consent were included in the study and those who were not willing to participate were excluded from this study. All data were processed through computer program (SPSS version 23). Data were analyzed using descriptive and inferential statistics.

Results

This cross-sectional study was carried out among 209 dental surgeons to identify the infection control knowledge and practice in a Dental College Hospital, Dhaka. The

respondents were interviewed face-to-face by using a pre-tested, semi-structured questionnaire. In addition, an observational checklist was used to observe the current awareness and practice of that hospital. This resulted in a response rate of 100%.

The respondents (52.2%) were from the 20–24-year age group. Rest of them, 47.8% respondents was from 2530 years age group. The mean age of the respondents was 24.77 (± 1.250) years. The majority of the respondents (51.20%) were female, and the rest of them (48.80%) were male. The majority of respondents (83.3%) were Bachelor of Dental Surgeons; the rest of them (16.7%) were postgraduates. [Table 1]

Table 1: Distribution of the study according to sociodemographic characteristics of patients (n=209).

Distribution of age		
20-24	109	52.2
25-30	100	47.8
Mean \pm SD	24.77 \pm 1.250	
Sex		
Male	107	51.2
Female	102	48.8
Educational Qualification		
BDS	174	83.3
Post-graduation	35	16.7
Religion		
Muslim	184	88
Hindu	25	12

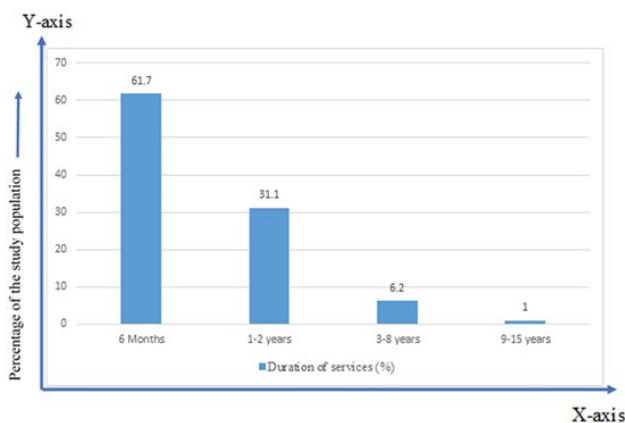


Figure 1: Distribution if respondents according to duration of service.

Almost half of the respondents, 61.7%, had duration of service within 6 months, 31.1% had from 1-2 years, 6.2% had from 3-8 years, and the rest of them, only 1%, had from 9-15 years. [Figure 1].

99.5% of respondents knew about infection control, 81.3% agree that triage was important, 92.3% knew about standard guidelines, 100% wash hands before and after examination, 100% prefer mouth rinse before treatment, 100% think isolation was important, 89.5% think ineffective sterilization can transmit infection, and 90% think that apart from instrument sterilization, disinfection of dental units is required. [Table 2].

Table 2: Distribution of the respondent’s having knowledge regarding infection control (by answering Yes/No question).

Name of the variables	n (%)	n (%)
Know about infection control	208(99.5)	1(0.5)
Think triage is important	170(81.3)	39(18.7)
Know about standard guideline	193(92.3)	16(7.7)
Wash your hand before and after patient examination	209(100)	0(0)
Prefer oral mouth rinse before treatment	209(100)	0(0)
Think isolation is important	209(100)	0(0)
Think ineffective sterilization can transmit infection	187(89.5)	22(10.5)
Apart from instrument sterilization, disinfection of dental chairs, clinics is required	188(90)	21(10)

Respondents out of 209 dental surgeons, 49.8% had either fair or good knowledge, and only 0.4% had poor knowledge. Knowledge levels were calculated using 3 points of a Likert scale. Participants who scored (50%) leveled as poor, (51%-79%) as fair, and (80%) as good. [Table 3].

51.4% female dental surgeons had good knowledge, and 48.6% had fair knowledge in comparison to male. Among male respondents, 48% had good and 51.0% had fair knowledge. [Table 4]

Table 3: Distribution of the respondent’s knowledge level.

Knowledge Level	Frequency	Percentage
Poor ($\leq 50\%$)	1	0.40%
Fair (51%-79%)	104	49.80%
Good (80%)	104	49.80%
Total= 209		

Table 4: Distribution of respondent’s knowledge level according to gender (n=209).

	Knowledge level			
	Poor ($\leq 50\%$)	Fair (51%-79%)	Good ($\geq 80\%$)	
Male	1(1.0%)	52(51.0%)	49(48%)	102
Female	0(0%)	52(48.6%)	55(51.4%)	107
Total	1(0.4%)	104(49.8%)	104(49.8%)	209

The poor group contained less than 5 members; Fisher’s exact test was done. There was an association between the level of education and level of knowledge that was statistically significant ($X^2 = 10.168, p=0.006$). Besides, among 209 respondents, 74.3% of postgraduates had fair knowledge, and 25.7% of postgraduates had good knowledge. On the other hand, 44.8% of BDS had fair knowledge, and 54.6% had good knowledge among BDS. [Table 5]

90% of respondents mentioned that there was a vaccination facility for dental surgeons, 68.4% received the hepatitis B vaccine, 94.7% counseled patients about completion of an antibiotic course, 82.3% participated in waste management, 71.3% used color-coded bins, 83.3% mentioned that authority informed them about infection control guidelines, and 93.8% followed infection control guidelines. 100% of respondents agreed that dental surgeons were at high risk of contracting infectious disease, and 100% agreed that effective infection control measures can reduce the risk of infectious disease. [Table 6]

Practice regarding infection control: 63.2% of respondents always maintained hand hygiene, 92.3% always followed the five-step hand washing technique, 83.3% preferred isolation of infectious patients, and 33.5% used PPE. [Table 7]

According to observation and checklist, correct practices consisted of a score “1” and incorrect practice consisted of a score “0” for each question of the checklist. It was also obtained that the maximum score for practice was ≥ 32 , the medium range was (24-31), and the minimum score was ≤ 23 , according to the questions that were made within the observational checklist. Correct responses were summed up to get a total practice score for each participant. The practice scores were categorized into good ($\geq 80\%$), fair (59-79%), and poor ($\leq 59\%$). Among 209 respondents 16.3% respondents’ practices was poor ($\leq 59\%$) also 35.4% respondents’ practices was fair (59%-79%) and 48.3% respondents were good ($\geq 80\%$). [Table 8]

Table 5: Association between level of education and level of knowledge (n-209).

Level of knowledge	Level of education		Total	X ² , df	P-value
	BDS	Post-graduation			
Poor ($\leq 50\%$)	1(0.6%)	0(0.0%)	1(0.4%)		
Fair (51%-79%)	78(44.8%)	26(74.3%)	104(49.8%)	10.168, 2	0.006
Good ($\geq 80\%$)	95(54.6%)	9(25.7%)	104(49.8%)		

Table 6: Distribution of the respondent’s practices regarding infection control (by answering Yes/No question) (n-209)

Name of the variables	Yes		No	
	N	%	N	%
Dental surgeons at high risk of infection	209	100	0	0
Agree with effective infection control measures can reduce the risk of infectious disease	209	100	0	0
Any vaccine facility for dental surgeons	188	90	21	10
Received hepatitis B vaccine	143	68.4	66	31.6
Counsel patient about completion of antibiotic course	198	94.7	11	5.3
Participate about waste management	172	82.3	37	17.7
Use color coded bin for waste segregation	149	71.3	60	28.7
Authority informed about hospital infection control guideline	174	83.3	35	16.7
Follow infection control guideline	196	93.8	13	6.2

Table 7: Distribution of the respondent’s practices regarding infection control (by answering Always/Sometimes/Never question) (n-209).

Name of the variables	Always	Sometimes	Never
	n (%)	n (%)	n (%)
Maintained hand hygiene	132(63.2)	32 (15.3)	45(21.5)
Follow five step hand washing technique	193(92.3)	15(7.2)	1(0.5)
Isolate infectious patients	174(83.3)	4(1.9)	31(14.8)
Use personal protective equipment	70(33.5)	77(36.8)	62(29.7)

There was an association between the level of education of the respondents and level of practices that was statistically significant ($X^2 = 76.081$, p value = 0.001) between two groups. Out of 35 postgraduate respondents, 65.7% score poor, while only BDS doctors, 55.2%, score good, and 38.5% score fair practice. There was an association between maintained hand hygiene and practice level that was statistically significant ($X^2 = 151.326$, $p = 0.002$). There was an association between use of PPE and level of practices ($p = 0.001$, $X^2 = 168.373$) and statistically significant. There was an association between vaccination and level of practice ($X^2 = 106.699$, $p = 0.001$). [Table 9]

Discussion

Infection control is vital to the safe and effective treatment

Table 8: Distribution of respondent’s according to practices level of infection control (n-209).

Practice level	Frequency	Percentage
Poor ($\leq 59\%$)	34	16.30%
Fair (59%-79%)	74	35.40%
Good ($\geq 80\%$)	101	48.30%

of patients in the dental office. Proper dental instrument sterilization procedures are not just good policies; they can help prevent illness and even death. A study was conducted by Singh, in that study majority (92.2 %) of the students considered the importance of triage in infection control. In the present study 99.5% respondents know about infection control, 81.3% respondents think that triage is important to control infection [5]. In this study, among all of the respondents, 15.8% know about logistic required for triage. In the present study, 92.3% respondents know about standard guideline. Most germs that cause serious infections in healthcare are spread through people's actions. Hand hygiene is a great way to prevent infection. However, previous studies show that, on average, healthcare providers clean their hands less than half the time they should.

In the present study 100% respondents preferred mouth rinse before treatment, 100% respondents think isolation is important, on the other hand a previous cross-sectional study was conducted by Silva found that 72.05% of the students preferred to use oral rinsing before starting a treatment [6]. In previous study was conducted by Sharma, there are various methods of sterilization adopted by the respondents as most common (40.6%) was combination of autoclave and

Table 9: Association between level of education, maintain hand hygiene, Use PPE and vaccination (Hepatitis B) of respondents and level of practices (n-209).

Level of Practice	Level of education			X ²	df	P value
	BDS	Postgraduate				
Poor ($\leq 59\%$)	11(6.3%)	23(65.7%)		76.081	2	0.001
Fair (59%-79%)	67(38.5%)	7(20.0%)				
Good ($\geq 80\%$)	96(55.2%)	5(14.3%)				
Level of Practice	Maintain hand hygiene			X ²	df	P value
	Always	Sometimes	Never			
Poor ($\leq 59\%$)	21(61.8%)	0(0.0%)	13(38.2%)	151.326	4	0.002
Fair (59%-79%)	10(13.5%)	32(43.2%)	32(43.2%)			
Good ($\geq 80\%$)	101(100%)	0(0.0%)	0(0.0%)			
Level of Practice	Use of PPE			X ²	df	P value
	Always	Sometimes	Never			
Poor ($\leq 59\%$)	21(61.8%)	0(0.0%)	13(38.2%)	151.326	4	0.002
Fair (59%-79%)	10(13.5%)	32(43.2%)	32(43.2%)			
Good ($\geq 80\%$)	101(100%)	0(0.0%)	0(0.0%)			
Level of Practice	Vaccination (hepatitis B)		X ²	df	P value	
	Yes	No				
Poor ($\leq 59\%$)	3(2.1%)	31(47.0%)	106.699	2	0.001	
Fair (59%-79%)	40(28.0%)	34(51.5%)				
Good ($\geq 80\%$)	100(69.9%)	1(1.5%)				

boiling water. In the present study found 89.5% respondents think ineffective sterilization can transmit infection, 90% respondents think that apart from instrument sterilization, disinfection of dental units is required.

In the present study, about 94.3% know the elements of standard precaution; only 31.6% know the standard hand washing soap and 97.6% followed WHO hand washing step. Among 209 only 86.6% and 53.1% know accurate time and pressure for sterilization in autoclave [7].

About vaccination a cross-sectional study was conducted by Alharbi et al., found that higher percentages of dentists with 10 years of experience were not vaccinated. In the present study only 14.4% know which vaccine should be vaccinated [8].

In this present study 84.7% had knowledge about highest rate of transmission via saliva, 25.4% know immediate action in case of blood contact with a HIV patient and 39.7% know the Odds of transmission often single contaminated needle stick injury also 99% mentioned best type of disinfectant but a similar study was done by Puttaiah et al., was found that Stigma in treating HIV/AIDS patients was still a concern, an ethically troubling response suggesting the need for a stronger focus on educating dentists in subjects, such as dental safety, stigma and infectious disease [9].

In this study, there was an association between the level of education and level of knowledge were statistically significant ($X^2 = 10.168$, $df=2$, $p=0.006$). In this table shows that 74.3% of posts graduate had fair knowledge and 25.7% of post graduate had good knowledge. On the other hand, 44.8% BDS had fair knowledge and 54.6% had good knowledge among BDS. A previous study was found by Khanal & Singh that found there was a significant difference in the level of knowledge among the health care workers ($p < 0.05$) [10].

In the present study, 90% respondents mentioned that there had vaccination facility for dental surgeon and 68.4% received hepatitis B vaccine, Sah et al., found from their previous study only 48.4% of dental students answered that hepatitis B is the most common infection transmitted in the dental clinic [11]. 33.5% used PPE. In the present study, 69.4% respondents wash hand on mandatory moments, 65.1% usually wash hands with soap and water while on duty. A study was conducted that found, 70% of dental students use examination gloves for intra oral surgical procedures [12]. Personal protective equipment is the major barrier to protect infection, in the present study shows 83.3% respondents isolate the infectious patients, in this study, 33.5% respondents used PPE that include were gloves, gown, mask and cap, in which 30.6% wear gloves, 61.2% wear gown, 92.3% wear mask, 63.6% wear caps.

In the present study, that most of the respondents 85.6%

had done standard cleaning practice of dental items, for cleaning dental instruments to remove visible dust are used for operation, dressing, suture cutting 48.8% respondents were done correct practice. For sterile dental instruments 82.8% respondents done correct practice and 53.1% maintained accurate time pressure and temperature followed. In the study, 84.7% respondents used chemical materials for surface disinfection, 80.4% respondents' environment was created to minimize the risk of spreading infection in dental settings and 65.6% respondent proper minimum spacing maintained between multiple dental units.

Improper disposal of dental waste can harm the dentist, the people in the immediate vicinity of the dentist who handle the materials, the waste managers or the general public at large through the manufacture toxins through incineration. Regarding infection control, in the present study, P value was determined by Pearson correlation. Age was negatively associated with knowledge score but no significant association has been found and Age was negatively significantly associated with practice score.

A previous study by Halboub et al., was conducted where no significant statistical differences were found between mean practice scores towards age, years of experience, training course, and qualification ($f=1.482$, 2.625 , 0.129 , 0.727) respectively at $p < 0.05$ (0.220 , 0.051 , 0.720 , 0.484) respectively. Significant statistical differences were found in mean practice scores only in relation to gender, ($F = 8.569$) at $p < 0.05$ (0.004) [13]. The problems in infection control in the dental college hospital studied, including lack of services, inadequate equipment and supplies, can be explained by these limited healthcare resources. The learned dental college hospital is not easy to introduce, but overall management and setup for infection control is decent and hygienic. This study was limited by the self-report method of assessment of knowledge and practice of infection control.

Conclusion

Infections in dental practice can cause extremely lethal infections that can lead to death. Study findings indicate that the awareness and practice of current infection management among dental surgeons is good and most likely right. Simple specific prevention measures such as hand washing, use of personal protective equipment; dental surgeon vaccination can minimize the occurrence and prevalence of any infections. It is only important to train, supervise, empower and enforce infection control policy and efficient dental settings. In all the dental college hospitals and the sooner and better, it is high time the government came forward and enforce the basic infection prevention practices.

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