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Dental students' awareness about infection control procedures in qassim province

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Abstract
Background: The most susceptible people to infectious diseases in the work environment are healthcare professionals. The dental professional is repeatedly exposed to many microorganisms present in blood and saliva. As a consequence, the incidence of certain infectious diseases is higher among dental professionals than observed for the general population. The aim of this study, therefore, was to determine and compare the level of awareness about infection control procedures among junior and senior dental students at colleges of dentistry in Qassim Area.
Materials and Methods: The current study is a cross-sectional survey conducted in Qassim province among undergraduate dental students who attended dental colleges in this area (one public and two private dental colleges). Data collection started on February 2015.
Results: Out of the 345 participating students, 76.23 % were aware about the metods of transmission of hepatitis B virus, 91.67% of fifth year responded correctly. About 82.03% of the studied subjects knew that needle recapping minimizes the risk of injury during clinical procedures; most of them 97.22% were from fifth year level.
Conclusion: Senior students reported a greatest level of awareness about infection control procedures in comparison to their junior counterparts.

Keywords: infection control, dental students, qassim province

Introduction

Infection control, which is one of the most discussed topics in dentistry, has become such an integral part of the practice to the extent that dental health workers no longer question its necessity [1]. Dental care professionals are at an increased risk of cross infection while treating patients. This occupational potential for disease transmission becomes evident when one realizes that most human microbial pathogens have been isolated from oral secretion [2, 3]. Consequently, the incidence of certain infectious diseases is higher among dental professionals than observed for the general population. Infection in the dental practice may result from direct contact with blood, oral fluids, and other secretions or from indirect contact with contaminated instruments, operatory equipment, and environmental surfaces. It may even occur due to contact with airborne contaminants, droplets, splatter, and aerosols. In addition, a majority of carriers of infectious diseases cannot be easily identified. Thus, dental professionals are at a greater risk of acquiring and spreading infections, which requires the implementation of infection control guidelines [4].

Infection control is consisted of actions to prevent further infections. Important issue is that they should be simple, practical and understandable and could be done by each member in the dental office [5]. Palenik *et al*. believed that infection control in dental clinics that follow proper protocols could help in protecting therapist, patient and society [6].

Dental students are the future dental professionals, who will provide oral healthcare for the population. They tend to practice the infection control procedures they acquired during training at the dental school. Although several recommendations and guidelines are issued by medical and dental societies as well as governmental organizations, studies demonstrate that infection is not well controlled in the dental settings and hospitals [4]. Although many surveys about cross-infection control procedures have been carried out in Saudi Arabia, there is no report in recent literature about how Qassim dental students manage the control of cross-infection in their practice. Thus, the present study aimed to investigate dental students' compliance with recommended infection control procedures at Qassim University, Qassim Private Colleges and Buraydah Private Colleges, which are located in Qassim province, Saudi Arabia.

Materials and Methods

The current study is a cross-sectional survey conducted in Qassim province among undergraduate dental students who attended dental colleges in this area (one public and two private dental colleges). Data collection started on February 2015. All undergraduate dental students were invited to participate in the study (N=475). Questionnaires were distributed, among them 345 were completed with response rate 73.00%. The study comprised of 73(21.2%) first year students, 61(17.7%) second year, 75(21.7%) third year, 64(18.6%) fourth year and 72 (20.9%) fifth year. The total number of males are 207(60%) and 138(40%) for females.

The questionnaire consisted of 22 closed-ended questions related to infection control awareness regarding the importance of wearing gown, gloves, mask, head cover and eye goggles, hand washing, vaccination against hepatitis B virus and its transmission method. It was distributed to all junior dental students. In addition to these questions, eight closed-ended questions related to working with sharp

instruments and deal with exposure for all senior students. The questionnaire used was adapted and modified from the article published by George B *et al*. 2014 [7].

Statistical analyses was conducted using the SPSS program (SPSS 15.0 for windows).All statistical analyses were carried out at a significance level of p<0.05.Results were analyzed and compared by means of cross-tabulation. The chi-square test was used to test associations between the level of awareness of undergraduate dental students and the different studied variables.

Results

Table 1: Knowledge of infection control measurement among junior and senior dental students

Normally you consider your patients								
Variables	**stat**	**Firs**	**Second**	**Third**	**Fourth**	**Fifth**	**Total**	**χ^2 (P)**
Healthy	Count	39	28	36	24	24	151	
	% within year	53.42	45.90	48	37.50	33.33	43.77	
Infected	Count	13	12	24	6	20	75	26.38*
	% within year	17.81	19.67	32	9.38	27.78	21.74	
Suspected of infection	Count	21	21	15	34	28	119	0.001
	% within year	28.77	34.43	20	53.13	38.89	34.49	
Importance of take Medical history of new patients								
Yes	Count	67	58	69	63	71	328	
	% within year	91.78	95.08	92	98.44	98.61	95.07	
No	Count	4	2	3	1	1	11	7.94
	% within year	5.48	3.28	4	1.56	1.39	3.19	
I don't know	Count	2	1	3	0	0	1.6	0.44
	% within year	2.74	1.64	4	0	0	1.74	
Who is responsible for infection control in the dental office?								
Dentist	Count	26	17	14	17	10	84	
	% within year	35.62	27.87	18.67	26.56	13.89	24.35	
Assistant	Count	7	6	11	5	3	32	
	% within year	9.59	9.84	14.67	7.81	4.17	9.28	50.53*
Cleaner	Count	13	3	5	0	0	21	
	% within year	17.81	4.92	6.67	0	0	6.09	0.000
Each member	Count	27	35	45	42	59	208	
	% within year	36.99	57.38	60.00	65.63	81.94	60.29	
Every member of the dental team is considered to be at risk to catch infection								
Yes	Count	62	47	63	63	68	303	
	% within year	84.93	77.05	84	98.44	94.44	87.83	
No	Count	2	4	6	0	4	16	29.51*
	% within year	2.74	6.56	8	0	5.56	4.64	
I don't know	Count	9	10	5	1	0	25	0.003
	% within year	12.33	16.39	6.67	1.56	0	7.25	
Does needle recapping minimizes the risk of injury?								
Yes	Count	48	43	63	59	70	283	
	% within year	65.75	70.49	84	92.19	97.22	82.03	
No	Count	5	6	9	4	1	25	50.13*
	% within year	6.85	9.84	12	6.25	1.39	7.25	
I don't know	Count	20	12	3	1	1	37	0.000
	% within year	27.40	19.67	4	1.56	1.39	10.72	

Table (1) shows the Knowledge of infection control measurement among junior and senior dental students. Asking about the knowledge of students as they normally consider their patients healthy, infected or suspected of infection, a statistically significant difference was observed between all undergraduate students (χ^2 = 26.38, P=0.001), where only 34.49% of all students concerned there patients as Suspected of infection, the highest percentage was reported within 4th year students (53.13%).

Ninety five percent of all dental students thought that it is important to take Medical history of new patients; the majority of them were from fifth year students (98.61%) followed by fourth year students (98.44%). Around (81.94%) of fifth year students knew that each member is responsible for infection control in the dental office. About 82.03% of the studied subjects knew that needle recapping minimizes the risk of injury during clinical procedures; most of them 97.22% were from fifth year level of study.

Table 2: Awareness about hepatitis B virus among junior and senior dental students.

Transmission methods of hepatitis B virus								
Variables	**Stat**	**Firs**	**Second**	**Third**	**Fourth**	**Fifth**	**Total**	**χ^2 (P)**
Body fluid	Count	35	49	61	52	66	263	
	% within year	47.95	80.33	81.33	81.25	91.67	76.23	
Touch	Count	4	6	5	7	3	25	
	% within year	5.48	9.84	6.67	10.94	4.17	7.25	83.1*
Air	Count	2	1	5	2	1	11	
	% within year	2.74	1.64	6.67	3.13	1.39	3.19	0.000
I do not know	Count	32	5	4	3	2	46	
	% within year	43.84	8.20	5.33	4.69	2.78	13.33	
Vaccine against hepatitis B								
Very important	Count	36	56	64	60	58	274	
	% within year	49.32	91.80	85.33	93.75	80.56	79.42	
Important	Count	10	4	8	4	12	38	
	% within year	13.70	6.56	10.67	6.25	16.67	11.01	
Not important	Count	1	0	1	0	0	2	92.61*
	% within year	1.37	0	1.33	0	0	0.58	
I do not know	Count	26	1	2	0	2	31	0.000
	% within year	35.62	1.64	2.67	0	2.78	8.99	
A booster dose of vaccine will be necessary every 5 years.								
Yes	Count	25	30	58	50	57	220	
	% within year	34.25	49.18	77.33	78.13	79.17	63.77	
No	Count	9	12	10	3	5	39	63.83*
	% within year	12.33	19.67	13.33	4.69	6.94	11.30	
I don't know	Count	39	19	7	11	10	86	0.000
	% within year	53.42	31.15	9.33	17.19	13.89	24.93	

Out of the 345 participating students, 76.23 % were aware about the methods of transmission of hepatitis B virus, 91.67% of fifth year students had a correct response. Among the undergraduate five years of dental study, the majority of fourth students (93.75%) had a significantly higher percent about the importance of hepatitis B vaccination as preventative measurement. Around 220 of the students (63.77%) had knowledge about booster dose of vaccine against hepatitis B; the majority of them was from fifth year students, Table (2).

Table 3: Knowledge about the use of Personal Protective Equipment among junior and senior dental students

Order of Personal Protective Equipment								
Variables	**Stat**	**Firs**	**Second**	**Third**	**Fourth**	**Fifth**	**Total**	**χ^2 (P)**
Yes	Count	49	35	64	59	67	274	
	% within year	67.12	57.38	85.33	92.19	93.06	79.42	47.89*
No	Count	7	11	8	3	3	32	
	% within year	9.59	18.03	10.67	4.69	4.17	9.28	0.000
I don't know	Count	17	15	3	2	2	39	
	% within year	23.29	24.59	4	3.13	2.78	11.30	
Do you believe that wearing a gown is a good protective barrier?								
Yes	Count	54	50	68	61	66	299	
	% within year	73.97	81.97	90.67	95.31	91.67	86.67	
No	Count	2	3	5	1	6	17	38.70*
	% within year	2.74	4.92	6.67	1.56	8.33	4.93	
I don't know	Count	17	8	2	2	0	29	0.000
	% within year	23.29	13.11	2.67	3.13	0	8.41	
Use gloves during clinical practice is								
Very important	Count	64	54	70	62	70	320	
	% within year	87.67	88.52	93.33	96.88	97.22	92.75	
Important	Count	6	6	4	2	2	20	
	% within year	8.22	9.84	5.33	3.13	2.78	5.80	
Not important	Count	0	1	0	0	0	1	17.44
	% within year	0	1.64	0	0	0	0.29	
I do not know	Count	3	0	1	0	0	4	0.134
	% within year	4.11	0	1.33	0	0	1.16	
Does wearing gloves replace the need for hand washing?								
Yes	Count	12	22	48	23	28	133	
	% within year	16.44	36.07	64	35.93	38.89	38.55	

No	Count	60	37	26	39	43	205	37.55*
	% within year	82.19	60.66	34.67	60.93	59.72	59.42	
I don't know	Count	1	2	1	2	1	7	0.000
	% within year	1.37	3.28	1.33	3.125	1.39	2.03	
washing hands before & after wearing gloves minimize the risk for infection								
Yes	Count	69	52	64	57	69	311	
	% within year	94.52	85.25	85.33	89.06	95.83	90.14	
No	Count	2	3	4	5	1	15	11.36
	% within year	2.74	4.92	5.33	7.81	1.39	4.35	
I don't know	Count	2	6	7	2	2	19	0.182
	% within year	2.74	9.84	9.33	3.13	2.78	5.51	
Do you think that reusing gloves may increase the risk for infection?								
Yes	Count	65	53	59	56	66	299	
	% within year	89.04	86.89	78.67	87.50	91.67	86.67	
No	Count	3	5	11	5	5	29	8.97
	% within year	4.11	8.20	14.67	7.81	6.94	8.41	
I don't know	Count	5	3	5	3	1	17	0.345
	% within year	6.85	4.92	6.67	4.69	1.39	4.93	
Do you believe that Facemasks protect from inhalation aerosols?								
Yes	Count	65	51	62	56	66	300	
	% within year	89.04	83.61	82.67	87.50	91.67	86.96	
No	Count	2	4	9	6	4	25	9.97
	% within year	2.74	6.56	12	9.38	5.56	7.25	
I don't know	Count	6	6	4	2	2	20	0.267
	% within year	8.22	9.84	5.33	3.13	2.78	5.80	
Change Mask								
Variables	Stat	Firs	Second	Third	Fourth	Fifth	Total	χ^2 (P)
Mandatory	Count	33	40	56	53	59	241	
	% within year	45.21	65.57	74.67	82.81	81.94	69.86	
Optional	Count	24	13	14	8	12	71	37.61*
	% within year	32.88	21.31	18.67	12.5	16.67	20.58	
I don't know	Count	16	8	5	3	1	33	0.000
	% within year	21.92	13.11	6.67	4.69	1.39	9.57	
Is face shield a good substitute for mask?								
Yes	Count	33	20	42	21	39	155	
	% within year	45.21	32.79	56	32.81	54.17	44.93	
No	Count	12	13	28	35	29	117	72.05*
	% within year	16.44	21.31	37.33	54.69	40.28	33.91	
I don't know	Count	28	28	5	8	4	73	0.000
	% within year	38.36	45.90	6.67	12.50	5.56	21.16	
Do you think wearing eye goggles essential in every procedure?								
Yes	Count	15	25	47	34	35	156	
	% within year	20.55	40.98	62.67	53.13	48.61	45.22	
No	Count	44	28	24	25	35	156	36.40*
	% within year	60.27	45.90	32	39.06	48.61	45.22	
I don't know	Count	14	8	4	5	2	33	0.000
	% within year	19.18	13.11	5.33	7.81	2.78	9.57	
Wearing head cover is:								
Very important	Count	25	29	48	43	42	187	
	% within year	34.25	47.54	64	67.19	58.33	54.20	
Important	Count	27	23	21	13	26	110	
	% within year	36.99	37.70	28	20.31	36.11	31.88	
Not important	Count	12	6	4	6	3	31	32.79*
	% within year	16.44	9.84	5.33	9.38	4.17	8.99	
I do not know	Count	9	3	2	2	1	17	0.001
	% within year	12.33	4.92	2.67	3.13	1.39	4.93	

In the present study, 274 students (79.42%) were aware about the correct sequence of putting on Personal Protective Equipment; most of them were from fifth year students. A significant difference was observed between students in different years with regard to washing hands before & after wearing gloves, the highest percentage (95.83%) was found in fifth year students. About 87.00% of the studied subjects thought that reusing gloves may increase the risk for infection. A great proportion (91.67%) of fifth year students believed that facemasks protect from inhalation of aerosols. Around

34.00% of the participants knew that face shield is not a good substitute for facemask; the majority of them were from fourth year students. Among the contributors, third year students had a significantly higher percentage (64%) about the importance of wearing head cover, Table (3).

Table 4: Practicing of infection control measurement among senior students.

Personal Protective Equipment should be removed before leaving treatment areas.						
Variables	**Stat**	**Third**	**Fourth**	**Fifth**	**Total**	**χ^2 (P)**
Yes	Count	63	58	66	187	
	% within year	84	90.63	91.67	88.63	
No	Count	4	3	5	12	6.34
	% within year	5.33	4.69	6.94	5.69	
I don't know	Count	8	3	1	12	0.175
	% within year	10.67	4.69	1.39	5.69	
Do you give the patients anti-microbial mouthwash before every procedure?						
Always	Count	31	19	23	73	
	% within year	41.33	29.69	31.94	34.60	
Usually	Count	31	24	34	89	6.19
	% within year	41.33	37.5	47.22	42.18	
Never	Count	13	21	15	49	0.186
	% within year	17.33	32.81	20.83	23.22	
If needles have to be recapped, the one-handed scoop technique is used						
Always	Count	50	46	63	159	
	% within year	66.67	71.88	87.5	75.36	
Usually	Count	24	15	7	46	12.11*
	% within year	32	23.44	9.72	21.80	
Never	Count	1	3	2	6	0.017
	% within year	1.33	4.69	2.78	2.84	
Transfer double-ended instruments as close to the handle center as possible is used						
Always	Count	42	40	46	128	
	% within year	56	62.5	63.89	60.66	
Usually	Count	28	18	21	67	1.97
	% within year	37.33	28.13	29.17	31.75	
Never	Count	5	6	5	16	0.741
	% within year	6.67	9.38	6.94	7.58	
Following an exposure to blood or body fluids with visible blood, did the procedure is stopped immediately?						
Yes	Count	58	53	55	166	
	% within year	77.33	82.81	76.39	78.67	
No	Count	7	4	12	23	5.30
	% within year	9.33	6.25	16.67	10.90	
I don't know	Count	10	7	5	22	0.258
	% within year	13.33	10.94	6.94	10.43	
Did you inform your supervisor / clinical instructor immediately following the exposure?						
Yes	Count	58	51	59	168	
	% within year	77.33	79.69	81.94	79.62	
No	Count	11	6	11	28	4.46
	% within year	14.67	9.38	15.28	13.27	
I don't know	Count	6	7	2	15	0.347
	% within year	8	10.94	2.78	7.11	
supervisor / clinical instructor report the incident immediately to the Faculty Infection Control Committee						
Yes	Count	48	41	42	131	
	% within year	64	64.06	58.33	62.09	
No	Count	7	4	14	25	6.59
	% within year	9.33	6.25	19.44	11.85	
I don't know	Count	20	19	16	55	0.159
	% within year	26.67	29.69	22.22	26.07	
Following initial treatment of the exposure site, did your supervisor / clinical instructor complete a “Clinical Incident Report”?						
Variables	**Stat**	**Third**	**Fourth**	**Fifth**	**Total**	**χ^2 (P)**
Yes	Count	50	38	40	128	
	% within year	66.67	59.38	55.56	60.66	
No	Count	4	8	11	23	4.34
	% within year	5.33	12.50	15.28	10.90	
I don't know	Count	21	18	21	60	0.362
	% within year	28	28.13	29.17	28.44	

Table (4) shows the Practicing of infection control measurement among senior dental students. A statistically significant difference was reported among senior students concerning the method of needle recapping as 75.36% of them stated that they had to use the one-handed scoop technique (χ^2=12.11, P=0.017). On the other hand, no statistically significant difference was registered regarding senior students' practicing in the dental clinic.

Discussion

Following the measures of infection control is an important part of dental practice for both patients' and practitioners' point of view. It is necessary to have a good knowledge of the required measures and a positive attitude, as well as the appropriate practices in place. The present study showed that 95.07% of dental students stated that, taking the medical history is an important issue of new patient. The present reults are in accord with that of Al-Rabeah A *et al*., (2002),where they stated that 93.1% of dentists asked about the medical history of patients before giving treatment [8]. Possible routes of hepatitis B transmission were known by 76.23% of students as they identify body fluid as mode of transmission.

The present study revealed that the majority of the participating students (79.42%) were aware about the correct sequence of putting on Personal protective equipment. These findings are in contrast with an earlier study that was conducted in a dental school in South Kerala in which only 47.9% of the students were aware of the correct sequence of putting on protective barriers [7]. About 70.00% of the sharing students reported that it is mandatory to Change face mask between patients, which is slightly higher level of knowledge than that of dental school in South Kerala (50.4%) [7].

The use of protective coats has been recommended to shield skin and clothing from splashes and spatter. Around 87.00% of the study subjects believed that wearing a gown is a good protective barrier, the majority of them was from senior students. The result of this study was higher when compared with the results of two previous studies carried out in Nigeria which reported that, 64.0% of dentists claimed that they always wear coats, while 29.2% only wear coats sometimes [9], and 52.7% of dentist always wore coats [10]. In Kenya, 82.5% reported the use of protective coats during clinical practice [11].

The present study showed that 85.33% of students knew that washing hands before & after wearing gloves minimize the risk for infection. Another study reported that 72.7% of students believed that hand washing minimize infection risk secondary to leakage [7].

The results of this survey were somewhat alarming as only (33.91%) of the students knew that face shield is not a good substitute for facemask. which is similar to a study reported that 33% of the participants knew that face shield is not a good substitute for mask [7]. If needles have to be recapped, the one-handed scoop technique was used by 75.36% of senior students, the highest percentage was registered among fifth year students followed by fourth year students. The results in this study were higher than that of previous study in South Kerala [7], which reported that only 48.7% of the studied subjects knew that both mechanical device and scoop technique could be used for needle recapping during clinical procedures.

Following an exposure to blood or body fluids with visible blood, the procedure is stopped immediately by 78.67% of senior students; the high percentage was from fourth year students. Similarly, 79.62% of them inform their supervisor / clinical instructor immediately following the exposure. Supervisor / clinical instructor reported the incident immediately to the Faculty Infection Control Committee for 62.09% of senior students. On the contrary, a study was conducted in Nigeria reported that, an infection control policy was reported to be available to 36.8% dentists, while 32.0% claimed that their hospitals did not have any. About thirty percent (31.2%) of the dentists did not know if their hospitals had any. Less than half of dentists (n = 118, 47.2%) did not know if their hospitals had a post-exposure protocol, while 34.8% claimed their institutions did not have any. Only 45 (18.0%) claimed their hospitals had a post-exposure protocol [9].

Conclusions

The current study revealed that the knowledge of dental students was adequate in most aspects of infection control measures except that is concerned with health condition of new patients as suspected to infection. Only 1st year students have lack of awareness about the right method of transmission of hepatitis B virus. The majority of the junior students have insufficient knowledge about the order of putting PPE.

Furthermore, the majority of senior students registered that face shield is a good substitute for facemask, that represents a condition of lack of awareness. Senior students reported a greatest level of awareness about infection control procedures in comparison to their junior counterparts.

Recommendations

Raising students' awareness about the importance of the application of infection control measures in dental clinics is of great importance, as well as following-up the commitment of students concerning the application of infection control regulations in dental clinics. Further studies are recommended to measure self- as well as supervised-assessment.

Limitations

The present research should be viewed with the following limitations in mind. First, the method for assessing the practice of the precaution. The responders' practice was not supervised. Therefore, the responses have not accurately reflect the true knowledge and attitude in practice and, therefore, the reported level of practice might be even lower than the real level. Since it is a cross-sectional study, the knowledge at that point of study was only considered. Lastly, because of the study is limited to Qassim province, other dental colleges in Saudi Arabia need to be assessed. However, the results of the current study can be used as a baseline for enhancing the knowledge about infection control among undergraduate dental students.

References

1. Runnells RR. An overview of infection control in dental practice. J Prosthet Dent. 1988; 59:625-9.
2. Samaranayake L. Rules of infection control. Int Dent J. 1993; 43:578 -84.

3. Cottone JA, Terezhalmy GT, Molinari JA. Practical infection control in dentistry. 2nd edition. Baltimore: Williams and Wilkins, 1996.
4. Kumar S, Sharma J, Prabu D, Kulkarni S. Infection control practices. among undergraduate students from a private dental school in India. odonto ciênc. 2009; 24(2):124-128.
5. Ehsani MTB, Abesi F, Mesgarani A, Mohammadi M. Knowledge and attitude of dental students towards infection control in Babol dental school. Journal of Dentomaxillofacial Radiology, Pathology and Surgery. 2013, 2(3).
6. Palenik CJ, Burke FJ, Miller CH. Strategies for dental clinic infection control. Dent Update. 2000; 27:7-10, 12, 14-5.
7. George B, Brigi C, Mulamoottil VM, Cherian SA. Awareness on infection control procedures among Dental students in a dental school in. South Kerala. Health Sciences. 2014, 1(3).
8. Al-Rabeah A, Gad A. Infection control in the private dental sector in Riyadh. Annals of Saudi Medicine. 2002; 22(1-2):13-17.
9. Uti OG, Agbelusi GA, Jeboda SO, Ogunbodede E. Infection control knowledge and practices related to HIV among Nigerian dentists. J Infect Dev Ctries. 2009; 3(8):604-610.
10. Sofola OO, Savage KO. An assessment of compliance of Nigerian dentists with the universal precaution guidelines for infection control. Infect control Hosp Epid. 2003; 24:737-40.
11. Gachigo JN, Naidoo S. HIV/AIDS: The knowledge attitudes and behaviour of dentists in Nairobi Kenya. SADJ. 2001; 56:587-91.