



European Journal of
**Dentistry and
Medicine**

ISSN 1996-3378



Academic
Journals Inc.

www.academicjournals.com



Research Article

Practice of Infection Control Amongst Clinical Dental Students of Three Public Universities in Malaysia

¹W.A. Wan Noorina, ¹D. Abdullah, ¹C.L. Goo and ²M.M. Rahman

¹Department of Operative Dentistry, Faculty of Dentistry, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur, Malaysia

²Department of Medical Microbiology and Immunology, PPUKM, Jalan Yaacob Latiff, Cheras, 56000 Kuala Lumpur, Malaysia

Abstract

Background and Objective: Infection control measures are applied to all healthcare practitioners including dental practitioners. There was aimed to assess the compliance and level of awareness of infection control practices among clinical dental students in three major public universities in Malaysia. **Methodology:** Data was collected by means of a self-administered, close-ended questionnaire with a response rate of 62%. **Results:** The results indicated that the students were generally compliant with the infection control practices with good compliance in certain areas such as usage of rubber dam for endodontic work (96.7%), hand-washing practices (91.2%) and use of facemask in dental procedures (93%). However, certain infection control issues such as dealing with needle stick injuries (18.3%) and waste disposal (37.7%) were less than ideal. **Conclusion:** It is thus recommended that all items of infection control measures should be given due emphasis in the curriculum and to be followed by close monitoring by supervisors.

Key words: Hand washing, face mask, health care, compliance, awareness

Received: August 27, 2015

Accepted: September 29, 2015

Published: June 15, 2016

Citation: W.A. Wan Noorina, D. Abdullah, C.L. Goo and M.M. Rahman, 2016. Practice of infection control amongst clinical dental students of three public universities in Malaysia. *Eur. J. Dent. Med.*, 8: 6-11.

Corresponding Author: W.A. Wan Noorina, Department of Operative Dentistry, Faculty of Dentistry, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur, Malaysia

Copyright: © 2016 W.A. Wan Noorina *et al.* This is an open access article distributed under the terms of the creative commons attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Standard precautions are minimum infection control measures which apply to all patients, are intended to prevent transmission of any infectious agents in health care settings¹. In year 2003, Centers for Disease Control and Prevention² produced a set of guidelines on infection control specifically for dentistry. Dentists have legal duties to take appropriate precaution to reduce the risk of disease transmission in the dental environment, from patient to Dental Health Care Worker (DHCW), from DHCW to patient and from patient to patient. Standard precautions should also apply to all healthcare practitioners including dental students as they start to treat patients during their clinical years. Therefore, health care associated infections are drawing attention from patients, practitioners, governments and regulatory bodies. This is not only due to the magnitude of the problem associated with morbidity, mortality and cost of treatment, but also create an awareness that most of these are preventable³. Among these hand hygiene is now regarded as one of the most important element of infection control activities educational interventions for medical students should provide clear evidence that health care workers hands become grossly contaminated with pathogens upon patient contact⁴.

CDC² provided comprehensive guidelines for proper monitoring of sterilization processes which involve the use of mechanical techniques, chemical indicators and biological indicators in dental care settings.

Dental health-care personnel should wear a surgical mask that covers both their nose and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood or body fluids⁵.

A survey conducted on clinical dental students at the United Kingdom dental hospital reported that knowledge of infection control procedures was lacking in certain areas especially concerning duties usually undertaken by dental nurses e.g., disinfection and sterilization of dental instruments⁶.

In Malaysia, reported dismal cross infection practices amongst Malaysian dentists in terms of personal protection equipment with only 54% of dentists routinely wearing gloves during treatment of patients⁷. However, a later study examining the practice of universal precautions amongst health-care workers in a teaching hospital in Malaysia noted that approximately three-quarters of the respondents had good knowledge about the practice of universal precautions⁸.

Three public universities started producing graduates in dentistry in Malaysia; Universiti Kebangsaan Malaysia (UKM), Universiti Malaya (UM) and Universiti Sains Malaysia (USM). Therefore, present study was conducted among the graduates of the Universities with a view to know their hand hygiene practice, use of personal protective equipment, immunization, sterilization, disinfection and waste disposal in dental practice in terms of infection control practices. It may be mentioned that no data available on infection control awareness amongst clinical dental students in Malaysia yet.

MATERIALS AND METHODS

A total of 450 self-administered closed ended questionnaires were delivered to all public dental schools in Malaysia (150 sets per dental school). Only those involved in the clinical years and agreed to participate were selected. Recruits in the study consisted of clinical dental students from all public universities in the year 2009.

Questionnaire design and data collection: The questionnaire was made up of 25 items, 5 of which were questions pertaining to the demographic data of the respondents and a further 20 questions related to infection control measures. The questionnaire was pre-tested on 20 individuals. Ambiguous statements found in the pre-test questionnaire were then amended and later posted to the respective schools. A first reminder was sent to the school after 2 weeks and followed by the second reminder a month later.

Questionnaires were related to the following topics

Hand hygiene: Hand washing is one crucial preventive step in infection control protocols whereby hands must be washed thoroughly with an appropriate disinfectant liquid soap prior to wearing and after removing gloves.

Personal Protective Equipment (PPE): Personal Protective Equipment (PPE) such as protective clothing, eyewear, facemask and disposable gloves are worn as barrier to prevent the transmission of microorganisms between patients and the dental team.

Immunization: Immunizations substantially reduce the susceptibility of DHCW being infected after exposure to infectious diseases. In Malaysia, only one private dental university so far has requested for evidence of non-infectivity status against HIV, hepatitis B and C for entry to their dental school.

Sterilization and disinfection: Patient-care items (dental instruments, devices and equipment) are categorized as critical, semi-critical, or non-critical, depending on their risk of transmitting infection and the need to sterilize them between uses.

Clinical waste and sharps disposal: The risk of inoculation injuries from sharp items can be reduced when the sharp items are disposed in a rigid safe container or a puncture resistant bin. McCarthy *et al.*⁹ reported most Canadian dentist respondents (94.2%) used puncture-proof containers for sharps disposal.

Data analysis: Only completed questionnaires were analyzed using the SPSS 16.0 software.

RESULTS

There were only three public universities with clinical dental students in year 2009. Out of the total questionnaires distributed, 284 surveys were returned, while 8 questionnaires were incomplete and discarded giving a total of 276 (62%) respondents those were analyzed using the SPSS version 16.0. From this, 22.5% (n = 62) were males and 77.5% (n = 214) were females in which majority were Malays (55.8%), followed by Chinese (39.1%), Indians (3.3%) and other ethnic minorities (1.8%).

Table 1 illustrates the usage of gloves and practice of hand washing by the respondents. Majority of the respondents (99.6%) used gloves when treating all dental patients. A small percentage of the respondents (5.8%) admitted used gloves while handling patient's folders or case notes, possible cross contamination occurred through it. Hand washing habits were less than ideal as some 12% of the respondents did not wash their hands after every patient.

Table 2 highlights the use of facemask during various dental procedures. Facemask was extensively used for scaling and polishing procedures (98.6%), however, a lower percentage of respondents (86.6%) used facemask while doing orthodontic treatment. The difference was also noted for use of protective eyewear (Table 3), where only 43.8% of respondents wore protective eyewear while doing orthodontic treatment as compared to 94.9%, while doing scaling and polishing procedures.

A high percentage of respondents used rubber dam during endodontic treatment (96.7%) as shown in Table 4. However, only 50.4% used rubber dam for simple restorative work e.g., fillings. With regards to needle stick injury (Table 5),

Table 1: Frequency and percentage of usage of gloves and practice of hand washing

Variables	Frequency			
	Yes		No.	
	No.	%	No.	%
Use of gloves when				
Opening and handling packed instruments	129	46.7	147	53.3
Handling used instruments	262	94.9	14	5.1
Treating all dental patients	275	99.6	1	0.4
Treating only known infectious patients	34	12.3	242	87.7
Handling patients' folders/case notes including radiographs	16	5.8	260	94.2
Hand washing				
Before handling patients	249	90.2	27	9.8
After handling patients	263	95.3	13	4.7
After every patient	243	88.0	33	12.0
Change of gloves				
In between patients	271	98.2	5	1.8
When the gloves are torn	262	94.9	5	1.8
When the gloves have been smeared	124	44.9	152	55.1
With body fluid e.g. blood, saliva				

Table 2: Frequency of the facemask users during dental intervention procedures

Variables	Frequency			
	Yes		No.	
	No.	%	No.	%
Use of facemask when				
Doing restorative treatment	268	97.1	8	2.9
Doing extraction	255	92.4	21	7.6
Scaling and polishing	272	98.6	4	1.4
Doing prosthodontics treatment	249	90.2	27	9.8
Doing orthodontic treatment	239	86.6	37	13.4

Table 3: Frequency of using protective eyewear during dental intervention

Variables	Frequency			
	Yes		No.	
	No.	%	No.	%
Use of protective eyewear when				
Doing restorative treatment	226	81.9	50	18.1
Doing extraction	160	58.0	116	42.0
Scaling and polishing	262	94.9	14	5.1
Doing prosthodontics treatment	131	47.5	145	52.5
Doing orthodontic treatment	121	43.8	155	56.2

Table 4: Use of rubber dam by respondents

Variables	Frequency			
	Yes		No.	
	No.	%	No.	%
Use of rubber dam when				
Doing endodontic work	267	96.7	9	3.3
Doing simple restorative treatment	139	50.4	137	49.6

Table 5: Knowledge regarding needle stick injuries

Variables	Frequency			
	Yes		No.	
	No.	%	No.	%
In the event of needle stick injury, respondents will				
Make the wound bleed and wash under running water	215	77.9	61	22.1
Report the incident to the officer-in-charge	236	85.5	40	14.5

77.9% of the respondents would make the wound bleed and wash the wound under running water. About 85.5% of them would report the incident to the officer-in-charge.

A total of 99.2% of respondents have been vaccinated against hepatitis B. However, out of that percentage, only 91.7% have completed all 3 doses while the other 7.5% have completed only the first or second dose.

About 94.6% of respondents recognized autoclaving as a method of sterilization. However, many of the respondents were unaware of other methods of sterilization such as dry heat sterilization (49.8%) and chemical sterilization (37.2%).

Most of the respondents (99.6%) used sharp bin to dispose of sharp items. About 60.1% of the respondents reported that sharp bins in their clinical setting were on the floor. About 62.3% of them thought the ideal position of the sharp bins were on the table or at the same level with arm, while 37.7% thought the ideal position of sharp bins was on the flow.

DISCUSSION

Demographic data: A total of 276 respondents were involved in this study. Participants were clinical dental students from 3rd year to 5th from the dental schools of Universiti Kebangsaan Malaysia (UKM), Universiti Sains Malaysia (USM) and Universiti Malaya (UM). The response rate for this study was 62%, which was comparable with a national study conducted among Canadian dentists⁹.

Personal protective equipment

Gloves: Based on the results, it can be concluded that the majority of respondents complied with gloves usage protocols in infection control precautions. Compared to the study⁴, this was a vast improvement in the percentage of glove wearers. In comparison to another study⁷, our findings were also significantly higher in this category¹⁰. This trend was likely due to the fact wearing gloves is now a common practice in

dentistry as compared to in the 1990s as there is an increased awareness of the spread of infectious diseases. Our findings were similar to a previous study conducted among Brazilian dentists whereby 97.8% of them use gloves routinely during clinical session¹¹.

Facemasks and protective eyewear: The results regarding the use of facemasks showed that a large percentage of respondents wore facemasks in clinical procedures such as in restorative treatment (97.1%), extractions (92.4%), scaling and polishing (98.6%), prosthodontic treatment (90.2%) and orthodontic treatment (86.6%). However, it was found that some of these respondents only wore protective eyewear in certain dental procedures such as restorative treatment (81.9%) and scaling and polishing (94.9%). Lower percentages of protective eyewear usage were found in other dental procedures such as extractions (58%), prosthodontic treatment (47.5%), as well as orthodontic treatment (43.8%). A possible reason why the usage of protective eyewear was less frequent in certain dental procedures could be due to the fact that the some treatment such as extractions generated less splatter and aerosol as compared to procedures such as scaling and polishing.

Rubber dam: In relation to the usage of rubber dam, we found that a high percentage of the respondents (96.7%) used it during endodontic work. However, this result was vastly conflicting with a study which reported only 23% of general dental practitioners in Malaysia use rubber dam for endodontic procedures¹². A study conducted in UK general dental practice showed that the majority of UK health service dentists never use rubber dam isolation in endodontic treatment, whereby only less than 20% of them use it¹³. A study conducted in United Kingdom assessing the attitudes of final year dental students found that more than 50% of the respondents predicted their use of rubber dam would decrease after leaving the dental school¹⁴. This finding was rather alarming as failure to use rubber dam was the main reason of biological failure of root canal treatment¹⁵.

This can be explained by the fact that rubber dam was made compulsory for endodontic work in most dental schools so students adhered closely to these regulations. However, general dental practitioners often fail to use rubber dams possibly due to costs; time spent on placing rubber dams, patients dislike for the rubber dam or just plain ignorance amongst many reasons.

Needle stick injury: The results from this study revealed that the respondents generally had good knowledge concerning the management of needle stick injury. About 77.9% of them reported that they would make the wound bleed and washed it under running water, whilst 85.5% of them reported the incident to the officer in-charge in case they get needle stick injury during clinical practice. This protocol was in accordance with the guidelines on occupational exposures set by the Ministry of Health Malaysia¹⁶. However, it was reported that many clinical staff failed to report on their needle stick injuries¹⁷.

Waste disposal: A high percentage of the respondents (99.6%) reported that they used sharp bins to dispose sharp items such as needles and syringes. There was notable difference in percentage when we compared with another study whereby only 54% of practices reported using special containers for sharps disposal¹⁸. The results that we obtained also revealed that 60.1% of the respondents reported that the sharp bin in their clinical setting were located on the floor whereas, 39.8% showed that the bin was located on the table or at the same level with arm. Their knowledge concerning the ideal position of the sharp bin was considered satisfactory as 62.3% of them answered either on the table or at the same level with arm. Centre of Disease Control guidelines on infection control in dentistry in the United States² strictly mentioned that sharp bin disposal container should be kept as close as practicable to the work station and should not be stored on the floor or in areas accessible to children.

Sterilization and disinfection: From our study, we found that 65.6% of the dental students agreed that washing instruments was one of the steps in sterilisation and 94.6% of them knew that autoclaving was the preferred method for instruments sterilisation. This showed that respondents have basic knowledge about the methods of sterilisation most commonly used in dentistry. However, a large percentage of respondents were not aware of other methods of sterilisation which can be used for items which can't be autoclaved.

CONCLUSION

In conclusion, within the limits of this study, it is found that the majority of dental students from 3 public universities in Malaysia have good compliance to infection control precautions. This is consistent with findings in the study done by whereby over the period of the review, there have been substantial improvements with compliance in most areas of infection control in dentistry. Regular monitoring and

continuing education are a must to reinforce the compliance of these future dentist's and to further improve their knowledge in infection control. More observational studies should be conducted to monitor the implementation of infection control protocols in general dentistry as well.

REFERENCES

1. CDC., 1996. Healthcare infection control practices. <http://wonder.cdc.gov/wonder/prevguid/p0000419/p0000419.asp>
2. CDC., 2003. Guidelines for infection control in dental health-care settings. MMWR52, <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5217a1.htm>
3. Mathur, P., 2011. Hand hygiene: Back to the basics of infection control. *Indian J. Med. Res.*, 134: 611-620.
4. WHO., 2010. Guidelines on Hand Hygiene in Health Care. First Global Patient Safety Challenge. Clean Care is Safer Care. Accessed on August 24, 2015. <http://www.who.int/patientsafety/en/>
5. CDC., 2013. Infection Control. http://www.cdc.gov/oralhealth/infectioncontrol/faq/protective_equipment.htm
6. Ogden, G.R., M. Bahrami, V. Sivarajasingam and G. Phillips, 1997. Dental students' knowledge and compliance in cross infection control procedures at a UK dental hospital. *Oral Dis.*, 3: 25-30.
7. Razak, I.A. and O.P. Lind, 1995. Cross-infection control in Malaysian dental practice. *Singapore Dent. J.*, 20: 11-15.
8. Hamid, M.Z., N.A. Aziz, A.R. Anita and O. Norlijah, 2010. Knowledge of blood-borne infectious diseases and the practice of universal precautions amongst health-care workers in a tertiary hospital in Malaysia. *Southeast Asian J. Trop. Med. Public Health*, 41: 1192-1199.
9. McCarthy, G.M., J.J. Koval and J.K. MacDonald, 1999. Compliance with recommended infection control procedures among Canadian dentists: results of a national survey. *Am. J. Infect. Control*, 27: 377-384.
10. Porter, S.R., C. Scully and M. El-Maaytah, 1996. Compliance with infection control procedures in dentistry. *Br. Med. J.*, 312: 705-705.
11. Bellissimo-Rodrigues, W.T., F. Bellissimo-Rodrigues and A.A. Machado, 2009. Infection control practices among a cohort of Brazilian dentists. *Int Dent. J.*, 59: 53-58.
12. Aziz, Z.A.C.A., M. Abdullah, C.D.S. Vello and K. Thangavelu, 2006. General dental practitioners' knowledge and practice on root canal treatment. *Ann. Dent. Univ. Malaya*, 13: 12-17.
13. Whitworth, J.M., G.V. Seccombe, K. Shoker and J.G. Steele, 2000. Use of rubber dam and irrigant selection in UK general dental practice. *Int. Endodontic J.*, 33: 435-441.
14. Mala, S., C.D. Lynch, F.M. Burke and P.M.H. Dummer, 2009. Attitudes of final year dental students to the use of rubber dam. *Int. Endodontic J.*, 42: 632-638.

15. Ford, T.R.P. and J.S. Rhodes, 2004. Root canal retreatment: I. Case assessment and treatment planning. *Dent. Update*, 31: 34-39.
16. MOH, 2007. Guidelines on occupational exposures to Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) and recommendations for post exposure prophylaxis. Occupational Health Unit, Diseases Control Division.
17. Gordon, B.L., F.J.T. Burke, J. Bagg, H.S. Marlborough and E.S. McHugh, 2001. Systematic review of adherence to infection control guidelines in dentistry. *J. Dent.*, 29: 509-516.
18. Horst, T., 2015. Infection control practices in dental clinics. <http://www.med.alexu.edu.eg/journal/bulletin/article/download/>