

# Knowledge, Attitude and Practice of Infection Control Measures among Dental Practitioners in Public Setup of Karachi, Pakistan: Cross-sectional Survey

Sidra Mohiuddin<sup>1</sup> and Narender Dawani<sup>2</sup>

## ABSTRACT

**Objective:** The objective of this study was to determine the knowledge, attitude, and practices regarding infection control measures among dental practitioners of Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences (DIKIOHS) Karachi. The study also examined the correlation between the knowledge, attitude, and practices scores.

**Methods:** A cross sectional survey was conducted at the DIKIOHS public setup of Karachi, Pakistan. All dental practitioners of the institute were approached through a non-probability convenience sampling technique and requested to fill self administered proforma consisting of twenty one variables regarding infection control knowledge, attitude and practices.

**Results:** Among the total, one hundred and sixteen dental practitioners (96.7%) were vaccinated against Hepatitis B and around (n=112, 93%) regularly wash hands before and after treatment. Ninety eight percent (n=118, 98.3%) of dental practitioners wore and changed gloves after each patient (n=118, 98.3%). Around three quarters (n=89, 74.2%) of the study participants routinely wore face mask. The habit of changing face-masks between patients and wearing protective eye-wear among dentist was less than 50%. More than half (n=61, 50.8%) of the study participants change hand pieces between patients.

In current study the mean knowledge, attitude and practice scores regarding infection control were found poor among senior dental professionals as compared to house officers and junior professionals. Moderate level of correlation existed between the knowledge and attitude ( $r = 0.4$ ;  $p$ -value  $< 0.01$ ); knowledge and practice ( $r = 0.367$ ;  $p$ -value  $< 0.01$ ) and attitude and practices ( $r = 0.487$ ;  $p$ -value  $< 0.01$ ).

**Conclusion:** In all, the infection control knowledge, attitudes and practices of junior professionals and house officers were better, however, there is also a need to improve the knowledge and practices among dental health care professionals to minimize cross infection in dental setup and reduces associated morbidity and mortality rates for both; dental practitioners themselves and patients.

**Key words:** Infection control, cross infection, dental practitioners, knowledge, attitude, practices.

*How to cite this article:* Mohiuddin S, Dawani N. Knowledge, attitude and practice of infection control measures among dental practitioners in public setup of Karachi, Pakistan: cross-sectional survey. J Dow Uni Health Sci 2015; 9(1): 3-8.

## INTRODUCTION

Dental procedures are associated with the risk of exposure to blood and transmission of blood-borne diseases can occur easily in the dental clinical environment<sup>1</sup>. During oro-dental examination or procedures in which there is a chance of coming in contact with the blood of infected patients; without

any protective medium, dental health care practitioners (DHCPs) are more prone to get infected by pathogens that directly enter the host's body. Furthermore, these disease causing agents can also be transmitted indirectly, either through contaminated needle stick injury or improper handling and contact with unsterilized instruments. Another route of transmission of these disease causing agents are in the form of droplets either blood, serum or airborne<sup>2,3</sup>. Thus, it is essential for DHCPs to use all protective means such as wearing gloves, face-mask, eye-wears as well as use an adequate high speed suction while using high and low speed rotary instruments<sup>4</sup>.

As far as DHCPs are concerned, they are potentially at more risk of infections caused by a wide range of causative organisms namely mycobacterium tuberculosis, hepatitis B & C virus, streptococci,

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1 Community Dentistry Department, Ziauddin College of Dentistry, Ziauddin University, Karachi, Pakistan.

2 Community Dentistry Department, Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, Dow University of Health Sciences, Karachi, Pakistan.

**Correspondence:** Dr. Sidra Mohiuddin, Senior Lecturer, Community Dentistry Department, Ziauddin College of Dentistry, Ziauddin University, Karachi, Pakistan.

**Email:** sidramohiuddin83@gmail.com

staphylococci, herpes simplex virus type 1 (HSV 1), mumps, rubella, human immunodeficiency virus (HIV), influenza<sup>5</sup>. There is also some evidence to suggest that students of dental schools are also at higher risk of infection through blood borne infectious agents<sup>6-8</sup>. Cross infection prevention in dental clinic and schools during a dental procedure is of immense significance, as well as all para-dental auxiliaries must adhere to the standard guidelines of prevention and safety measures particularly at the time of patients handling<sup>4</sup>.

The guidelines related to infection control measures in dental setup, have been updated and made available by the Centers for Disease Control (CDC) in 2003. The main aim of these guidelines is to provide a working environment with all standard safety measures along with prevention of transmitting potential pathogens and nosocomial infections among dentists, DHCPs and their patients<sup>9</sup>. According to these guiding principles of CDC, it is mandatory to wear face-masks and gloves during each and every patient followed by changing face-masks and gloves after completion of dental procedures on a patient. Furthermore, CDC's guidelines also recommend to wear protective eye-cover and properly disinfect clothes before re-use. Moreover, after performing chair-side dental treatments, hands must be thoroughly washed with anti septic solution<sup>10,11</sup>.

Infection control can be achieved by following the standard guidelines; however, there is evidence which shows that the DHCPs have an inadequate knowledge, negative attitudes and poor practices regarding the infection control measures. There is need of further research to understand the nature of injuries during dental practice and evaluation of the current knowledge, attitude and practices of DHCPs regarding infection control practices. The new evidence will provide assistance in the planning of educational interventions to improve the attitude and practices among DHCPs<sup>12</sup>. Hence, the objective of this study was to investigate the knowledge, attitude and practices along with correlation between them, among dental practitioners of Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences (DIKIOHS) a public set up of Karachi Pakistan.

## MATERIALS & METHODS

This cross sectional study was conducted at the Dr. Ishrat-ul-Ebad Khan Institute of Oral Health Sciences, a public setup of Karachi Pakistan. A non-probability convenience sampling technique was used to select sample that included a total of 150 DHCPs which included house officers, junior and senior dental professionals. All house-officers had at-least six months

of clinical training. Junior professional were the post-graduate trainees with having at least two years of training and senior professionals were the dental practitioners with having more than five years of clinical experience and were serving on academic posts were included in the study. Whereas, all those DHCPs who were foreign qualified were excluded from the study.

A self administered close-ended questionnaire consisting of 21 variables were distributed among the study participants. The first three questions were related to socio-demographic details, whereas remaining variables were used to assess sample's knowledge, attitude and practices about infection control measures. Infection control awareness and measures were primarily provided in all four years of undergraduate schooling followed by various sessions of infection control also carried out during house job period.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Informed consent was obtained from all patients for being included in the study.

### Data Analysis:

The data were entered into the Social Package of Statistical Sciences version 16. Descriptive statistics were computed. Categorical variables (i.e. age, gender and professional levels) were presented as frequency/percentage. Affirmative responses on knowledge, attitude and practices items on infection control were also presented as frequency/percentage. The mean knowledge, attitude and practices scores regarding infection control were computed and compared across the three job categories (interns/ junior and senior professionals) by ANOVA with post-hoc comparison. For post-hoc analysis the Scheffe's test was used. The Pearson test was used to compute correlation between knowledge and attitude scores, knowledge and practice score; and attitude and practice scores. For all comparative analysis, level of significance at  $p=0.05$ .

## RESULTS

Among the 150 study participants, 120 complete questionnaires were collected, thus the response rate was eighty percent (80%). Majority ( $n=71$ , 59.2%) of the participants were younger with the mean age of 26.53(SD  $\pm$  4.93) years. Seventy percent ( $n=84$ ) were females and thirty percent ( $n=36$ ) were male participants. Majority of the study participants were house officers 47.5% ( $n=57$ ) followed by junior 27.5% ( $n=33$ ) and senior professionals 25% ( $n=30$ ). (Table 1)

Table 1: Characteristics of the Study Population

Variables	Frequency (%)
Age	
= 25 years	71 (59.2)
> 25 years	49 (40.8)
Gender	
Male	36 (30)
Female	84 (70)
Job Category	
Senior Professionals	30 (25)
Junior Professionals	33 (27.5)
House Officers	57 (47.5)

### Infection Control Knowledge, Attitude and Practices:

Ninety seven percent (n=116) of dental practitioners were immunized against Hepatitis B, 98.3% (n=118) had stated affirmatively that they take patient's detail history prior to starting dental procedure. Ninety eight percent (n=118) of them replied that they wear and change gloves after each patient. On asking about wearing mask for each patient, 74.2% (n=89) of them stated positively, however 48.3% (n=58) stated that they change face- mask between patients, 40.8% (n=49) stated that they wear protective eye-wear while performing dental procedures. On inquiring about disinfection of impression 67.5% (n=81) reported affirmatively, 50.8% (n=61) stated that they change hand pieces in between patients. Regarding changing extraction instruments and saliva ejectors; 97.5% (n=117) and 96.7% (n=116) stated affirmatively about it. Furthermore, 75.8% (n=91) had stated that they do change hand piece burs during operative dentistry procedures after every patient.

Regarding dental practices of the study participants, majority 93.3% (n=112) of the DHCPs washed hands before and after the dental procedures. Questions related to use of an autoclave for sterilization of hand pieces, plastic wrappings for sterilized instruments and special containers for the disposal of sharp objects; 76.7% (n=92), 88.3% (n=106) and 60% (n=72) responded positive, respectively. Fifty one percent (n=61) stated that they also use rubber dam applications, 54.2% (n=65) responded that they wear hand jewelry or wrist watch during dental treatments. (Table 2)

### Comparison of Mean Knowledge, Attitude and Practice Scores among Dental Practitioners

The mean of knowledge, attitudes, and practice scores were computed individually. The means of knowledge score (mean score 2) for house officers and junior professionals were found to be equivalent; while senior professional were found to have a lower mean knowledge score (mean score 1.8). Significant

Table 2: Infection Control Knowledge, Attitude and Practices of the Study Participants

Variables	Frequency (%)
Knowledge	
Take patients medical history?	118 (98.3)
Vaccinated against Hepatitis B?	116 (96.7)
Attitude	
Wear gloves?	118 (98.3)
Change gloves after each patient?	118 (98.3)
Wear face masks?	89 (74.2)
Change face masks between patients?	58 (48.3)
Wear protective eye wear?	49 (40.8)
Disinfect impressions?	81 (67.5)
Change hand pieces between patients?	61 (50.8)
Change extraction instrument after every patient?	117 (97.5)
Change saliva ejectors after each patient?	116 (96.7)
Change burs in Operative dentistry after every patient?	91 (75.8)
Practices	
Wash hands before and after treatments?	112 (93.3)
Wear hand jewelry or wrist watch during treatment?	65 (54.2)
Use rubber dam?	61 (50.8)
Use autoclave for sterilization of hand pieces?	92 (76.7)
Use plastic wrappings for sterilized instruments?	106 (88.3)
Use special containers for the disposal of sharp objects?	72 (60)

difference was found in the mean knowledge score with p-value = 0.03. The overall mean attitude scores was  $7.48 \pm 1.26$ . However, junior professionals reflected the better attitude with higher mean scores of  $8.06 \pm 1.73$ , followed by house officers with means of  $7.74 \pm 1.26$ . While senior professionals had the worst attitude score for infection control practices  $6.37 \pm 2.28$ . Significant difference was also found in the mean attitude score with p-value = 0.01. The overall mean of practice scores were  $4.23 \pm 1.08$ . The practices of junior professional were found better with mean scores of  $4.42 \pm 1.23$ , followed by house officers  $4.21 \pm 0.9$ . While senior professional practices regarding infection control was found worst with lowest mean scores of  $4.07 \pm 1.23$ . No significant difference was found related to the infection control practices among three study participants with p-value = 0.07. (Figure 1)

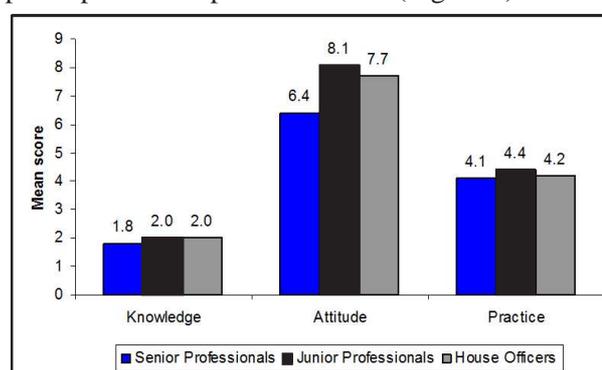


Figure 1: Comparison of Mean Knowledge, Attitude and Practice Scores among Dental Practitioners.

## Correlation of Infection Control Knowledge, Attitude and Practices

Moderate and statistically significant correlation was observed between the knowledge and attitude ( $r = 0.4$ ;  $p$ -value  $< 0.01$ ); knowledge and practice ( $r = 0.367$ ;  $p$ -value  $< 0.01$ ) and attitude and practice ( $r = 0.487$ ;  $p$ -value  $< 0.01$ ) of the dental practioners participated in the study.(Table 3)

Table 3: Correlation among Knowledge, Attitude and Practice Scores

Variables	Correlation Co-efficient	P-value
Knowledge - Attitude	0.438	$< 0.01$
Attitude - Practice	0.487	$< 0.01$
Knowledge - Practice	0.367	$< 0.01$

## DISCUSSION

The results of this study shows increase in mean knowledge regarding infection control measures of house officers and junior professionals as compare to the senior professionals whereas attitudes and practices of junior professional were better than house officers, followed by senior professionals. Furthermore, moderate and statistically significant correlation exists among knowledge, attitude and practices of DHCPs.

Cross- infection can be defined as the spread of pathogenic organisms between patients and staff in a clinical setting<sup>13</sup>. Nowadays, understanding concerning cross-infection control among dental practioners and para-dental auxiliaries has been increased in dental setups because of the increase in transmission of blood borne diseases like HIV, Hepatitis to dental patients and practioners<sup>14,15</sup>. In current study affirmatively, most of the dental practioners were vaccinated against Hepatitis B. These findings are in accordance with studies<sup>15-17</sup>.

Regarding attitudes of DHCPs, almost all of them used to wear and change gloves after each and every patient. The studies<sup>16,18</sup> were in agreement with the current study, use of gloves by dental health practitioners prevents hands contamination while touching blood, saliva, mucous membrane, and other infectious material. It also reduces the transmission of microorganisms present on hands while carrying out the surgical or other dental procedures. Furthermore, inappropriate use of glove (i.e. not changing gloves) could lead to the spread of microorganisms and potentially puts the caregiver at increased risk<sup>19</sup>. Mc Carthy et al and Yengopal et al had reported affirmative response towards wearing of face-masks in their studies however similar findings are also reported in current study that is about three forth of the study participants have shown affirmative attitudes towards it<sup>20,21</sup>. However, studies

showed dissimilarities in findings to current study, as low compliance of wearing face-masks were reported there<sup>16,22-24</sup>. In present study less than half of the study participants did not change face-mask between patients and about less than half of them did not wear protective eye-wear. Similar findings have been reported by Qudeimat MA et al, Field EA et al and Salisbury DM et al in their studies previously<sup>16,25,26</sup>.

This study also highlighted that majority of DHCPs washed their hand before and after dental procedures. These findings were in dissimilarity with the studies<sup>16,24</sup> where less than half of the DHCPs were practicing hand wash after dental procedures. Hand washing is a good practice against infection control, as it reduces the number of bacterial colonies. In present study, more than half of the participants wore wrist watch and/or hand jewelry during dental procedures, these findings were not in accordance with studies<sup>16,23</sup> reported where more than half of the DHCPs remove jewelry before dental procedures.

In the present study the knowledge, attitude and practices regarding infection control was found poor among senior dental professionals as compared to house officers and junior professional. This can be accounted due to the misconception prevalent among the senior dental professionals who have the added responsibility of supervising undergraduate dental students in addition to treat patients; thus, they have the false believe that showing students how to carry out the procedures does not require adherence to infection control practices.

The findings were of great significance as junior professionals and house officers might follow the practices of their senior professionals, thus strict adherence to the infection control practices are required by the senior dental faculty members. Moreover, as in recent times there has been much stress over the infection control practices and more literature has been cited, including the continuing medical education session planned in relevance to infection control practices, thus the DHCPs should be encouraged to attend, update and revisit their knowledge, attitude and practices in relation to infection control.

Mean scores of knowledge among house officers and junior professionals were slightly more than senior professionals and was statistically significant. This gives a good impression that fresh graduates and post graduates do have awareness about infection control measures. Moreover, junior professionals had shown better attitudes and practices as compare to senior professionals and house officers. Statistically significant findings with attitudes and insignificant with practices

were shown. The study also reported positively moderate association between knowledge-attitude, knowledge- practices and attitude-practices and was significant. This showed that those dental professional reported to have better knowledge were more likely to have better attitude and eventually better practices. These finding were in accordance with the study<sup>13</sup> reported as far as association between knowledge and practices exist while in disagreement with the association among knowledge-attitude and attitude-practice.

It is the responsibility of the DHCPs to follow standardized protocol in order to control infection which will be beneficial for para-dental auxiliaries, patients and their attendants<sup>27,28</sup>.

## CONCLUSION

In all, the infection control knowledge, attitudes and practices of junior professionals and house officers were better however, there is also a need to improve the knowledge and practices among dental care professionals to minimize cross infection in dental setup belonging to public as well as private sector and reduces associated morbidity and mortality rates for both; dental practitioners themselves and patients.

## REFERENCES

- Taiwo JO, Aderinokun GA. Assessing cross infection prevention measures at the dental clinic, university college hospital, ibadan. *African Journal of Medical Sciences*. 2002;31(3):213-7.
- Mousa AA, Mahmoud NM, El-Din AMT. Knowledge and attitudes of dental patients towards cross-infection. *Eastern Mediterranean Health Journal*. 1997; Volume 3, issue 2: 263-73.
- Harrel SK, Molinari J. Aerosols and splatter in dentistry: a brief review of the literature and infection control implications. *Journal of the American Dental Association*. 2004;135(4):429-37.
- Santra D.K, Tripathi S, Ganger A. Study to access the level of knowledge, attitude and practices of infection control among dental professionals. *JDSOR*. 2010;57-60.
- Singh A, Purohit BM, Bhambal A, Saxena S, Singh A, Gupta A. Knowledge, attitudes, and practice regarding infection control measures among dental students in central india. *J Dent Educ*. 2011;75(3):421-7.
- Rosenthal E., Pradier C., Keita-Perse O., Altare J, Dellamonica P., Cassuto J. P. Needle stick injuries among French medical students. *JAMA*, 1999. 281(17): 1660.
- Kennedy, J.E., Hasler, J.F. Exposures to blood and body fluids among dental school-based dental health care workers. *J Dent Educ*, 1999. 63(6): p. 464-9.
- Osborn, E.H.S., Papadakis, M.A., Gerberding, J.L. Occupational exposures to body fluids among medical students. *Ann Intern Med*, 1999. 30: p. 45-51.
- DTMH OAM. Infection control practices among dental professionals in Shiraz Dentistry School, Iran. *Archives of Iranian medicine*. 2009;12(1):48-51.
- Kohn WG, Collins AS, Cleveland JL, Harte JA, Eklund KJ, Malvitz DM. Guidelines for infection control in dental health-care settings-2003. US Government Printing Office; 2003.
- Harte JA. Looking inside the 2003 CDC dental infection control guidelines. *Journal of the California Dental Association*. 2004;32(11):919-30.
- Burke FJ, Baggett FJ, Wilson NH. Glove wearing by dental surgery assistants in general practice: Results of a survey. *Dent Update*. 1992;19(6):263-5.
- Ali M F, Hussain A, Maqsood A. Knowledge, attitude and practices concerning infection control measures among dental health care providers of Dow University of Health Sciences. *PODJ*. 2014;34(3):452-56.
- Sofola OO, Folayan MO, Denloye OO, Okeigbemen SA. Occupational exposure to bloodborne pathogens and management of exposure incidents in Nigerian dental schools. *Journal of dental education*. 2007;71(6):832-37.
- Hudson-Davies S, Jones J, Sarll D. Cross-infection control in general dental practice: dentists' behaviour compared with their knowledge and opinions. *British dental journal*. 1995;178(10):365-69.
- Qudeimat MA, Farrah RY, Owais AI. Infection control knowledge and practices among dentists and dental nurses at a Jordanian university teaching centre. *Am J Infect Control*. 2006;34(4):218-22.
- McCarthy GM, MacDonald JK. A comparison of infection control practices of different groups of oral specialists and general dental practitioners. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1998;85: 47-54.
- Stevenson AR, Higgins TJ. Infection Control in general dental practice: results of a postal survey of 600 registered dental practitioners in New South Wales. *Aust Dent J* 1989;34:106-14.
- Burke FJ, Baggett FJ, Wilson NH. Glove wearing by dental surgery assistants in general practice: results of a survey. *Dent Update*. 1992; 19:263-5.
- McCarthy GM, Koval JJ, John MA, MacDonald JK. Infection control practices across Canada: do dentists follow the recommendations? *J Can Dent Assoc* 1999;65:506-11.
- Yengopal V, Naidoo S, Chikte UM. Infection control among dentists in private practice in Durban. *SADJ*. 2001;56:580-4.
- Hudson-Davies SC, Jones JH, Sarll DW. Cross-infection control in general dental practice: dentist's behaviour compared with their knowledge and opinions. *Br Dent J*. 1995;178:365-9.

23. Stevenson AR, Higgins TJ. Infection Control in general dental practice: results of a postal survey of 600 registered dental practitioners in New South Wales. *Aust Dent J.* 1989;34:106-14.
24. Scully C, Porter SR, Epstein J. Compliance with infection control procedures in a dental hospital clinic. *Br Dent J.* 1992;173:20-3.
25. Field EA, McGowan P, Pearce PK, Martin MV. Rings and watches: should they be removed prior to operative dental procedures? *J Dent.* 1996;24:65-9.
26. Salisbury DM, Hutfilz P, Treen LM, Bollin GE, Gautam S. The effect of rings on microbial load of health care workers' hands. *Am J Infect Control.* 1997;25:24-7.
27. Thomas MV, Jarboe G, Frazer RQ. Infection control in the dental office. *Dental Clinics of North America.* 2008;52(3):609-28.
28. Larson E, Kretzer E. Compliance with hand washing and barrier precautions. *Journal of Hospital Infection.* 1995;30:88-106.

