

Systematic Review

Knowledge, Attitude, Practice, and Status of Infection Control among Iranian Dentists and Dental Students: A Systematic Review

Behnam Moradi Khanghahi¹ • Zahra Jamali^{2,3} • Fatemeh Pournaghi Azar⁴ • Mohammad Naghavi Behzad¹ •
Saber Azami-Aghdash^{5*}

¹ Medical Philosophy and History Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

² Dental and Periodontal Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

³ Assistant Professor, Department of Oral Medicine, Faculty of Dentistry, Tabriz University of Medical Sciences, Tabriz, Iran

⁴ Assistant Professor, Department of Operative Dentistry, Faculty of Dentistry, Tabriz University of Medical Sciences, Tabriz, Iran

⁵ Tabriz Health Services Management Research Center, Faculty of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran

*Corresponding Author; E-mail: saberazami@yahoo.com

Received: 10 January 2013; Accepted: 18 March 2013

J Dent Res Dent Clin Dent Prospect 2013;7(2):55-60 | doi: 10.5681/joddd.2013.010

This article is available from: <http://dentistry.tbzmed.ac.ir/joddd>

© 2013 The Authors; Tabriz University of Medical Sciences

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Background and aims. Infection control is an important issue in dentistry, and the dentists are primarily responsible for observing the relevant procedures. Therefore, the present study evaluated knowledge, attitude, practice, and status of infection control among Iranian dentists through systematic review of published results.

Materials and methods. In this systematic review, the required data was collected searching for keywords including infection, infection control, behavior, performance, practice, attitude, knowledge, dent*, prevention, Iran* and their Persian equivalents in PubMed, Science Direct, Iranmedex, SID, Medlib, and Magiran databases with a time limit of 1985 to 2012. Out of 698 articles, 15 completely related articles were finally considered and the rest were excluded due to lack of relevance to the study goals. The required data were extracted and summarized in an Extraction Table and were analyzed manually.

Results. Evaluating the results of studies indicated inappropriate knowledge, attitude, and practice regarding infection control among Iranian dentists and dental students. Using personal protection devices and observing measures required for infection control were not in accordance with global standards.

Conclusion. The knowledge, attitudes, and practice of infection control in Iranian dental settings were found to be inadequate. Therefore, dentists should be educated more on the subject and special programs should be in place to monitor the dental settings for observing infection control standards.

Key words: Attitude, infection control, knowledge, practice, systematic review.

Introduction

Infection is a major problem for health care systems in many countries.¹ Infection control has gained much attention especially in dentistry after introduction of HIV infection in 1980s, and reports of contamination of six patients by a dentist.² Among health care professionals, dentists are more prone to infection due to their direct contact with blood and saliva on a daily basis in their offices.³ In spite of advances in infection control in recent years, there is still infection control problem in health care centers including dentistry clinics and hospitals.^{4,5}

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.⁶ The results of previous studies indicate inappropriate knowledge, attitude, and practice regarding proper measures of infection control among dentists.⁷⁻⁹ Studies conducted in Iran also demonstrate a lower-than-standard knowledge, attitude, and practice among dentists regarding the issue.¹⁰⁻¹² There has been, however, no systematic approach to summarize the results of such studies to enable offering a comprehensive, yet clear viewpoint of the current status of infection control in the dental profession in Iran.

Therefore, the present study aimed to systematically summarize and report the results of studies evaluating infection control measures in the dental

settings as well as knowledge, attitude, and practice of dental professionals regarding infection control.

Materials and Methods

In this systematic review study, the required data was collected searching for keywords including infection control, Iran, behavior, attitude, knowledge, dent*, infection prevention and their Persian equivalents through PubMed, Science Direct, SID, Medlib, Magiran, and Iranmedex databases. Articles published between 1985 to 2012, articles which dealt with infection control or dentists' knowledge, attitude and practice, studies that collected the data using questionnaires and observation, and articles published in Persian and English were regarded as inclusion criteria of the study. Letters to editor, case reports, and articles presented at conferences were excluded from the study. Following database searching, authentic journals in Persian and English were hand searched in order to identify and cover more published articles. After excluding those articles with weak relationship to the study objectives, references of the selected articles were re-searched to ascertain identification and evaluation of all available literature and find more related articles. Out of 698 articles, 15 completely-related articles were finally selected and the rest with weak relationship to the study objectives were excluded (Figure 1). The selected articles were evaluated meticulously. Three articles were in English. Nine articles dealt with den-

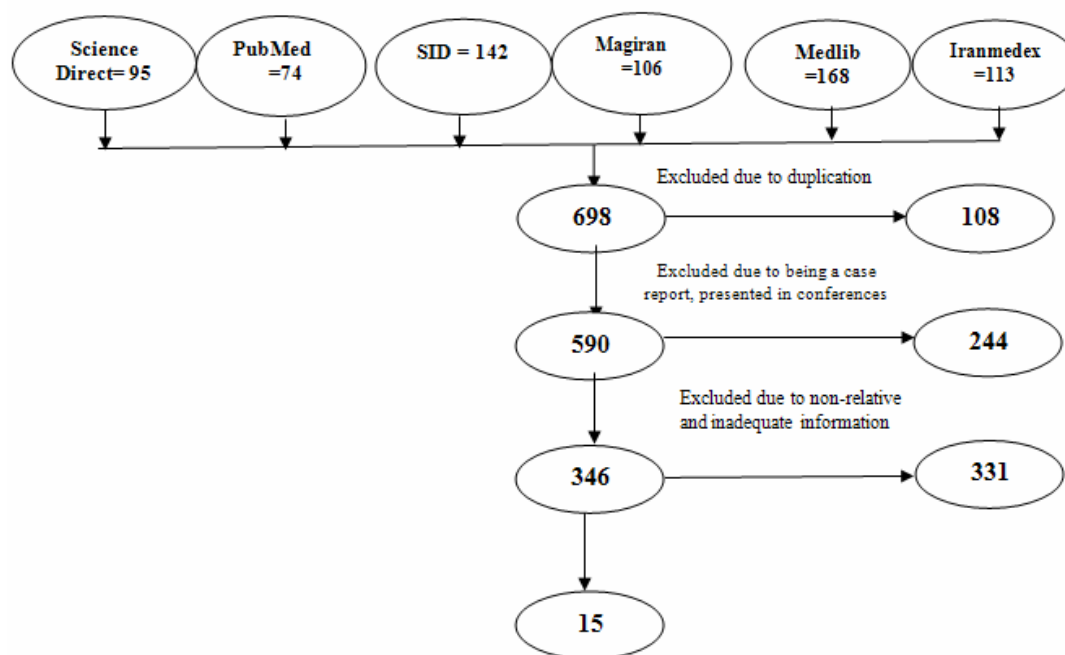


Figure 1. Literature review and retrieval flow diagram.

tists' knowledge, attitude, and practice on infection control. The required data were summarized in an extraction table and analyzed manually.

Results

Dentists' Knowledge, Attitude, and Practice on Infection Control

Self-reported scores of dentists' knowledge, attitude, and practice on infection control are summarized in Table 1. Where other indices were used in a study, they were converted to percentage in order to facilitate comparisons.

Approximately 60% of dentists demonstrated appropriate practice regarding infection control (moderate interval regarding classifications of studies about practice on infection control). The results showed dispersion and deviation regarding dentists' knowledge about required measures of infection control, as the rate varied from 35% to 75%. The knowledge of dentists on infection control was overall about 50%. A positive attitude toward infection control was seen among dentists (>70%).

Applying Staff Protection Devices among Dentists

This study reported four most important and necessary devices used in infection control. The rate of staff protection devices was included in ten articles (Table 2). The rate varied significantly among dentists from 7% in using glasses to 98% in using a

cover.

Necessary Actions in Infection Control among Dentists

Nine articles had studied the rate of observing principles and measures required for infection control. Table 3 summarizes the results. Several studies reported measures such as washing hands and applying disinfectants. Similar to the rate of using staff protection devices, there were differences between the rate of observing necessary actions towards infection control (33% for washing hands to 98% for applying disinfectants).

Discussion

Taking measures required for infection control is an important part of daily dental practice from both patients' and practitioners' point of view. In this regard, it is necessary to have a good knowledge of the required measures and a positive attitude, as well as the appropriate practices in place. Evaluating the results of those studies conducted in Iran indicate a relatively low level of knowledge, attitude, and practice regarding infection control among dentists and dental students. Also, the results suggest that using personal protection devices and taking necessary measures required for infection control are not in accordance with global standards.

The results of the studies evaluated in this review

Table 1. Dentists' and dental students' knowledge, attitude, and practice regarding infection control

Author	Year	City	Practice score	Knowledge score	Attitude score
Askarian & Assadian ¹¹	2003	Shiraz	55.22 ± 24.11	74.55 ± 11	77.75 ± 9.93
Ebrahimi et al ¹³	2009	Mashhad	68 ± 8	34.9 ± 13	—
Zakerijafari & Mohammadisalami		Rasht	62.2(weak), 37.8(moderate), 0 (good)	1.1 (weak), 24.4 (moderate), 74.5 (good)	1.1 (weak), 54.4 (moderate), 44.4 (good)
Eghbal et al ¹⁴	2002	Tehran	58.37	52.85	—
Simari et al ¹⁵	2001-2002	Tehran	—	1.8 (weak), 25.3 (moderate), 68.8 (good), 4.1(excellent)	15.5 (weak), 73.2 (moderate), 11.3 (good)
Ajami et al ¹⁰	2008	Mashhad	27.5(weak), 60.4(moderate), 12.1 (good)	35 ± 13.3	—
Mohammadrazavi et al	2003	Isfahan	68.25 ± 14.7	—	—
Hekmatian & Khalfi, ¹⁶	2012	Boushehr	—	45	—
Alipour et al ¹⁷	2005	Bandarabbas	69 ± 6.55	54 ± 8.8	—

Table 2. Application rate of staff protection devices among dentists and dental students

Study/ personal protection devices	City	Year	Gloves (%)	Glasses (%)	Mask (%)	Cover (%)
Askarian & Assadian	Shiraz	2003	82.9	51.3	76.3	30.3
Ebrahimi et al	Mashhad	2009	97.95	65.30	97.95	—
Eghbal et al	Tehran	2002	37.3	27.3	—	—
Geramipناه & Monzavi	Varamin		76.9	64	—	—
Najafi Dolatabadi et al ¹⁸	Yasouj	2005-2006	93	60	90	90
Mohammadrazavi et al	Isfahan	2003	69.4	44.9	82.1	92.5
Hashemipour et al ¹⁹	Kerman	2007	23.3	7.7	15.5	36.9
Alavian et al ²⁰		2004	93.1	63.8	—	—
Najafi Dolatabadi et al ²	Yasouj	2005-2006	97	78	92	98
Zakerijafari & Mohammadisalami ²¹	Rasht	-	82.2	28.9	82.2	95.6

Table 3. Measures reported for infection control in the reviewed studies

Study/infection control measures	Washing hands	Disinfection of equipment	Separation of infectious waste material	Environment health	Disinfectants & sterilizers	Disposable devices	Hepatitis vaccination
Askarian & Assadian / 2003 - Shiraz	45.4	—	—	—	—	—	—
Geramipناه & Monzavi / Varamin	96.2	91	—	—	97.9	95.7	—
Najafi Dolatabadi et al / 2005-2006 - Yasouj	43	73	—	—	93	68	—
Ajami et al / 2008- Mashhad	33.1	—	46.6	—	—	—	89.9
Mohammadrazavi et al / 2003 - Isfahan	>70	>70	—	>50 70>	50>	52	93.4
Hashemipour et al / 2007 - Kerman	—	—	—	—	42.7	—	52.4
Alavian et al / 2004	—	—	—	—	—	—	74.8
Najafi Dolatabadi et al ² / 2005-2006 - Yasouj	82	95	—	—	92	97	—
Valiollahi et al ²² / 2004 - Tehran	—	—	53.47	56.55	97.29	—	—
Alipour et al/ 2005 - Bandarabbas	56.7	74	61	81	67	—	24.7

demonstrate that Iranian dentists' and dental students' knowledge, attitude, and practice are on an overall poor level. Accordingly, outcomes of other studies conducted in countries such as United States, Italy, Nigeria, and England refer to low level of dentists' knowledge, attitude, and practice.^{7,8,23,24} Therefore, there seems to be a need for more education and emphasis regarding infection control for dental students and dentists. Additionally, providers of dental services and supervising organizations should focus more on the subject.

The obtained results suggest that rate of using personal protection devices among Iranian dentists for infection control is not at a desirable level. For example, although it is recommended to use gloves during all procedures involving contact with the patient, this is not always observed by about 25% of the dentists. The rate of using gloves and cover is higher than that of glasses and mask. Given the above-mentioned cases, glasses are used less than other three devices, and a significant gap between the current status and the ideal condition. In comparison with other countries, it can be noted that gloves are used more often in other countries than in Iran. One study conducted in Jordan, for instance, demonstrated that about 81% of the dentists wear gloves while performing dental procedures.¹ Another study among orthodontists in Illinois, US showed gloves are used in 97% of the cases. The figure is about 94% in a Canadian study.²⁵ In comparison with high income countries, the use of other personal protection aids such as masks, covers, and glasses is at a lower level among the Iranian professionals. Montagna et al²⁶ have reported 96%, 91%, and 92% as application rate of gloves, mask, and eye-protection glasses. The statistics demonstrate a high application rate of personal protection devices in

comparison with Iranian dentists. However, some of previous studies show varying rates of using personal protection devices by dentists.²⁷⁻³⁰ This indicates the need for further continuing education with emphasis on using personal protection devices.

Findings of the present study indicate an inappropriate level of observing necessary actions for infection control such as washing hands before and after contact with the patients, using disposable items, applying disinfectants, and hepatitis B vaccination among Iranian dentists. It can be inferred while a relatively acceptable status exists for measures like using disposable items and disinfectants, other measures like separation of infectious wastes from non-infectious waste, environment health, and washing hands are in a relatively undesirable status. A national study conducted in Canada demonstrated that 94-100% of dentists used disposable devices and 60-96% of them disinfected handpieces after every application.²⁵ The results indicate that 25-94% of Iranian dentists are vaccinated against hepatitis B. This rate varies between 68%-98.9% in different countries,³¹⁻³⁴ which indicates a better condition in comparison with Iran.

The findings of the presents study demonstrated a relatively desirable condition for disinfection of dental equipments (exceeding 70%). Another study has shown while about 89% of dentists have the necessary equipments to disinfect their devices, only 45% of them use them.⁶ The rate of observing infection control measures were shown to be at a low level among Iranian dentists. The issue has been seen in several other studies too.^{1,35,36}

The findings of the studies evaluated have been reported in diverse forms and it can be regarded as a weak point for the present study, not allowing for quantitative analyses and calculating of results mean.

However, this study attempted to offer a comprehensive viewpoint towards infection control among Iranian dentists and dental students through summarizing and reporting different aspects of infection control. In order to evaluate the conducted studies and to improve the condition of infection control, further intervention studies are recommended.

Conclusion

Evaluating the results of previously conducted studies indicated an inappropriate knowledge, attitude, and practice among Iranian dentists and dental students regarding infection control. The rate of using personal protection devices and observing necessary procedures for infection control was not consistent with the accepted standards. Therefore, education should be provided and infection control subjects should be emphasized as a priority of academic curricula. Additionally, special programs should be in place to monitor the dental settings for observing infection control standards.

References

- Al-Omari M, Al-Dwairi Z. Compliance with infection control programs in private dental clinics in Jordan. *J Dent Educ* 2005;69:693-8.
- Bray F, Chapman S. AIDS and dentistry in Australia: knowledge, infection control practices and attitudes to treatment in a random sample of Australian dentists. *Community Health Stud* 1990;14:384-93.
- de Melo GB, Gontijo Filho PP. Survey of the knowledge and practice of infection control among dental practitioners. *Braz J Infect Dis* 2000;4:291-5.
- Sofola OO, Uti OG. Hepatitis B virus infection and prevention in the dental clinic: knowledge and factors determining vaccine uptake in a Nigerian dental teaching hospital. *Nig Q J Hosp Med* 2008;18:145-8.
- Yuzbasioglu E, Sarac D, Canbaz S, Sarac YS, Cengiz S. A survey of cross-infection control procedures: knowledge and attitudes of Turkish dentists. *J Appl Oral Sci* 2009;17:565-9.
- Yengopal V, Naidoo S, Chickie U. Infection control among dentists in private practice in Durban. *SADJ* 2001;56:580-4.
- Angelillo IF, Nardi G, Rizzo CF, Viggiani NM. Dental hygienists and infection control: knowledge, attitudes and behaviour in Italy. *J Hosp Infect* 2001;47:314-20.
- Akeredolu PA, Sofola OO, Jokomba O. Assessment of knowledge and practice of cross-Infection control among Nigerian dental technologists. *Niger Postgrad Med J* 2006;13:167-71.
- Guruprasad Y, Chauhan DS. Knowledge, attitude and practice regarding risk of HIV infection through accidental needlestick injuries among dental students of Raichur, India. *Natl J Maxillofac Surg* 2011;2:152-5.
- Ajami B, Ebrahimi M, Seddighi Z. Evaluation of Awareness and Behavior of Dental Students of Mashhad Dental School on Infection Control. *J Mash Dent Sch* 2009;33:53-62. [In Persian]
- Askarian M and Assadian O. Infection Control Practices among Dental Professionals in Shiraz Dentistry School, Iran. *Arch Iranian Med* 2009;12:48-51. [In Persian]
- Askarian M, Mirzaei K, Honarvar B, Etminan M, Araujo MW. Knowledge, attitude and practice towards droplet and airborne isolation precautions among dental health care professionals in Shiraz, Iran. *J Public Health Dent* 2005;65:43-7. [In Persian]
- Ebrahimi M, Ajami B, Rezaeian A. Longer Years of Practice and Higher Education Levels Promote Infection Control in Iranian Dental Practitioners. *Iranian Red Crescent Medical Journal* 2012;14:422-9. [In Persian]
- Eghbal M, Asna-Ashari M, Hosseini M. Knowledge, attitudes, and professional behaviors of dental students in endodontics department of Shahid Beheshti dental school concerning infection control principles. *Beheshti Univ Dent J* 2004;22:369-77. [In Persian]
- Simari H, Sadeghi R, Abrahimi Z. Assessment of senior dental students' knowledge and attitude on infection control. *Daneshvar* 2007;14:23-36. [In Persian]
- Hekmatian E, Khalafi H. Evaluation of awareness of dental practitioners in Bushehr regard to infection control techniques during dental radiographic procedures. *Journal of Isfahan Dental School* 2012;7:523-33. [In Persian]
- Alipour V, Araghi-zadeh A, Dindarlo K, Rezaei L. Infection control status in Bandarabbas city dental clinics in year 2006. *Hormozghan Medical Journal* 2007;12:115-20. [In Persian]
- Najafi Doulatabad S, Mohebi Nobandegani Z, Ghafarian Shirazi H. Self evaluation of dentists of Yasouj regarding the observance rate of infection control principles. *Dena* 2009;3:65-73. [In Persian]
- Hashemipour M, Moshrefian S, Alizadeh M, Ravaei HR. Survey of infection control in Kerman City dental laboratories. *Journal of Isfahan Dental School* 2008;3:17-23. [In Persian]
- Alavi S, Akbari H, Ahmadzad Asleh M, Majed K, Davoudi A. Hepatitis B vaccination status and infection control behavior among dentists participating in the forty-second international congress. *Journal of Islamic Dental Association* 2006;17:48-56. [In Persian]
- Zakerijafari H, Mohammadisalami H. Knowledge, attitude and practice of implant dentistry dental students in infection control in Rasht. *Iranian Journal of Infectious Diseases and Tropical Medicine* 2009;13:71-4. [In Persian]
- Valiollahi S, Anissian A, Dabiran S, Razavi S. Assessing the compatibility rates of governmental dentistry centers of Tehran with desirable infection control criteria and the factors involved, 2004. *JQUMS* 2009;13:92-8. [In Persian]
- Banks T, Jones JH, Sarll DW. Dental surgery assistants' roles in cross-infection control in general dental practice: their knowledge and use of autoclaves. *Br Dent J* 1994;177:378-81.
- Daniel SJ, Silberman SL, Bryant EM, Meydrech EF. Infection control knowledge, practice, and attitudes of Mississippi dental hygienists. *J Dent Hyg* 1996;70:22-34.
- McCarthy G, Koval J, John M, McDonald J. Infection control practices across Canada: do dentists follow the recommendations? *J Can Dent Assoc* 1999;65:506-11.
- Montagna M, Napoli C, Tato D, Liguori G, Castiglia P, Tanzi M. Multicentric survey on hygienic aspects in private dental practice. *Ann Ig* 2003;15:717-24.
- Onana J, Ngongang A. Hygiene and methods of decontamination, disinfection and sterilization in dental offices in Yaounde. *Odontostomatol Trop* 2002;25:45-51.
- Farrier S, Farrier J, Gilmour A. Eye safety in operative dentistry—a study in general dental practice. *Br Dent J* 2006;200:218-23.

29. Scully C, Moles D, Fiske J. Infection control: a survey of UK special care dentists and dental care professionals. *Prim Dent Care* 2007;14:40-6.
30. Kanjirath P, Coplen A, Chapman J, Peters M, Inglehart M. Effectiveness of gloves and infection control in dentistry: student and provider perspectives. *J Dent Educ* 2009;73:571-80.
31. Leggat P, Chohanadisai S, Kukiattrakoon B, Yaping B, Kedjarune U. Occupational hygiene practices of dentists in southern Thailand. *Int Dent J* 2001;51:11-6.
32. Taiwo J, Aderinokun G. Assessing cross infection prevention measures at the dental clinic, university college hospital, Ibadan. *Afr J Med Sci* 2002;31:213-7.
33. Martins A, Barreto S. Hepatitis B vaccination among dentists surgeons. *Rev Saude Publica* 2003;37:333-8.
34. Whittle J. An audit of the hepatitis vaccination status of staff in general dental practices in Lancashire. *Prim Dent Care* 2003;10:27-9.
35. McCarthy G, McDonald J. Improved compliance with recommended infection control practices in the dental office between 1994 and 1995. *Am J Infect Control* 1998;26:24-8.
36. Oliveira ER, Narendran S, Falcao A. Brazilian dental students' knowledge and attitudes towards HIV infection. *AIDS Care* 2002;14:569-76.