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REVIEW ARTICLE

Infection Control Policy for Dental Practice: An Evidence-based Approach

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ABSTRACT

Having a policy on infection control based on current evidence and guidelines is essential for all dental practices. The evidence shows that all the members of the dental team may not possess adequate knowledge of all relevant aspects related to infection control, such as the transmission of infectious diseases, current regulations, etc. Moreover, there exists evidence to support the value of education and certified training the dental professionals in improving their understanding of infection control policies and procedures. The training must be provided by an expert team comprising of an academician with suitable clinical experience and demonstrable expertize in dentistry, and a microbiologist who understands the needs of dental settings. Evidence suggests that a training over 10 hours is associated with maximal benefits; and the CDC and BDA guidelines recommend training to all dental staff (clinical as well as nonclinical) for optimal benefits. Successful implementation of the infection control policies depends on the adequate provision of time and facilities for the same.

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INTRODUCTION

Ignaz Semmelweis, a Hungarian physician (1818-1865), now regarded as the 'father of infection control,' first demonstrated that doctors were causing deaths by not washing their hands prior to patient examinations.[1] Cross-infections contribute to unsafe care which is responsible for a great deal of mortality and morbidity globally.[2] It was not until the recognition of the risk associated with the hepatitis B virus (HBV) in 1970s and the human immunodeficiency virus (HIV) in 1980s, the dental profession embraced the fundamentals of infection control seriously.[3-5]

For several years, immersion of instruments in boiling water was the method of choice for decontamination of instruments.[5] The recommendations, such as the 'universal precautions' or 'standard precautions' accelerated the widespread use of gloves as barriers by dental professionals.[4] The British Dental Association (BDA) in 1986 and Center for Disease Control (CDC) in the USA in 1987 recommended the universal precautions for the prevention if blood borne infections. A reported case of suspected transmission of HIV from an infected dentist in the UK prompted the use of autoclaves in the UK in 1990.[5] American Dental Association (ADA) in collaboration with the CDC developed guidelines for dental practices in 1993.[6] The CDC updated the guidelines on the infection control measures for dental practice on several occasions and a comprehensive guidance for procedures in dental settings was made available in 2003; which was recommended by the ADA for all dental practices.[6]

Why is it Important to have a Policy for Infection Control?

This section presents appraisal of evidence related to the risk of infections and cross-infections to dental professionals, the patient perspective, knowledge and attitude of dental professionals, and the need and importance of training for the infection control.

RISK OF INFECTIONS AND CROSS-INFECTIONS TO DENTAL PROFESSIONALS

Cross-infections are a threat to the dental professional and the patient alike in a dental situation.[7] Dental personnel are at a risk of blood borne infections through percutaneous injuries, and airborne infections due to close proximity with the patients.[8,9] Poor infection control on the part of dental professionals can also jeopardize patients' safety putting them under undue risks of developing infections.[10]

Mahboobi et al (2010) reported that dentists have the highest risk of acquiring cross-infections among health professionals, with 2.5- to 6-fold higher experience of hepatitis B among dentists.[11] The aerosols that form in the dental clinics from both the equipment and patient sources can cause droplet infections such as tuberculosis, influenza, Legionnaires' disease, sudden acute respiratory syndrome (SARS), pneumonic plague, etc.[12] Certain dental professionals such as the pediatric and orthodontic dental teams are more prone to infections like mumps, measles, chicken pox, cytomegalovirus, etc.[13] Babaji et al (2011) reported that during the working hours in a clinic, air bacterial count has a 3-fold increase (aerobic bacterial count increasing 1.5 times and anaerobic bacterial count increasing 2 times).[14] Cleveland et al (1997) reported a three times increase in needle stick injuries in dentists over the decade 1986 to 1995.[8] Coleman et al (2010) reported that the tank water supply (which is usually not potable), biofilms in

waterlines, suction pipes and hoses were the sources of infections to patients.[15] Contaminated endodontic instruments were identified as a source for prion infection.[5] Furthermore, the methicillin-resistant *Staphylococcus aureus* (MRSA) could spread through direct and indirect contacts such as contaminated hands, surfaces, objects, etc. and through droplets.[16]

Therefore, in view of the threat to the professionals, it is necessary for the practices to have adequate infection control measures in the form of well-documented policies.

THE PATIENT PERSPECTIVE

From a patient perspective, the risk of infection transmission is related to dentists not complying with the infection control policies. In a national survey of a representative sample of 6,444 dentists in Canada, with a response rate of 66.4%, it was stated that the compliance of dentists was inadequate for most infection control procedures.[10] The authors reported that 70% dentists used only the basic barriers (gloves, masks, eye protection); 42.6% dentists used basic barriers, and also washed hands before patients and after removing gloves; 33.2% dentists used basic barriers, washed hands before patients and after removing gloves, and were immunized against HBV with their staff; and only 28.8 dentists used basic barriers, washed hands before patients and after removing gloves, were immunized against HBV with their staff; and heat-sterilized handpieces. 'Excellent compliance' was found only in 5.6% of the dentists.[10] In a study of all dental practices in Scotland National Health Services, it was reported that many practices were lacking in quality infection control procedures.[17] Thus, it can be seen that there could exist disparities in what is recommended (in the policies), and what is being practiced, which is a threat from the patient's perspective.

KNOWLEDGE AND ATTITUDE OF DENTAL PROFESSIONALS AND IMPORTANCE OF POLICIES AND TRAINING FOR INFECTION CONTROL

Only having policies may not bring about sufficient change in the practices. The knowledge and attitude of the dental professionals must change for effective infection control. Research has pointed out to deficiencies in the training of the dental personnel and the need for imparting knowledge to them for better infection control measures. In a study by Greshon et al (1998), only 15% dentists felt that the risk of blood borne infections was high in dental clinic premises.[18] Gordon et al (2001) reported a systematic review on adherence to infection control guidelines by dental professionals of 71 articles published during 1980 to 1999, and authors stated that the knowledge of dentists required to be updated regarding the transmission of infections.[19] They also reported that training of nurses and dental surgery assistants was much needed, and improvements were necessary in the policy documents and implementation, too. The authors, however, felt that the awareness regarding the guidelines was increasing among dentists with reference to certain acts, such as immunization against hepatitis B and sterilizing handpieces.[19] McCarthy et al (1999) found that attending education over more than 10 hours was a strong predictor of 'excellent compliance' to infection control guidelines among dentists (odds ratio: 6.3).[10] Ashton et al (1994) reported the findings of a questionnaire survey of dental surgery assistants in North England. They found the certified dental surgery assistants to be more knowledgeable than the noncertified ones. A total of 50% of the dental surgery assistants were not carrying out the procedures up to their satisfaction due either to lack of time or inadequate facilities. The authors also stated that the dental surgery assistants needed training and work experience for carrying out the infection control procedures; and the responsibility for their deficiencies lied with the employers.[7]

Cleveland (1997) reported a decrease in the needle-stick injuries in dental professionals on imparting them education.[10] Although dental professionals understand the importance of policies and training with regards to the infection control guidelines, there is also a demand that the guidelines should be practical and cost effective.[20] Petti and Polimeni (2010) pointed out that 'absolute safety is generally an unachievable goal' and recommended that periodic revisions of infection control guidelines be based on scientific evidence rather than mere additions to the old guidelines.[21] The authors also felt that the risk of infection was usually inflated due to unknown routes of transmission of diseases, and demanded that a certain risk be termed acceptable if the probability of occurring the same was rare enough.[21]

Thus, it is evident from the literature that in addition to the need for a policy, training of the dental professionals is essential for the successful infection control in dental settings.

Discussed below is staffs training program and the implementation of the policy and procedures for infection control in dental clinics.

TRAINING DENTAL PROFESSIONALS

Training dental professionals must be evidence-based. The CDC guidelines (2003) have outlined the requirements of training dental professionals on infection control measures.[22] The BDA Advice Sheet A2 on infection control also states

that the training must be mandatory to all the staff members.[17] As mentioned in the CDC guidelines, the infection control programs have the best chance of meeting success if dental professionals understand the rationale. Unambiguous and practical policies help effective implementation of the programs. The training should be imparted to the personnel at the beginning of their job assignment, or and continued periodically on a yearly basis. Educational materials must be within the legal framework of the governing authorities and must enable the learner easy understanding of the subject.[22] The BDA recommends use of videos, online and printed manuals for this purpose.[17] Training should entail the risks, infection-control policies and procedures, management of occupational hazards, hazards communication, and prevention of exposures and management of post exposure. The training should also be given to those with relatively few risks (nonclinical staff) so that the understanding of its importance is emphasized.[17,22]

Described below (Table 1) is a framework of a training program on infection control for a dental practice.

Table 1: Framework of a training program on infection control for a dental practice

Aspects of training	*Description*
Vision of the training	To enable the practice of infection control in dental clinics to protect the patients and the clinic staff from contracting infections, uplift the overall standards of dental care and assure all patients and staff the feeling of 'safety'.
Objectives of the training	To enable the clinic team adopt and document a policy on infection control; and develop a system of checking compliance and keep updated with the guidance.
Training to whom	All members of the dental team: the dentists, nurses and auxiliary staff, such as dental surgery assistants and the nonclinical staff. Some aspects of the training should also be extended to laboratory technicians if possible.
Training period	The training period should be least 10 hours (based on the evidence); however, specific requirements of the first time attendees and nonclinical staff should be matched.
Who provides the training	The training must be provided by a recognized specialist team or two experts in the field, such as an experienced academician who has demonstrated past experience of having worked in the relevant area and also is involved in a dental practice, and a microbiologist with adequate knowledge of dental equipment and procedures.
Manner of training	The training program can be made interactive with: • Power-point presentations • Live demonstrations (for example, hand washing) • Hands-on (for example, operating the equipment, assisting the transfer of instruments, etc.) • Assessment of knowledge-gain by a short quiz • Feedback of participants
List of topics to be covered in the training	Details for each topic presented below:
Fundamentals of infection control	• Concepts: cross-infections, sterilization, decontamination • Historical background • Risks in the dental environment: to patient and to dental staff • Airborne and bloodborne infections • Universal precautions/standard precautions
General cleanliness in the clinics	• Cleaning the floor and walls with a disinfectant • Maintaining surfaces of furniture, chairs clean and dust-free • Replacing the tank water supply to dental chair with distilled water, specially procured for dental/medical use or cleaning of water tanks regularly and checking portability of water • Cleaning of suction lines and hoses with disinfectant flushing • Cleaning of dustbins and waste baskets preferably with a disinfectant
Personal hygiene	• Proper uniforms—aprons, with the use restricted to clinic areas • Personal barriers for the protection of eyes, use of face masks and hand gloves • Hand hygiene: hand-washing routine • Removal of ornaments, such as rings, bangles, wrist watches prior to carrying out procedures • Regular cutting of nails and covering hair with caps
Immunization	• All dental staff working in the operatory must have received HBV vaccine
Decontamination	• Presoaking (to reduce prion infections) • Cleaning (ultrasonic cleaner and washer disinfector preferred over manual) • Inspecting (for residues, corrosion and defects) • Sterilization using the best and most recommended method, i.e. autoclaving for all hand instruments, instrument trays, forceps, handpieces, burs, etc. • Storage in sterile condition away from the dental chair units in secure cabinets until used; in pouches, tray system (UV cabinets), closed lid window, closed autoclave drums, boxes or cassettes • Concept of zones

Contd.

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Disinfection of surfaces, reducing air contamination	• Proper cleaning of surfaces of dental chairunit, X-ray arms, light cure machine, etc. using suitable chemicals • Avoiding contamination while operating chair light, switch-buttons, arms • Practicing four-handed dentistry • Fumigation of operatories, periodic swab tests for the surfaces and air counts of bacteria by authorized laboratories • Prerinsing, i.e. minimizing aerosol formation by asking the patient to rinse with an antiseptic solution • Use of high vacuum evacuators (HVEs) • Use of HEPA air purifiers
Disposal of biomedical waste	• Use needle burners and syringe cutters • Segregation of waste disposal and tying up with medical waste disposal agencies
Managing hazards	• Prevention of needle stick injuries by avoiding recapping needles or using correct method for recapping, if at all necessary to recap • Minimizing handling contaminated instruments and waste and use of heavy duty rubber gloves while handling sharp instruments • Postexposure prophylaxis
Handing over material to patients and laboratories	• Care while handing over potentially infectious things, such as X-ray films, old appliances, etc. • Care while sending to and receiving from dental laboratories impressions, dental models, prostheses, etc.
Patient records	• Obtaining sufficient medical history and maintaining records of patients pertaining to acute or chronic infectious condition (such as HIV, HBV, TB, HSV, etc.) and identifying high-risk category, such as drug abusers, professional blood donors, recipients of transfusions, dialysis, chronically ill patients (while maintaining the rights of the patients to disclosing sensitive information and confidentiality) • Existing compromised conditions, such as congenital, rheumatic heart diseases, uncontrolled diabetes, etc.
Miscellaneous	• Proper laundry of contaminated linen • Staying away from patients if suffering from acute infectious diseases, such as common cold, or in case of a finger cut or an open wound • Separate footwear for dental professionals and if possible for patients in the operatory • Periodic health checkups of the clinic staff • Documentation: autoclave registers, laboratory reports, checklists, etc. • Management of time and resource
Certification	Certification of the participants and enrollment for periodic training and evaluation

Implementation of the Infection Control Policy in Practice

There is no single approach to the implementation of infection control strategies.[12] After undertaking a thorough training and being certified with reference to infection control measures, the staff of the dental clinic should initiate a process of documenting and implementing the standards for practice. Following steps are necessary for the effective implementation of the infection control policy:

- Identifying the equipment required for the implementation
- Identifying the consumables required for the implementation
- Identifying the resources (both the capital and running costs) required for the implementation
- Identifying the additional manpower and time required for the implementation.

The policy of infection control should be documented in the standard operating procedure manual of the clinic. The timeframe for the implementation of the policy should be decided and the infection control measures should be given due priority over other issues. The person responsible for the day-to-day execution of the procedures must be identified and another person to monitor the same, or carry them out in the same manner in case the person responsible is on leave. The communication among the dental staff must be good and in the event of failure to comply, a staff member should be able to 'blow whistles' to protect the larger interest. The most common reasons for the failure to implement infection control policies have been cited as lack of time or facilities; hence the provision of time and sufficient facilities are the key to successful implementation.[7] Additionally, sufficient space provision is necessary (as per the guidelines) in the form of either a decontamination room or a decontamination area.

The clinic must also have a compliance check strategy in place. The compliance check can be regularly carried out with frequent internal audits and if possible, an external audit by a third party. An effective checklist system can be incorporated for the purpose in the documentation.

The infection control policy of the clinic should also be briefly informed to patients either by summarizing the same in the form of a document that is easy for them to understand and displayed appropriately on the notice board in the waiting area. This would assure the patients that they are in safe hands while undergoing the dental treatment in the clinic.

CONCLUSION

Infection control in a practice underpins the dictum of medicine 'first do no harm'. Infection control in dental practice has become an important issue after the identification of HBV and HIV as threats to dental professionals over the past 3 decades. It also is a legal, ethical and quality requirement of the best practice standards. Any lapses in the infection control procedures could cost dear to both the patient and the staff of the practice alike. Current evidence surmises that the dental team may not possess adequate knowledge about the infection control standards and emphasizes the requirement of an infection control policy for any dental practice with stress on mandatory certified training to all the staff, provision of equipment, space, and allocation of specific time and resources for the same.

REFERENCES

1. Best M, Neuhauser D. Ignaz Semmelweis and the birth of infection control. Qual Safe Health Care 2004 Jun;13(3):233-234.
2. Jha AK, Prasopa-Plaizier N, Larizgoitia I, Bates DW. Patient safety research: an overview of the global evidence. Qual Safe Health Care 2010 Feb;19(1):42-47.
3. Mosley JW, White E. Viral hepatitis as an occupational hazard of dentists. J Am Dent Assoc 1975 May;90(5):992-997.
4. Kanjirath PP, Coplen AE, Chapman, JC, Peters MC. Effectiveness of gloves and infection control in dentistry: student and provider perspectives. J Dent Educ 2009 May;73(5):571-580.
5. Whitworh CL, Palmer N. Decontamination in primary care dentistry. J Infect Prevention 2010 Nov;11(6):200-204.
6. American Dental Association. Statement on infection control in dentistry; 2004. Available from: http://www.ada.org/1857.aspx.
7. Ashton MA, Jones JH, Sarll DW. Factors affecting the role of dental surgery assistants in cross-infection control in dental practice. J Dent 1994 Dec;22(6):349-351.
8. Cleveland JL, Gooch BF, Lockwood SA. Occupational blood exposures in dentistry: a decade in review. Infect Control Hosp Epidemiol 1997 Oct;18(10):717-721.
9. Thomas MV, Jarboeb G, Frazer RQ. Infection control in the dental office. Dent Clin North Am 2008;52(3):609-628.
10. McCarthy GM, Koval JJ, MacDonald JK. Compliance with recommended infection control procedures among Canadian dentists: results of a national survey. Am J Infect Control 1999 Oct;27(5):377-384.
11. Mahboobi N, Agha-Hosseini F, Mahboobi N, Safari S, Lavanchy D, Alavian SM. Hepatitis B virus infection in dentistry: a forgotten topic. J Viral Hepatitis 2010 May;17(5):307-316.
12. Harrel SK, Molinari J. Aerosols and splatter in dentistry: a brief review of the literature and infection control implications. J Am Dent Assoc 2004 Apr;135(4):429-437.
13. Runnells RR. An overview of infection control in dental practice. J Prosthet Dent 1988 May;59(5):625-629.
14. Babaji P, Samadi F, Jaiswal JN, Bansal A. Occupational hazards among dentists: a review of literature. J Int Dent Med Res 2011 Aug;4(2):87-93.
15. Coleman D, O'Donnell MJ, Boyle M, Russell R. Microbial biofilm control within the dental clinic: reducing multiple risks. J Infect Prevention 2010 Nov;11(6):92-199.
16. Zimmerli M, Widmer AF, Dangel M, Filippi A, Meyer J. Methicillin-resistant Staphylococcus aureus (MRSA) among dental patients: a problem for infection control in dentistry? Clin Oral Investig 2009 Dec;13(4):369-373.
17. Smith GWG, Smith AJ, Creanor S, Hurrell D, Bagg J, Lappin DF. Survey of the decontamination and maintenance of dental handpieces in general dental practice. Brit Dent J 2009 Aug; 207(4):E7.
18. Greshon RRM, Karkashian C, Vlahov D, Spannhake E. Correlates of infection control practices in dentistry. Am J Infect Control 1998 Feb;26(1):29-34.
19. Gordon BL, Burke FJ, Bagg J, Marlborough HS, McHugh ES. Systematic review of adherence to infection control guidelines in dentistry. J Dent 2001 Nov;29(8):509-516.
20. Bagg J, Sweeney CP, Roy KM, Sharp T, Smith A. Cross infection control measures and the treatment of patients at risk of Creutzfeldt Jakob disease in UK general dental practice. Brit Dent J 2001 Jul;191(2):87-90.
21. Petti P, Polimeni A. The rationale of guidelines for infection control in dentistry: precautionary principle or acceptable risk? Infect Control Hosp Epidemiol 2010 Dec;31(12): 1308-1310.
22. Kohn WG, Collins AS, Cleveland JL, Harte JA, Eklund KJ, Malvitz DM. Guidelines for infection control in dental health-care settings. Center Dis Control Prev 2003 Dec;52(RR17):1-61.

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