

Educational compliance with infection control practices in dentistry

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Summary

Dental students are at risk of exposure to pathogens while they become more involved in patient contact during their training. It is the responsibility of academic institutions to lay the foundation for safer work practices in dental health care by providing training in infection control to protect patient's health and the health of undergraduate students. Studies monitoring occupational injuries and infection control practices among dental students are necessary to assess the efficacy of infection control training and facilitate the development of educational interventions to improve adherence to guidelines and reduce injuries. The objective of this study was to investigate occupational injuries and compliance with recommended infection control procedures reported by undergraduate dental students in their final year of The Faculty of Dental Medicine (U.M.F. "Gr.T. Popa" Iași). *Method.* Data from an anonymous, self-administered questionnaire were analyzed. The questionnaire included 25 items covering knowledge and attitudes related to disinfection, sterilization, HIV and HBV, infection control practices and occupational injuries.

Results. Occupational injuries that increase the risk of infection were reported by 40.5% of respondents. It has been supposed that dental students are at increased risk of occupational injury because of inexperience in performing invasive procedures. 56.7% of dental students reported more frequent use of gloves and masks than eye protection and 28.6% of them were aware of correct post-exposure protocols. Educational interventions by implementation of new programs, protocols, techniques, and devices in controlling occupational exposure to bloodborne pathogens are required to improve handling of sharps, use of barriers and post-exposure follow-up.

Key words: infection control, occupational injuries prevention, student's compliance.

Introduction

Strict infection control is required to prevent the spread of disease, since many dental procedures involve direct contact with blood and saliva. The HIV/AIDS epidemic precipitated rethinking the methodology and importance of protective precautions. Health professionals practicing in the European Union must possess the basic knowledge and skill essential for their patients' protection and safety. Infection control is a set of recommended safety precautions that dentists implement to protect their patients and staff in the office.

In 1983, the Centers for Disease Control (CDC) made the first recommendations for the

prevention of exposure to blood and body fluids through the use of universal precautions. In 1986, less than 30 percent of dentists wore gloves, masks or gowns. Today, these infection control tools are required in all dental practices.

Universal precautions, as defined by the CDC, refer to a set of precautions designed to prevent the transmission of HIV, HBV, and other bloodborne pathogens in the health care setting. According to this concept, blood and other body fluids are considered to be infectious with HIV, HBV, and other bloodborne pathogens in all patients. Saliva is generally not considered to be infectious, however, in dentistry special precautions are observed because the possible contamination with blood is predictable. The infection

control policies and procedures must not be based on the serological status of any patient for any particular disease, but are designed to provide safe and effective treatment to all patients without discrimination due to health status. The application of universal precautions to all patients is necessary because of the limitations of routine health history information. It is unlikely that dental personnel will know the infectious disease status of their patients because many infected patients are unaware that they are infected and that their blood or saliva may be capable of transmitting certain infectious diseases. Some patients will not reveal known infectious diseases to health care due to fear of discrimination from proper treatment.

Infection control in dental education

The actual real concern by both public and professionals over the transmissibility of infectious diseases in the dental surgery had demanded a formalized and extended approach to teaching cross-infection control in the dental curriculum. Baseline knowledge must be obtained in the pre-clinical period but is translated to clinical training. It must be fully integrated and extended through the entire clinical training period with equal standing to the traditional parameters of clinical effectiveness. The competence of new graduates in establishing a clinical protocol will be an important mean for disseminating current information and practices in infection control.

Students, who are the primary providers of care, must have their actions monitored regularly to determine whether or not infection control procedures have been followed and if they are effective. The goals of a dental school infection control program must be to minimize or eliminate the risk of transmission of bloodborne pathogens to patients and dental health care workers in the dental care environment by stimulating compliance with each aspect of the infection control program. Also, it must provide the faculty, staff and students with sufficient protection against bloodborne pathogens to deliver routine dental treatment to hepatitis B carriers, HIV antibody positive patients, diagnosed AIDS patients, and patients with other known bloodborne infectious diseases.

At the completion of the program, students are expected to:

- understand the principles of workplace health and safety as it applies to dentistry;
- be able to identify workplace hazards, and design and implement strategies to overcome them;
- understand the concept of cross-infection control as applied to personnel and patients;
- be able to design and implement a cross-infection control protocol for a dental establishment;
- be able to converse with, and educate members of the public on any of the above areas;
- be able to conduct an in-service staff training program.

Needle stick injuries in dental practice

The dental practitioner and staff are continuously exposed to potential percutaneous injury by needles or sharp instruments that have been contaminated by blood or saliva.

Depending upon the nature of the contents of the needle adverse health effects may be noted either through direct contact with bloodborne pathogens or other pathogens, toxins, drugs, chemicals, etc., or indirectly, through subsequent infection. Therefore measures must be taken to prevent possible injury through the use of safe techniques, procedures and selection of specialized equipment. Although recognized needle stick injuries occur very often, accurate statistics are difficult to obtain due to the lack of reporting.

Causes of needle stick injuries may be traced to:

- equipment design: needle devices requiring additional manipulation, non-retracting or shield needles, poor designed needle/syringe fittings;
- recapping: 15%-20% of all injuries result from the needle missing the cap;
- training: lack of technique;
- work conditions: crowded environment, limited time;
- disposal practices: dispose of non approved sharps container, lack of ability.

The danger of contaminated penetrating sharps injuries during student's clinical training cannot be eliminated, but adherence to the following recommendations will limit the occurrence of injury:

- use needleless techniques wherever possible;
- never recap a needle by moving the needle toward another body part, especially the other

- hand; the one-handed scoop method should be used;
- never recap a needle by a cooperative effort between two people;
- transfer double-ended instruments as close to the handle center as possible;
- use a needle stick shield or an approved capping device whenever possible;
- do place needles, expended sharps and anesthetic cartridges into the puncture resistant containers located at each unit. The disposal unit must be placed as close to the treatment area as practical and clean-up procedures must minimize the handling and transport of blood contaminated disposables.
- do use special care when exchanging or transferring instruments during and following patient treatment.

Objective

The objectives of this study were to assess the compliance with recommended infection control procedures and to investigate nonsterile occupational injuries reported by undergraduate dental students of the fifth and sixth years of study – Faculty of Medical Dentistry, University of Medicine and Pharmacy “Gr. T. Popa”, Iași.

Method

The study population included 187 dental students of the fifth and sixth year. Women represented 61.7% of dental students respondents. The students were asked to complete a self-administered, anonymous questionnaire, which included 25 items covering knowledge, attitudes, infection control practices and occupational health. For the purpose of this study, an occupational injury was defined as any needle stick injury or cut. The questions related to bloodborne transmission of infectious diseases, and compliance for infection control procedures were:

1. What should you do if you suffer a needle stick injury?
2. What changes you consider necessary if the patient is HIV-positive?
3. How many times did you suffer an accidental needle stick injury?
4. What personal protection do you consider necessary for dental team when carrying out:

- conservation of a tooth
- extraction of a tooth

5. What changes you consider necessary if the patient is HIV-positive?

6. What personal protective equipment do you use during dental procedures?

- masks
- gloves
- eye protection

7. How should you dispose of sharps?

Results

All 187 questionnaires were completed and results analyzed. Nonsterile occupational injuries were reported by 40.5% of dental students (Figure 1).

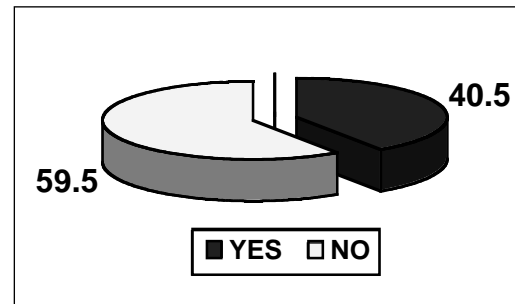


Figure 1. Students' reports of contaminated occupational injuries

Women gave 57.3% of the positive answers and 63.1% of the negative answers (Table 1). There were not significant differences in occupational reports by gender.

Table 1. Occupational injuries reports by gender

Students' reports	Occupational injury prevalence (%)	
	Women	Men
Yes	57.3	42.7
No	63.1	36.9

It is discouraging that more than half of the students who reported injury in this survey did not record the exact post exposure protocol required (immediate wound care by washing with water and soap and disinfection with an suitable product like chlorhexidine and reporting of the exposure for evaluation by a staff physician which is responsible for determining the appropriate course of management) (Figure 2).

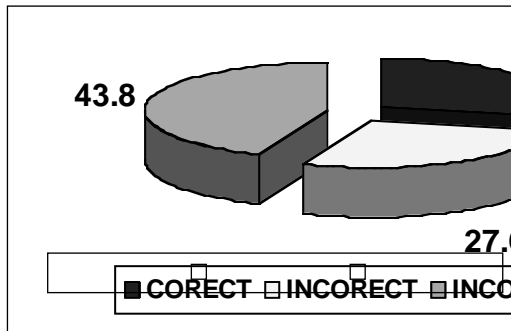


Figure 2. Compliance with post exposure protocols in dental students who reported occupational injuries

Knowledge of post exposure protocols is crucial as prophylaxis for HIV and can reduce the risk of infection by 80%. Those protocols are recommended within 2 hours of exposure. There are also time constraints for the administration of hepatitis B immune globulin to those who have inadequate HBV antibody protection.

Dental students were significantly more aware of post exposure protocols and were also more likely to use follow-up procedures for injury if the patient was HIV-positive. When treating HIV-infected patients and contact with blood or body fluid is expected, types of added precautions reported double gloving, being more cautious and serological tests. Any lower standard increases the risk of cross-infection.

The prevalence of needle stick injuries by procedure was: 47.3% syringe needle, 31.5% endodontic instrument, 21.2% others (Figure 3).

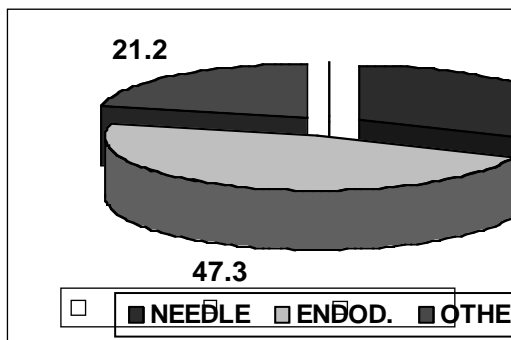


Figure 3. Injuries prevalence by object

Approximately 60% of students surveyed in our study considered masks, gloves and eye-glasses to be important protection for themselves. Compliance for the complete protective

equipment was reported in 56.7% of questionnaires. However, 43.3% of the respondents ignored the risk of ocular infection and reported less-frequent use of eye protection (Table 2).

Table 2. Compliance for protective equipment in dental students

Protective equipment	Compliances responses (%)
Complete equipment (gowns, masks, gloves, eyeglasses)	56.7
Partial protection (gowns, masks, gloves)	43.3

There were not significant differences for the two students groups (with and without exposures) in the inquired level of protection (Table 3).

Table 3. Protective compliance by exposure reports

Exposure reports	Protection equipment compliance (%)					
	Compl. E.Q.		Masks, Gloves		Gloves	
	F	M	F	M	F	M
YES	31.6	21.0	26.3	15.8	5.3	
NO	28.6	25.0	28.6	17.8		

Needlestick injuries prevention

The physical, emotional, and financial consequences of percutaneous injury from contaminated sharps and needle sticks can be severe and sometimes fatal. A safe work environment can be achieved through prevention activities to reduce exposure to needle stick and sharps injuries.

According to the CDC, up to 86% of needlestick injuries can be prevented by using safer needlestick devices.

Exposure and subsequent harm related to percutaneous injuries should include both *primary* and *secondary* prevention strategies. Traditionally, efforts to reduce the risk of needle stick exposure have focused on secondary prevention techniques including attempts to make the needle or sharps safer by blunting, shielding or retracting the needle. More recently, efforts have focused on primary prevention strategies to remove needles and sharps from the environment entirely, or when absolutely necessary, reduce the frequency of its use. Primary prevention strategies focus on the use of needleless

devices and diagnostics, safety securement devices (Figure 4), and surgical glues and adhesives as alternatives to needles and sharps. Where occupational exposure remains personal, protective equipment shall also be used. Engineering controls include needleless systems, retractable needles, retractable blades, blunt needles, and various devices used to occlude or cover the point of the needle to prevent accidental needle stick or sharps injury.

Most percutaneous injuries are predictable and preventable; however, when they occur the individual should have immediate support and access to post-exposure evaluation and treatment.

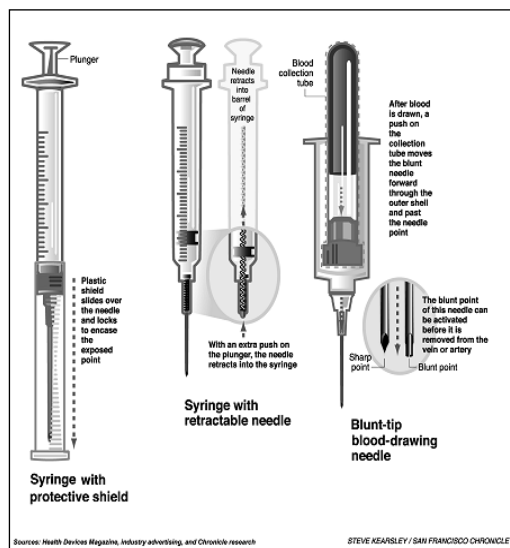


Figure 4. Syringes with safety devices

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Conclusion

1. Cross-infection control must be clearly an identifiable component of the dental curriculum. Baseline knowledge must be obtained in the preclinical period and translated to clinical training.

2. Nonsterile occupational injuries were reported by 40.5% of dental students, women giving 57.3% of the positive answers and 63.1% of the negative answers.

3. More than half of the students who reported injuries did not record the exact post-exposure protocol as result of a low perception of risk.

4. Needle stick reports by object were: 47.3% – syringe needle, 31.5% – endodontic instrument, 21.2% – others.

5. Subjects' compliance to complete protection equipment (56.7%) demonstrates their decreased awareness to self-protection. 43.3% of respondents ignored eye protection.

6. Interventions to improve and maintain optimal compliance with infection control guidelines are required and must take into consideration personal factors as well as organizational and administrative factors.

7. Comprehensive educational interventions based on primary and secondary prevention strategies as safer recapping methods, reinforcement of the use of puncture-proof containers for disposal, and adoption of safer devices are required in decreasing the incidence of needle-stick injuries.

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