Infection Control Measures Among Senior Dental Students in Rio de Janeiro State, Brazil

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Abstract

Objective: The aim of this study was to verify the practices and attitudes of senior dental students about infection control procedures. **Methods:** A cross-sectional survey was performed during the 1st semester of 2003. Open- and close-ended questions were given to 196 students in 6 universities. **Results:** Overall, 90.8% of students had been vaccinated for hepatitis B. Only 25.0% have been assessed for anti-HBs. A total of 99.5% students reported always using gloves for all procedures. Eye protection were always used by 84.2% of students, and all the students used face masks for all procedures. Caps or hair covers were used by 92.3% of students and 87.8% reported no objection to treating patients with infectious diseases. Among instructors, the students observed that 60.2% of them did not use gloves for all procedures. These results address the need for an improved quality assurance, in order for the students and faculty to improve their practices and attitudes on infection control measures.

Key Words: infection control, dentistry, dental students, infectious diseases

Introduction

Dentists are at risk of exposure to various blood-borne and upper respiratory pathogens through contact with blood, saliva and other body fluids. This risk is enhanced by accidental injuries caused by dental instruments. Many dental patients may appear clinically healthy according to physical examination and medical history (1), therefore, applying risk management strategies or standard precautions should not be based on patient appearance.

Dental schools are responsible for providing appropriate infection control measures, proper training of dental students to protect patients, and for laying the foundation for safer work conditions (2). Updated infection control recommendations providing guidelines for safer dental procedures are frequently published (3-5). The most reliable approach to controlling cross-infection in dentistry is the implementation of standard precautions in all dental health care settings (3,6).

The purpose of the study was to identify barriers and other violations/ breaches to safe work practices in a dental school environment and to evaluate the adherence to infection control procedures of senior dental students in Rio de Janeiro's state universities.

Methods

The study population was comprised of only senior dental students (n=215) in 3 public (Universidade Federal Fluminense, Universidade Federal do Rio de Janeiro and Universidade do Estado do Rio de Janeiro) and 3 private universities (Universidade do Grande Rio, Faculdade de Odontologia de Nova Friburgo and Universidade Veiga de Almeida) in Rio de Janeiro State, Brazil. A lottery drawing was used to select the private schools from among nine available.

A questionnaire was developed with open- and closed-ended questions, to obtain information and data on senior dental students' practices and attitudes about infection control procedures during the 1st semester of 2003.

The questions related to hepatitis B vaccination and serology, use of personal protective equipment, gloves use by instructors, percutaneous and mucous membrane exposures, and dental treatment of infected patients.

A pilot survey was conducted with 35 dental students in a non-participating private university to ensure that the questions were understandable. The responses to these questions were not included in the final survey. The questions were modified based on the feedback thus obtained and the project was submitted and approved by the ethical Committee at Universidade Federal Fluminense.

One of the authors distributed the questionnaire, on the same day and time, to all senior dental students present at each school chosen for that day. The questionnaire was immediately filled out, and after signing a consent form they were returned to the senior author who coded them to ensure confidentiality of the responses. The data obtained were tabulated and analyzed by frequency, average, per-

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cent and chi-square test, with a 5% level of significance. Data analyses were conducted using SPSS® for windows (11.0.1) package.

Results

One hundred and ninety six students participated in the survey, representing 91.2% of all senior dental students (215), in the 6 chosen universities. The average age was 23.8 (±3.0) years, ranging from 20 to 43 years; 67.9% were women.

Hepatitis B vaccination and serological testing. Immunization was completed by 90.8% of the students; 94.7% among women and 82.5% among men. This difference is statistically significant (p<0.05). Among the immunized students, 66.9% were vaccinated in the past 2 years of their dental school, and 31.5% in the preclinical years. Table 1 shows the data related to hepatitis B immunization, number of doses and post-HBV immunization serology. There was no statistically significant difference between post-HBV immunization serology and gender (p>0.05).

Use of personal protective equipment. Table 2 shows students' selfreported use of protective barrier techniques. Additionally, for protective eyewear use, the women had greater use than men (p<0.05); however, no significant difference between gender and cap use was observed (p>0.05) (Data not shown.).

According to the students, 60.2% of the instructors did not use gloves for all procedures, and 43.4% of instructors did not change gloves between patients.

Rates of percutaneous and mucous membrane exposures. Non-sterile occupational injuries were reported by 31.1% of students. Accidental puncture with anesthetic needle was the cause in 37.1% of cases, followed by periodontal scaler (9.8%), suture needle (8.2%), bur (8.2%), explorer (6.5%), waxing instrument (4.9%) and other miscellaneous instruments 25.3%.

Dental treatment of infected patients. No objection to treating patients having infectious diseases was reported by 87.8% of students.

 TABLE 1

 Frequency and percentage of measures against hepatitis B reported

 by senior dental students

Variable	n	%
Received HBV vaccine (n=178) *		·
3 doses hepatitis B immunization	143	80.3
Less than $\hat{3}$ doses hepatitis B immunization	21	11.6
More Than 3 doses hepatitis B immunization	5	3.0
Don't remember number of hepatitis B immunization doses	9	5.1
Post-HBV immunization serology (n=178) *		
Yes	49	27.5
No	129	72.5
	$X^{2} = 2.4,$	DF=2
	p>0.05	

(n=196)

TABLE 2 Frequency and percentage use of protective barrier techniques reported by senior dental students

	%			Total (%)
	Always	Sometimes	Never	<u>n= 196</u>
Gloves use	99.5	0.5	0.0	100.0
Masks use	100.0	0.0	0.0	100.0
Wear protective eyewear	84.2	10.2	5.6	100.0
Cap use	92.3	6.6	1.0	196 (100.0)

(n=196)

Discussion

Hepatitis B vaccination and serological testing. Hepatitis B immunization among dentists ranges from 6% to 95% but it has increased during the past few years (5, 7-10). Part of the increase can be attributed to the aggressive policies of dental schools requiring vaccination for dental students (8). The authors observed in their sample that women completed the immunization more frequently than men (p<0.05). This fact may be due to historical concern of women regarding preventive measures, specifically for sexually transmitted diseases.

When comparing the number of vaccine doses (Table 1) among vaccinated students (n=178), 83.3% of students received the correct minimum number of doses to obtain adequate immunity (3,4). Correct hepatitis B vaccination is the best procedure to prevent contagious transmission during dental treatments.

McCarthy and Britton (2) in a survey of health care professional students (12.9% dental students, 24.3%

medical students and 40.7% nursing students) in their last year of studies found that 100.0% of dental, 98.7% of medical and 95.3% of nursing students have been vaccinated. However, a significant proportion of students failed to confirm the adequacy of their post-immunization anti-HBs titre (2). In this study, only 27.5% of participants reported post-HBV immunization serology, an important measure in light of the more recent infection control guidelines (3,4).

Of the 90.8% of students reporting HBV vaccination in this survey, 66.9% were vaccinated in the past 2 years of their studies, and 31.5% during the preclinical period, which is the best time to be immunized (3,4).

Although the hepatitis B vaccination rate among students of this sample was high, universal vaccination and serological testing should be encouraged to reduce the risk of acquiring hepatitis B following an occupational exposure.

These results show that male and female students reported statistically

different rates of hepatitis B immunization (p<0.05). This reflects a need to explore the reasons for this gender difference and to eliminate the gap.

Use of personal protective equipment._Although there is evidence of improvement in compliance with barrier use in many countries, dentists' compliance with all infection control guidelines or standard precautions (3-5) remains a target to be achieved. The compliance level in this sample of students for the use of gloves (99.5%) and masks (100%) was high, however the frequency of protective eyewear use (84.2%) was less satisfactory, suggesting that students should be reminded that lack of use compromises protection of eyes. The lower compliance in using protective eyewear may be partly explained by the perception that they are exposed to blood splashes or aerosols with low frequency, being often underestimated.

According to students, only 60.2% of instructors correctly used gloves during dental procedures and 43.4% of those did not change them between patients. This finding is extremely important because instructors should be role models of compliance with standard precautions (6). Dental schools are responsible for transmission of infection control recommendations. It is essential that the teachers stimulate compliance with standard precautions and should asssume that they are unique examples to the students.

In reviewing published reports from other dental schools, the rate of personal protective equipments use was: For gloves, 91.7% (6), 100% (2), and 99.5% (by us); for masks, 62.5% (6), 90.9% (2), and 100% (in this report); For caps, 83.3% (6), 92.3% (by us); for eyewear, 59.7% (6), 93.5% (2), and 84.2% (in this report). Song *et al.* (9) showed a low rate of gloves usage (4.5%) among Korean dentists, which possibly accounts for the high prevalence of HBsAg in that sample.

To date, the practice of standard precautions including the use of bar-

rier techniques has been shown to be the best prevention strategy against occupational transmission of infectious diseases in health care settings, especially dentistry.

Rates of percutaneous and mucous membrane exposures. The survey reports that 31.1% of the students had non-sterile occupational injuries. McCarthy & Britton (2) reported that occupational exposures occurred in 82% of their dental students. Consistent which what was reported by others (1,2), the anesthetic needle was the major source of accidental injuries in our survey.

Sharp injures are more likely to occur in the dental environment than to other health care settings (1), usually due to small operating field, frequent patient movements and the variety of sharp dental instruments. Such injuries may pose a risk of transmission of blood borne pathogens, especially hepatitis B, C, or HIV (1-4).

The results of this study should be interpreted with consideration of recall bias as self-reports of occupational injuries may not be accurate. Additionally, information related to specific circumstances associated with injury was not collected, and more research is required to further investigate occupational exposures among students. Therefore, universities should have a post-exposure management program for non-sterile occupational injures, and comprehensive educational interventions on the risk of nonsterile occupational injuries during their clinical training.

The findings of this study suggest that dental students should be better educated on infection control measures. Dental schools must communicate effectively to students the associated risks and importance of transmission of infectious diseases, and exposures during dental treatment. Educational efforts are needed to improve attitudes, to implement information, and to motivate dental students in the correct and routine use of infection control measures. The authors also stress that instructors should model appropriate infection control compliance for students. Therefore, universities should promote infection control compliance among students and faculty on a continuous basis. This topic also should be a goal of continuing education. Reaching these goals may be an instructional challenge.

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