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# Dentists' Occupational Exposures to Bloodborne Pathogens and Universal Precautions Compliance in Iasi, Romania

*** Lucia Magda Barlean** — Associate Professor , Head of Discipline of Preventive Dentistry, Faculty of Dental, Medicine, University of Medicine and Pharmacy „Gr.T.Popa" Iasi, ROMANIA * correspondent author

**Iulia Catalina Saveanu** — Assistant Professor , Discipline of Preventive Dentistry, Faculty of Dental, Medicine, University of Medicine and Pharmacy „Gr.T.Popa" Iasi, ROMANIA

## ABSTRACT

*The dental team is at risk of exposure to pathogens during clinical activity. The aim of the study is to evaluate the risk for occupational injuries by sharp instruments and the compliance with infection control procedures reported by the dentists in Iasi, Romania. Materials and Methods: Data from an anonymous 20 items questionnaire distributed to 279 dentists was analyzed using SPSS 14.0 system. Results: Occupational injuries during the professional activity were reported by 64,2% of respondents. The most involved sharp instruments were: syringe needles (41,8%) and endodontic needles (39,0%). Data about the clinical conditions and severity of the exposures, dentists' immunization and compliance to Standard Precaution and Post Exposure Protocol are analyzed. Conclusion: It is necessary to promote a realistic perception on infection transmission risk in the dental office and, at the same time, to promote compliance with infection control strategies starting with Universal Precautions*

## INTRODUCTION

Infection control is an essential part of modern dentistry by adopting the concepts of Universal Precautions (1985) and Standard Precautions (CDC / 1996) (1). The complexity of dental care procedures pleads for increasing the individual awareness and responsibility for patient and dental team safety. (2)

## MATERIALS AND METHODS

It was initiated a study based on a anonymous, self-administered questionnaire distributed to 279 dentists working in private dental offices in Iasi , Romania, aged between 26 and 62 years old. The questionnaire included 20 questions regarding the exposures by sharp instruments and the compliance to safety procedures. Data were analyzed using SPSS 14.0 system.

## RESULTS

Out of the investigated dentists 38% were women and 62% men. The number of years of professional activity of the dentists ranged between 1 and 37. The time spent daily by the dentists at work ranged between 4 and 9 hours.

64,2% of the subjects reported occupational lesions by sharp instruments during their professional activity and 41,8% of them experienced such an injury in the last year. 17,9% of the dentists who reported accidental injures in the last year suffered 1 to 4 exposures and 39,6 % pricked over 5 times . The most frequent lesion localization was the opposite hand fingers (45,8%). The lesions on the opposite hands' palm were reported by 4,5% of the subjects . Most part of the injuries were produced by infected syringe needles (41,8%) and endodontic needles (39%).

The syringe needle recapping represented the main risk procedure for the accidents (16,2%), followed by the moment after syringe use (14,0%), between clinical procedures at the same patient (13,4%), preparing the syringe (12,3%) and injecting the anesthetic (7,3%) (Fig. 1).

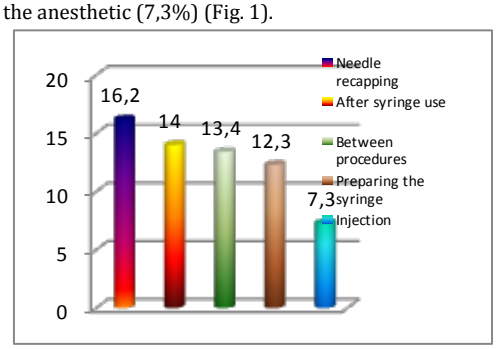


**Figure 1. Syringe needlestick incidence by clinical procedure**

A large percent of the subjects (65,1 % females and 54,4% males) recapped the syringe with both hands ; only 16,1% women and 20,2% men used the one-handed technique and 6,6% women and 8,7% men recapped the syringe in collaboration with the assistant. No dentist used the safety devices for needle recapping .(Table 1)

**Table nr. 1 . Syringe needle recapping technique**

| | Recapping with both hands | | Recapping with one hand | | Collaboration with dental assistants | | Recapping by the dental assistant | | Safe devices | | No recapping | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | Nr. | % | Nr | % | Nr | % | Nr | % | Nr | % | Nr | % |
| Women | 69 | 65,1 | 17 | 16,1 | 7 | 6,6 | 9 | 8,5 | 0 | 0 | 4 | 3,7 |
| Men | 94 | 54,4 | 35 | 20,2 | 15 | 8,7 | 19 | 10,9 | 0 | 0 | 10 | 5,8 |

Concerning the severity of exposures by syringe needlesticks 36,9% of the subjects mentioned that they experienced moderate bleeding after needle prick and only 1,1% indicated severe lesions followed by important bleeding. The data offered by the questionnaires shows that needlestick and scalpel injuries are associated with reduced bleeding while injuries determined by endodontic needles produce minimal bleeding ($p < 0,05$).

22,3% of the investigated subjects pointed out the unexpected movements of the patient as circumstances of the accident, followed by dental personnel fatigue (16,8%) and negligence (14,5%).

72,6% of the subjects reported that they are immunized against Hepatitis B virus (HBV). The full protective equipment (gown, mask, gloves, glasses) is used for all the patients by 73,1% of the dentists; 90,9% of them are compliant to rubber gloves.

The assessment of the dentists' attitude towards the Post Exposure Protocol demonstrate that 35,8% of the subjects wash and disinfect the accidental lesion , 21,2% only use antiseptics and 16,2% simply rinse the plague with water and then finish the clinical procedure. 22,7% of the respondents are aware of the need to evaluate the infection risk. This percent correlates significantly with the proportion of subjects immunized against HBV ($p < 0,05$).

## DISCUSSIONS

Transmission of bloodborne pathogens in the medical settings by accidental exposures to sharp instruments represents the most common transmission way for hepatitis

viruses (HBV, HCV) and HIV, with severe consequences for the health status of the patient and medical team (3). The trans-

mission risk after percutaneous injury is 30%, 1,8% and, respectively, 0,3%.

WHO estimated in 2000, that 501 000 deaths occurred because of unsafe injection in the past and unsafe injections in 2000 will lead to 9 million years of life lost between 2000 and 2030. (4).

In this study the percentage of the dentists exposed to blood by occupational incidents is in agreement with the WHO reports for the developing regions where 40%–65% of HBV and HCV infections in health-care workers were attributable to percutaneous occupational exposure (5) .

Syringe needle stick injuries account for 80% of accidental exposures to blood contact or other blood infected fluids and represents the most frequent and severe risk for pathogens transmission. A quarter of the subjects recapped the syringe by bimanual technique which represents the most important risk procedure for accidental lesions and is not recommended by the safety guidelines . In contrast with our data, the compliance with safety needle recapping mentioned in the literature ranged between 44% - 92%. .

The most frequent lesion localization on the opposite hand fingers and palm suggests deficiencies in the functional and ergonomic organization of clinical activities which should focus on optimal instrument and equipment positioning, ergonomically selection of the equipment, removal of harmful maneuvers and procedural steps. The pre-procedural preparation of the instruments, increasing the efficiency and standardizing clinical procedures are essential in order to adopt the functional concept of "Four handed dentistry".

One third of the dentists are not vaccinated against HBV as a result of a poor compliance to this essential preventive measure considering the fact that dental care professionals are included in the A risk category regarding the exposure to infection. Even though they are concerned about the possible transmission of bloodborne pathogens the percentage of the dentists immunized against HBV is far below that reported in similar studies: Canada - 91%, UK – 86%, USA – 93% (6).

The preventive measures recommended by the European Union Resolution regarding protection of medical personnel in Europe (2003) include education and training, safety professional procedures and protection technologies. The percentage of the dentists using the rubber gloves as protective equipment is close to the values reported in Canada (McCarthy – 95%) and UK (Gibson- 95%) (7).

Occupational exposure to bloodborn pathogens must be seen as medical emergency and calls for a strict protocol known as Post-Exposure Protocol (PEP) (8). A small proportion of the dentists take into account the necessity of the exposure evaluation in order to establish the proper attitude. Medical personnel exposed should benefit of counseling, regular medical check-up, post-exposure testing and medical evaluation for PEP initiation.

**CONCLUSION**

The complexity of dental care procedures pleads for increasing the medical staff awareness and responsibility for patient and dental team safety. It is necessary to promote a realistic perception on infection transmission risk in the dental office and, at the same time, to promote compliance with infection control methods starting with Universal Precautions.

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