

LEVEL OF KNOWLEDGE CONCERNING THE PREVENTION OF INFECTION TRANSMISSION AMONG DENTISTS IN IASI, ROMANIA

Livia Bobu¹, Lucia Barlean¹, Carina Balcos¹, Magda Barlean²,
Alice Murariu^{1*}, Iulia Saveanu¹

¹ "Grigore T. Popa" University of Medicine and Pharmacy - Iași, Romania, Faculty of Dentistry, Department of Surgicals

² "Grigore T. Popa" University of Medicine and Pharmacy - Iași, Romania, Faculty of Dentistry, Department of Implantology. Mobile restorations. Technology. Oro-Dental Diagnostic and Gerontostomatology

Corresponding author: Alice Murariu, DMD, PhD; *e-mail*: murariu_alice@yahoo.com

ABSTRACT

Aim of the study. The aim of this study was to assess dentists' knowledge in preventing infection transmission, after having participated in professional training courses. **Material and methods:** 127 dentists from Iasi, Romania, aged 25-65 years, were investigated using a 14 item questionnaire with simple / multiple responses. **Results:** 66.5% of the investigated dentists were familiar with the elements included in the concept of preventing the infection transmission in the dental office. 90% of the subjects knew the complete post-exposure protocol for accidental contamination with infected blood, but only 36.8% of those surveyed knew the substances used for high-level disinfection. **Conclusion:** The main methods and techniques for the prevention of infection transmission in dental medicine are known by most of the investigated practitioners, but further training programs are required in the area to increase the level of knowledge.

Key words: dentists, Romania, infection transmission

INTRODUCTION

The study was conducted in the framework of the strategic project called "Competences for Competitiveness" and was included in the market research entitled "Current practices in the field of ergonomics, prevention and management in dentistry" as part of the project "Ergonomics, prevention, performance management in dental medicine through alignment with European standards" (Contract POSDRU/81/3.2/S/55651). The main goal of the project was to bring Romanian practices in line with the working methods of dental practitioners to European ones by creating coherent and effective professional training programs through an integrated concept.

The project brought together three important specializations: dental

ergonomics, dental prevention and health and dental management, in a unitary concept, the prevention part referring to infection control, minimally invasive treatments, prevention programs, in general a preventive work optic.

The purpose of this descriptive study was to evaluate the knowledge in the field of control of transmission of the infection in dental medicine, following the participation in vocational training courses.

MATERIAL AND METHODS

The target group of the project consisted of 1000 dentists, 500 dental assistants, 300 dental technicians and 100 managers working in the six counties of the northeastern region of Romania. Of these, 127 dentists (72.4% women and 27.6% men) aged between 25 and 65 years were selected

for this study. Data collection was done through the questionnaire survey method applied in the "face-to-face" scheme in the dental office. The questionnaire included 42 single or multiple answer questions, grouped by sections about: attitude towards the infected patient, education in the field of infection control, protective equipment in the dental office, sterilization methods, collaboration with dental assistant. In the present study the knowledge regarding the control of the infection in dentistry (14 questions) were analyzed.

Data analysis was performed using SPSS 14.0. For the comparison of data, the chi-square statistical test was used. The threshold for statistical significance was set at 0.05.

RESULTS

The analysis of the answers obtained from the questionnaires showed that the prevention of transmission of the infection in dental medicine is considered to include: universal precautions (12.50% of all questioned), avoiding contamination risk procedures (3% of the subjects), controlling the infection chain with the detection of

sources (10.20%), control of the contamination of the waterline system (7%). Most subjects (66.50%) considered all these aspects as part of the concept of preventing transmission of infection in the dental office.

With regard to the prevention of airborne pathogens, 16.60% of the respondents considered that this could be achieved by periodic ventilation of the cabinet, 20% - by using air conditioning units with antimicrobial filters, 3% - by using a saliva vacuum, 4% - through pre-procedural rinses with antiseptic solutions, and the majority of subjects (57%) considered all these procedures as necessary to prevent transmission of the infection by air.

In contrast, less than half of the subjects (46%) were aware that chlorhexidine gluconate was used in the form of aqueous or detergent solution in a concentration of 2% in the products for hands decontamination.

With regard to blood transmission, 89.3% of subjects included in the study knew that the complete post-exposure protocol for accidental contamination with infected blood was localized lesion treatment, exposure assessment, and general treatment (Fig. 1).

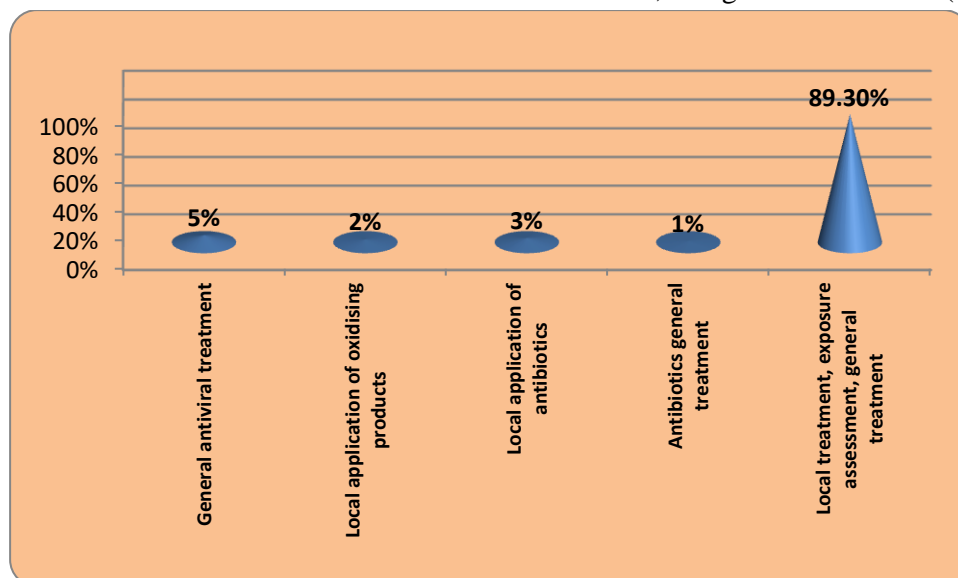


Figure 1. The responses rate for the complete post-exposure protocol for accidental contamination with infected blood

In contrast, a quarter of those surveyed (26.70%) considered that strategies to prevent puncture injuries include selective use of protective equipment; 63.50% considered that needles need to be recovered by unimanual technique, while 7% were considering the placement of syringes in the middle of the operator field for the prevention of puncture injuries, and 3% - selective vaccination of medical personnel.

Only half of the subjects included in the study knew that disinfection was the method

of eliminating / destroying pathogenic microorganisms, except spores, from inert surfaces, while 24% considered it a method of destroying all microorganisms and 17% - of removing microorganisms from the surface of living tissues.

With regard to disinfectants used in the dental office, only 36.8% of those surveyed knew the substances used for high-level disinfection (Fig. 2).

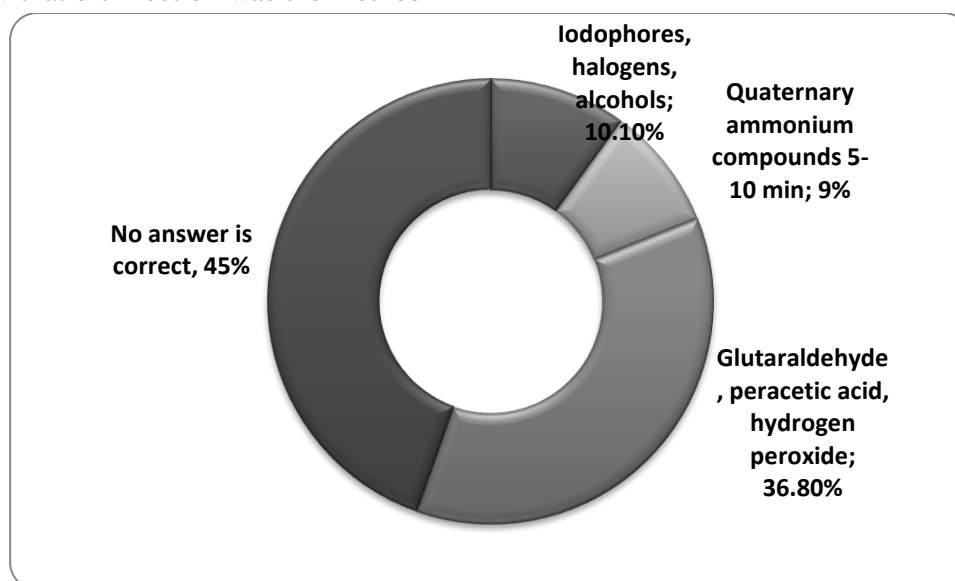


Figure 2. The rate of responses for high-level disinfection products

Sterilization was recognized by 69% of study participants as the method of destroying all saprophytes and pathogens, while 23% considered it a method of destruction only of pathogenic microorganisms, 5.9% - of viruses and fungi, and 1.8% - of saprophytic microorganisms.

Regarding sterilization indicators, 59% of those surveyed knew that they might be physical, chemical or biological (the most accurate).

Handpieces are tools that are often not properly processed in the dental office in terms of transmission of microbial agents.

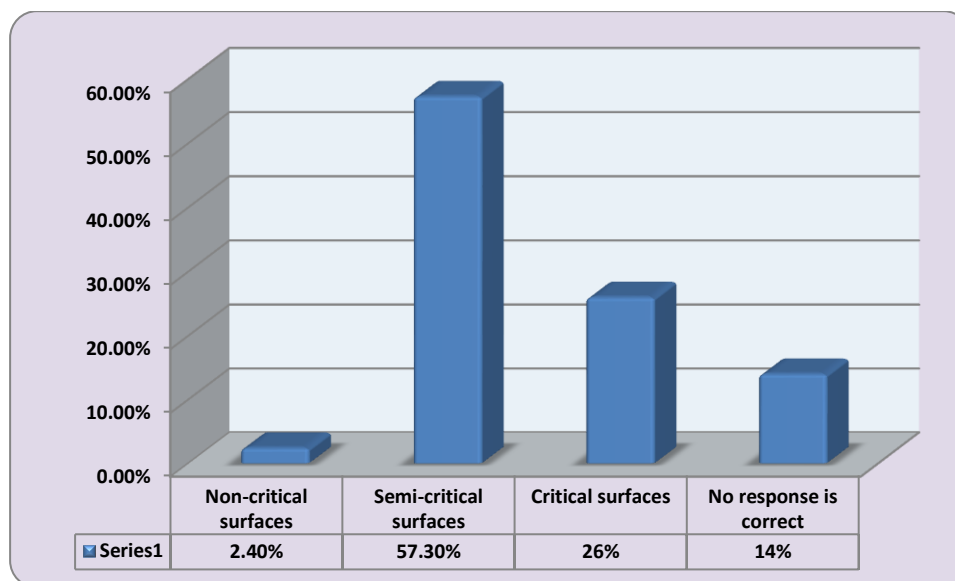


Figure 3. Distribution of responses to the risk of contamination of handpieces

Of all the respondents, only 83.30% considered handpieces to be semi-critical or critical areas (come in contact with oral mucosa/injured tissues) for which sterilization is required (Fig. 3).

DISCUSSION

Infections may be transmitted in the dental operatory through several routes, including direct contact with blood, oral fluids, or other secretions; indirect contact with contaminated instruments, operatory equipment, or environmental surfaces; or contact with airborne contaminants present in either droplet splatter or aerosols of oral and respiratory fluids. Infection via any of these routes requires that all three of the following conditions be present (commonly referred as the chain of infection): a susceptible host, a pathogen with sufficient infectivity and numbers to cause infection, and a portal through which the pathogen may enter the host. Effective infection control strategies are intended to break one or more of these links in the chain, thereby preventing infection (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. 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 (2- 5).

Oral health-care facilities have led the way in implementing infection-control practices by routinely incorporating hand hygiene and sterilisation procedures. This has contributed positively to the reduction of various disease-transmission challenges. Additionally, since the mid-1980s, before any of the other health professions, oral health-care facilities have rapidly incorporated hepatitis B virus (HBV) vaccinations for personnel members (6, 7, 8).

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. 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. The results of previous studies

indicate inappropriate knowledge, attitude, and practice regarding proper measures of infection control among dentists (9-14).

Current epidemiological data outline the risk of exposure and possibility of transmitting diseases when providing oral health-care treatment. The World Dental Federation (FDI) thus recommends that all oral health-care professionals keep their knowledge and skills current. With the application of up-to-date knowledge and skills, transmission of infectious diseases could be managed in oral health-care facilities. Recent media reports on breaches of infection control in USA oral health-care facilities have increased public concern. Compliance with infection control and factors associated with the implementation of CDC infection-control guidelines were investigated by Cleveland et al. from the USA (15). The authors linked compliance with infection control to continuous professional education through various modes/events of education. Examples of the modes of learning and education included workshops, journal articles and Internet-based learning. Furthermore, Cleveland reported that younger dental practitioners, who had been in their current practice for less than 30 years, were more likely to implement infection-control guidelines. Exposure to more intensive and varying types of infection-control education were highlighted as possible reasons for better compliance among younger oral health-care practitioners. Apart from the age of practitioners, it was also reported that the size of facilities played a role in compliance with infection control. The results indicated that larger facilities, employing nine or more oral health-care practitioners and other personnel, were more likely to have implemented guidelines and also to have more knowledge to comply with infection

control when compared with solo or smaller facilities.

However, basic knowledge of infection prevention and control varies among countries. In a study investigating the education and knowledge of Turkish dental practitioners, only 43% of participants were able to define 'cross-infection' correctly (16). In Brazil, education and knowledge was agreed to contribute to improved infection-control attitudes and behaviour. However, upon further investigation of the compliance with infection control, the results in practice were worrying (17). Similarly, findings in India indicated that oral health-care professionals have good knowledge of infection control. However, the authors admitted that the compliance levels with infection control were low. Singh et al. concluded that infection-control guideline training among oral health-care personnel and cooperation with local hazardous waste-disposal authorities were identified as priorities (18).

On the other hand, the existence of knowledge in the area is not a guarantee of its application in the practice. Knowledge, attitude and practice act as three pillars, which make up the dynamic system of life itself. Knowledge is some information that is acquired or gained. Knowledge, being the basic criterion that allows one to earmark between the right and the wrong, is a mixture of comprehension, experience, discernment and skill. Attitude accredits to thinking towards a proper situation. There could be a number of furtherance to empathize a situation but it depends on how an individual reacts towards the situation. Practice means contemplation of rules and knowledge that lead to action. Thus, a right knowledge, a positive attitude and a good practice are imperative to guide and serve the patients (19).

CONCLUSIONS

The main methods and techniques for the prevention of infection transmission in dental medicine are known by most of the

investigated practitioners, but further training programs are required in the area to increase the level of knowledge.

REFERENCES

1. Singh A., Purohit B.M., Bhambal A., Saxena S., Singh A. et al, Knowledge, Attitudes, and Practice Regarding Infection Control Measures Among Dental Students in Central India, *Journal of Dental Education*; 2011, 75(3): 421-427.
2. Laheij A.M.G.A., Kistler J.O., Belibasakis G.N., Välimaa H., de Soet J.J., Healthcare-associated viral and bacterial infections in dentistry, *Journal of Oral Microbiology* 2012,4: 17659 - <http://dx.doi.org/10.3402/jom.v4i0.17659>.
3. Ayatollahi J., Ayatollahi F., Ardekani A.M., Bahrololoomi R., Ayatollahi J. et al, Occupational hazards to dental staff, *Dent Res*; 2012, 9(1): 2-7.
4. Murariu A., Vasluianu R., Matricala L., Stoica I., Forna N.C., In vitro evaluation of morphological integrity of dental enamel exposed to carbamide peroxide-based bleaching agent, *Revista de Chimie*; 2016, 67(10): 2103-2105.
5. Vasluianu R., Agop Forna D., Zaltariov M., Murariu A., In vitro study using ATR-FTIR method for analyze the effects of the carbamide peroxide on the dental structure, *Revista de Chimie*; 2016, 67(12): 2475-2478.
6. Oosthuysen J., Potgieter E., Fossey A., Compliance with infection prevention and control in oral health-care facilities: a global perspective, *Int Dent J*; 2014: 1-15.
7. de Amorim-Finzi M.B., Cury M.V.C., Costa C.R.R., dos Santos A.C., de Melo G.B., Rate of Compliance with Hand Hygiene by Dental Healthcare Personnel (DHCP) within a Dentistry Healthcare First Aid Facility, *Eur J Dent*; 2010, 4: 233-237.
8. da Silva Sacchetto M.S.L., Barros S.S.L.V., de Alencar Ararape T., Silva A.M., Faustino S.K.M. et al, Hepatitis B: Knowledge, Vaccine Situation and Seroconversion of Dentistry Students of a Public University, *Hepatitis Monthly*; 2013, 13(10): e13670.
9. Khanghahi B.M., Jamali Z., Azar F.P., Behzad M.N., Aghdash S.A., Knowledge, Attitude, Practice, and Status of Infection Control among Iranian Dentists and Dental Students: A Systematic Review, *J Dent Res Dent Clin Dent Prospect*; 2013,7(2):55-60.
10. Duarte Valim M., Instruments for evaluating compliance with infection control practices and factors that affect it: an integrative review, *Journal of Clinical Nursing*; 2014, 23(11-12): 1502-1519.
11. Su J., Deng X.H., Sun Z., A 10-year survey of compliance with recommended procedures for infection control by dentists in Beijing, *Int Dent J*; 2012, 62(3): 148-153.
12. Săveanu C.I., Cristea A.P., Dănilă V., Golovcencu L., Anistoroaei D., Forna N.C., Comparative study for evaluation of level of education of students in rural and urban area, *Romanian Journal of Medical and Dental Education*; 2018, 6 (1): 31-37.
13. Barlean L.M., Saveanu I.C., Dentists' Occupational Exposures to Bloodborne Pathogenes and universal Precautions Compliance in Iasi, Romania, *International Journal of Scientific Research*; 2014, 3 (4), ISSN 2277-8179.
14. Barlean L.M., Dănilă I., Săveanu I.C., Dentists ergonomic knowledge and attitudes in north-east region, *Romanian Journal of Oral Rehabilitation*; 2012, 4(1): 40-3.
15. Cleveland J.L., Foster M., Barker L., Brown G.G., Lenfestey N., Advancing infection control in dental care settings. Factors associated with dentists' implementation of guidelines from the Centers for Disease Control and Prevention, *JADA* ; 2012, 143(10):1127-1138.
16. Yüzbaşıoğlu E., Saraç D., Canbaz S.Y. et al. A survey of cross-infection control procedures: knowledge and attitudes of Turkish dentists, *J Appl Oral Sci*; 2009, 17: 565–569.
17. De Abreu M.H.N.G., Lopes-Terre M.C., Braz L.F. et al. Attitudes and behavior of dental students concerning infection control rules: a study with a 10-year interval. *Braz Dent J*; 2009, 20: 221–225.
18. Singh B.P., Khan S.A., Agrawal N. et al. Current biomedical waste management practices and cross-infection control procedures of dentists in India, *Int Dent J*; 2012, 62: 111–116.

19. Jain M., Sawla L., Mathur A. et al. Knowledge, attitude and practice towards droplet and airborne isolation precautions among dental health care professionals in India, *Med Oral Patol Oral Cir Bucal*; 2010, 15: e957–e961.