



# OCCUPATIONAL INFECTIOUS RISK IN DENTISTRY - AWARENESS AND PROTECTION

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## SUMMARY

**Introduction:** The syllabi of many dental subjects include topics about infectious diseases. Students are informed about their symptoms, transmission routes, prevention and treatment. Great attention is paid also on the necessity of full medical history, appropriate disinfection and sterilization protocols and the use of personal protective means.

**Purpose:** We aim to determine to what extent dental students and dentists evaluate the risk of infectious diseases and protect themselves and their patients.

**Participants and methods:** Dental students in their fourth, fifth and sixth year, and dentists fill an anonymous questionnaire about the protection means they apply - types and frequency of usage. They are asked if they are vaccinated against HBV and if they are informed about their patients' infections, as well.

**Results:** 94 dental students and dentists from Varna have filled the questionnaire. All of them use different protection means in their everyday clinical practice and most of them are HBV vaccinated.

**Conclusions:** It is absolutely necessary to protect ourselves and the health of our patients. The adequate academic training of dental students implies future responsible work.

**Key words:** infectious diseases, dentistry, protection, infection control

## INTRODUCTION

There is a vast risk of transmission of blood-borne and other occupational microbial pathogens in everyday dental practice [1]. So guidelines for infection control are designed and introduced to dental practitioners and students. The syllabi of many dental subjects include topics about infectious diseases – students are informed about their symptoms, transmission routes, prevention and treatment.[2, 3] Great attention is paid also on the necessity of full medical history, appropriate disinfection and sterilization protocols and the use of personal protective means.

The awareness level is usually good but compliance to infection control precautions is globally suboptimal. This leads to the necessity of continued education and revision of the recommendations, based on the updated scientific information. [4, 5, 6, 7, 8]

The purpose of our study is to determine the knowledge and compliance of dental students and professionals with the guidelines for infection control – the extent of infectious risk evaluation and adherence to protection measures.

## PARTICIPANTS AND METHODS

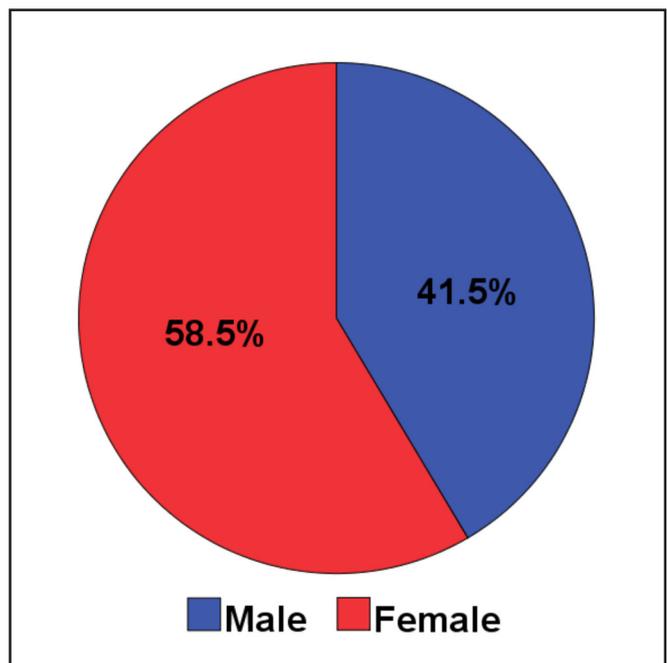
Dental students in their fourth, fifth and sixth year, and dental practitioners complete self-administered questionnaire about infection control. The questionnaire consists of 7 items regarding hands washing and application of protection means (types and frequency of usage), vaccination status (hepatitis B immunization and subsequent assessment of anti-HBs), awareness about their patients' infection status (human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), herpes simplex virus (HSV)) and attitude to these patients, proper obtaining and registration of medical history.

Data are analyzed using SPSS software, version 19, as  $p \leq 0.05$  is considered significant. Variety of tests are implemented for this purpose - chi-square, Shapiro-Wilk, Mann-Whitney, Kendall's tau, Cramér's phi.

## RESULTS

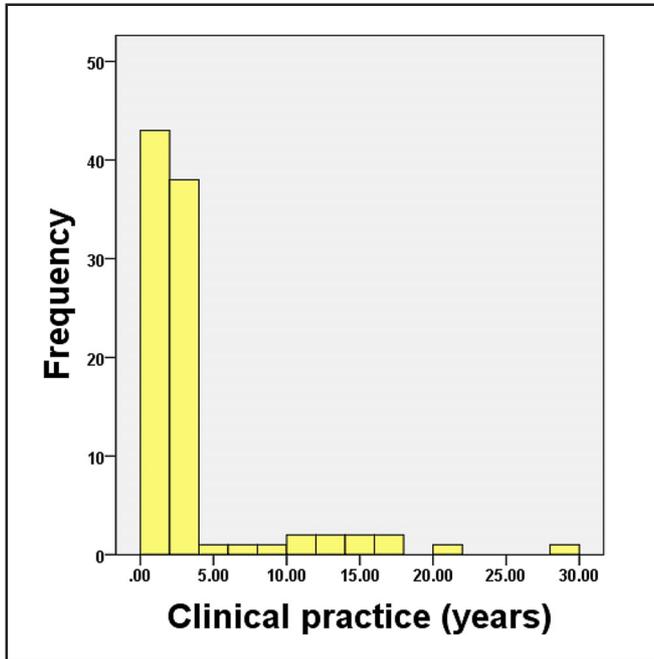
The questionnaire is completed by 94 participants in the first quarter of 2014. The participants are students from the Faculty of Dental medicine in Varna and dentists from Varna, as 39 (41.5%) of them are males and 55 (58.5%) are females (Fig. 1). The females prevail insignificantly ( $p=0.099$ ).

Fig.1



Students' clinical practice is between 1 and 3 years and dentists' one is logically bigger. As the students prevail in the group, the average clinical practice duration is  $3.41 \pm 4.68$  years and the distribution based on clinical practice duration is not normal ( $p=0.000$ ) (Fig. 2).

Fig. 2.



All participants in the study (students and dentists) report that they use various protective means and procedures in their everyday clinical practice (Table 1). Respondents that always use gloves and masks, change masks after every patient and wash their hands before and after every manipulation, prevail significantly ( $p=0.000$ ). On the other hand, most of them occasionally use goggles and rarely or never put on shield ( $p=0.000$ ). Gender is not determinative for the application of protective means ( $p>0.05$ ).

Comparing the various factors of the study, weak up to moderate correlation is estimated in the application of different protective means and procedures (Table 2). There is also weak negative correlation between the duration of clinical practice and the usage of gloves ( $\tau=-0.245$ ,  $p=0.010$ ), and the duration of clinical practice and mask change ( $\tau=-0.259$ ,  $p=0.003$ ) (Fig. 3).

Table 1.

Usage of \ %	Never	Rarely	Occasionally	Almost always	Always
Gloves	-	-	1.1	7.4	<b>91.5</b>
Mask	-	-	5.3	27.7	<b>67.0</b>
Goggles	1.1	11.7	<b>42.6</b>	24.5	20.2
Shield	27.7	<b>30.9</b>	29.8	7.4	4.3
Hands pre-wash	-	6.4	7.4	11.7	<b>74.5</b>
Hands post-wash	-	-	-	8.5	<b>91.5</b>
Mask change	3.2	13.8	14.9	19.1	<b>48.9</b>

Table 2.

Correlation pairs	$\tau$	p
Mask use – Goggles use	0.297	0.001
Mask use – Hands pre-wash	0.315	0.001
Goggles use – Shield use	0.245	0.005
Hands pre-wash – Hands post-wash	0.418	0.000

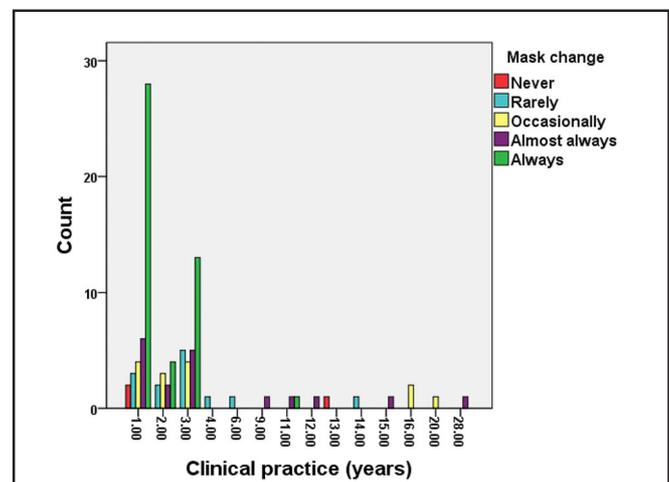


Fig. 3.

A lot of patients are suspected for different infectious diseases suffering or viral shedding, but only appropriate medical history and patient's conscientiousness may prove this fact. Almost all respondents (96.8 %) declare they ask their patients about infectious diseases or viral shedding, and 79.8% of them treat their patients as potentially ill. There is no correlation between these two factors ( $\phi=0.059$ ,  $p=0.565$ ). Big parts of the respondents declare that they've worked with patients with HBV or HSV, but only a few know about their patients' HCV or HIV shedding (Fig. 4 - 7).

Fig. 4.

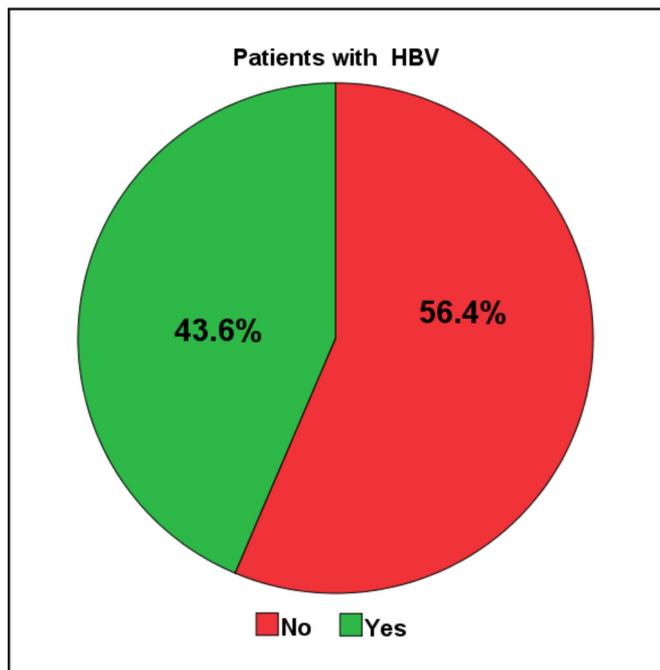


Fig. 5.

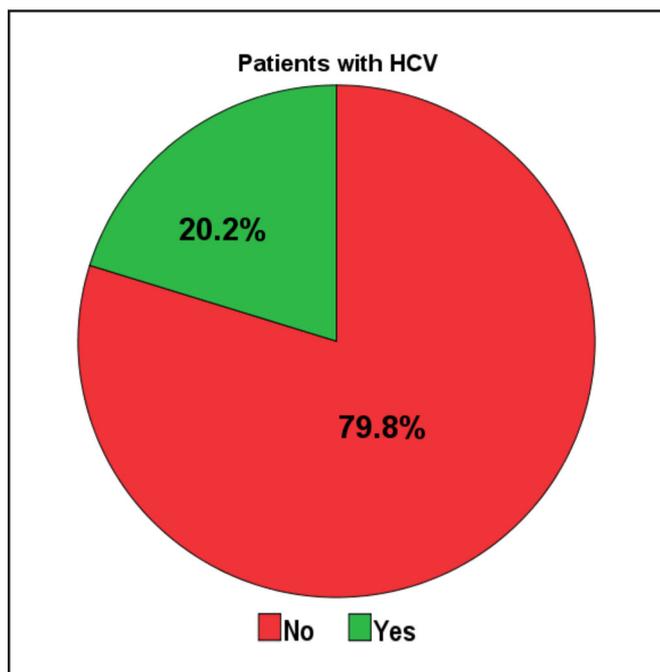


Fig. 6.

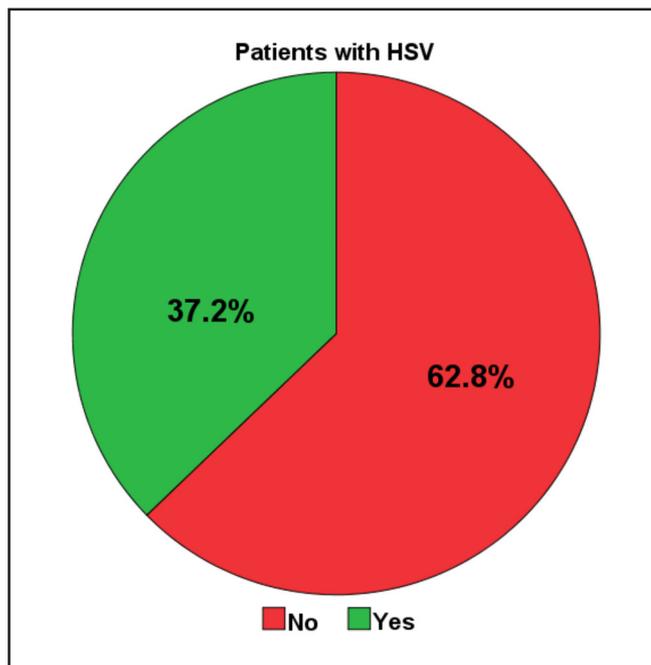
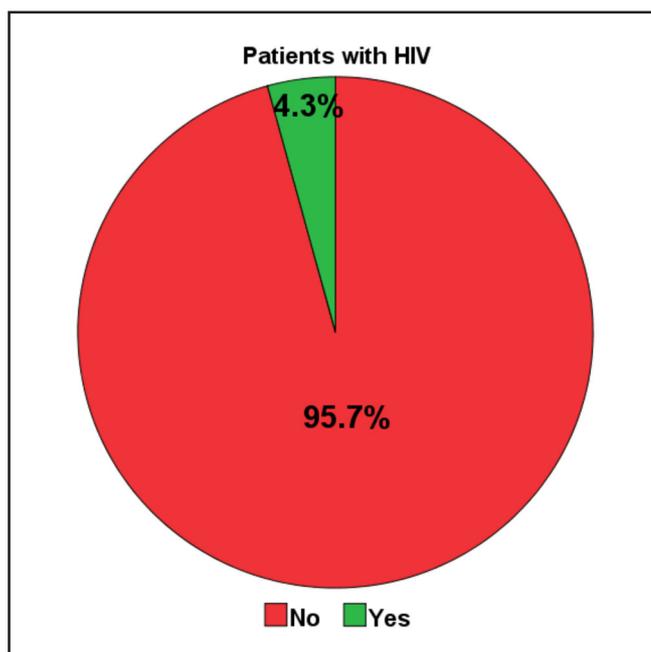
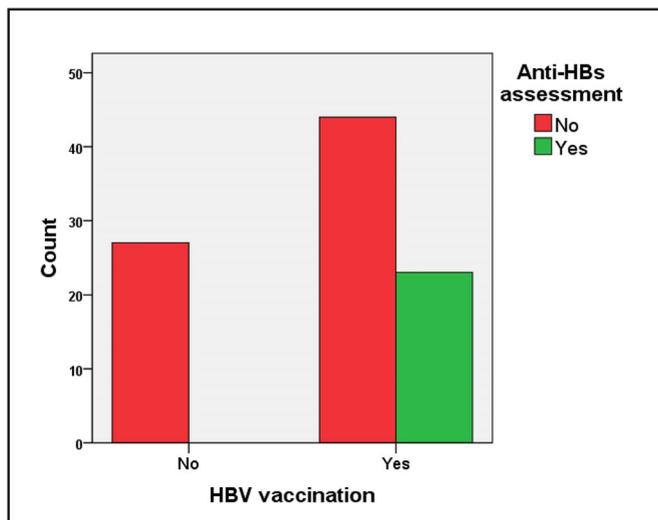


Fig. 7.



More than a third of respondents (36.2%) report for injuries with non-sterile instruments - this is a big frequency for the low average practice duration. Fortunately, the part of practitioners vaccinated against HBV, prevails - 71.3%. Only a third of them have a subsequent anti-HBs assessment ( $\phi = 0.361$ ,  $p = 0.000$ ) (Fig. 8).

Fig. 8.



## DISCUSSION

As the respondents of the study are clinical dental students and practitioners, it is expected to have high level of awareness and adherence to the infection control measures. Knowledge about infectious diseases and protection in the surveyed group is adequate, but standard precautions are not followed strictly enough. Unfortunately, dentists start to neglect the correct protocol of infection control after years of practice - e.g. among students prevail these who change their masks after every patient and practitioners do it less frequently. So introduction of continuous educational programs and training workshops could be helpful in increasing the compliance with the recommendations [3, 5, 9, 10, 11].

Some aspects of protection are fulfilled at good level. As hands are the major source for cross-infection, the reported data that 74.5% of respondents always wash their hands before any manipulation and 91.5% of them do it afterwards also, is satisfactory. It is much better than findings from Yemen and other countries. [5] Gloves are used always by 91.5% of participants. This information is comparable to the data from other studies - the level is slightly higher in Yemen, Saudi Arabia and USA and much lower in Central India and other Asian countries [4, 5, 9, 12, 13].

Unfortunately, eyes and face protection is often neglected. Only 67.0% of the respondents use masks and 48.9% of them change their masks after every patient. Less than a half (44.7%) of the students and practitioners put on goggles always or almost always. This indicates very poor awareness about the possibility about infection transmission via aerosols and blood splashes. On the other hand, those

who use masks most often put eyewear also, which guide us to the idea that compliance with protective measures is a matter of creation of stable habits.

There is responsible attitude to medical history. Majority of the respondents get aware with the infectious status of their patients - 43.6% of them declare treating patients with HBV infection, and 37.2% with HSV infection. HCV and HIV shedding is comparatively rare, so it is normal to have lower shares of treated patients with these diseases - 20.2% and 4.3% respectively. Reported positive attitude is comparable to data from other studies [2, 3, 4, 5, 14]. Most of the respondents (79.8%) take special precautions treating patients as potentially ill. Similar measures are described in a survey by King and Muzzin [15].

According to a survey from 2001, 2.06% of dentists in Bulgaria have positive results for HBV surface antigen (HbsAg) [16]. One of the possible reasons for this fact is the occupational injury with non-sterile instrument and 36.2% of participants in our study report for such problem. Al-Maweri obtained similar results [4], and Halboub even higher ones [5]. It is hard to define whether short clinical experience, insufficient skills, or inattention leads to these injuries.

Slavchev also reports for decreasing of HbsAg positivity among dentists in the last decades [16], and HBV immunization is the major preventive measure. The results of our study are relatively good, but still insufficient - 71.3% of respondents are HBV vaccinated and 24.5% of them (34.3% of the vaccinated ones) have been assessed for anti-HBs. Our findings are better than those in another Bulgarian survey [17] (57.4% vaccinated and 13.9% post-assessed) and the possible explanation is that almost half of their participants are pre-clinical students. The levels of the same indices are also better in studies from Saudi Arabia and Brazil [4, 14], and worse in studies from Mexico, Yemen, Central India, China and Laos [3, 5, 9, 10, 18, 19].

## CONCLUSIONS

We made this questionnaire to address the infection in dental practice, hoping to contribute to its reduction. It is absolutely necessary to protect ourselves and the health of our patients. This is just as important for a successful dental practice as quality, terms and value of work and proper patient-doctor relationship. The adequate academic training of dental students implies future responsible work. The level of protection in the investigated group is high as regards the usage of protection means. Yet, this state should be preserved and improved. On the other hand, level of post-HBV immunization serology is low taking into account that vaccination is mandatory, which needs progress.

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