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ORIGINAL RESEARCH

Dental Infection Control and Occupational Safety in the Russian Federation

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ABSTRACT

Background: In the recent past, the Russian Federation has seen a considerable increase in HIV caseload. A high level committee was formed to assess the status of dental infection control and safety (IC&S) in Russia. This article is one of the outcomes to assess the status of IC&S and is the research of a doctoral student (PhD) in public health.

Purpose: To assess needs in Dental Infection Control and Occupational Safety in the Moscow Metropolitan Region of the Russian Federation.

Materials and methods: A survey with variables assessing knowledge, attitude and practice of IC&S was administered to dentists practicing and or teaching in Moscow city and suburban areas on a convenience sample of dental practitioners.

Results: The total number of completed questionnaires were 303. Over 67% had up to three significant exposures to blood and potentially infectious materials (OPIM), but less than 30% got tested for HIV in the previous 3 months. Use of personal protective equipment was not based on anticipated exposure. Less than 10% had an understanding of Spaulding's classification with respect to sanitization, disinfection and sterilization. Only about 34% stated that there was a potential for infectious disease transmission through a percutaneous route and about 61% double gloved while treating patients with infectious diseases. Only about 61% disinfected impressions and most (83%) used alcohol for disinfection purposes. While 34% still used glass-bead sterilizers, about 13% did not sterilize handpieces between patients.

Conclusion: Results from this study indicated a disparity in the practice of infection control and safety procedures requiring formulation of nationwide dental safety standards. Further, there is a need in implementation of a standardized dental safety curriculum for dental schools and continuing dental education requirements in dental safety for practicing dentists in the Russian Federation.

Keywords: Dental infection control, Occupational safety, Surveys, Russian Federation, Dental safety, Postexposure, Infectious diseases, HIV/AIDS.

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INTRODUCTION

Infection control and occupational safety of dental health care workers is of prime importance with respect to the control of diseases linked to blood-borne pathogens. In the recent past, the Russian Federation has seen a considerable increase of HIV and other blood-borne diseases, resulting in the reassessment of infection control measures in dentistry. The previous infection control and safety (IC&S) standards were published in the 1980s. In 2009, leading Russian academicians in various fields of dentistry, public health, health policy, infectious diseases, along with the heads of the Russian Agency for International Development and the Russian Dental Association, invited experts in infectious disease control in dentistry and dental care for HIV patients from the United States to a meeting convened in Moscow to formulate guidelines to assess needs, educate and facilitate dental IC&S standards and dental care provision for HIV patients of the Russian Federation. An initial outcome of this meeting was to conduct a meaningful assessment of IC&S needs in the Russian Federation through Moscow State University. This manuscript highlights outcomes of the dissertation research of a graduate student of the Moscow State University of Medicine and Dentistry and denotes dental safety needs of the Russian Federation.

BACKGROUND

Common infectious diseases impacting dentistry are the different hepatitis-causing viruses, HIV and AIDS and tuberculosis (TB), including multidrug-resistant TB.[1-9] While hepatitis B, C, D and G viruses follow a blood-borne route of transmission, hepatitis A and E are transmitted

through the fecal-oral route. HIV infection and TB occurring individually or as comorbidities are common conditions that are present in many regions of the world and in certain segments of the population, even in medically advanced countries.[10] Multidrug resistant TB and extremely or extensively drug resistant TB are also a major concern.[11] In the past decade, there have been epidemics of respiratory diseases and infections [e.g. severe acute respiratory syndrome (SARS) and influenza A H1N1] that have caused chaotic effects with respect to daily living in many countries in the world.[12,13] Other common infectious conditions, such as herpetic infections, seasonal influenza and bacterial infections in both patients and clinicians may also impact the quality of dental care.

According to estimates by the Joint United Nations Programme on HIV/AIDS (UNAIDS),[14] there were 33.3 million people living with HIV at the end of 2009 compared with 26.2 million in 1999, a 27% increase. While most medically advanced countries have shown a steady reduction in HIV caseload, Eastern Europe shows an increase. In Eastern Europe and Central Asia prevalence of HIV was about 760,000 in 2001 and was about 1.4 million in 2009, a two-fold increase. Adult prevalence in the region doubled from 0.4% in 2001 to 0.8% in 2009, though there were 240,000 new HIV infections in 2001 compared to 130,000 in 2009. AIDS- related deaths increased four-fold, from 18,000 in 2001 to 78,000 in 2009. The Russian Federation and Ukraine, with a prevalence of roughly 1%, together account for about 90% of newly reported HIV cases. Ukraine had an adult HIV prevalence of about 1.1%, doubling annually since 2001. Growth of the HIV epidemic in the Russian Federation was slower during the past decade in comparison to the 1990s, yet it continues to grow. Uzbekistan was evidently the largest contributor to the epidemic in Central Asia.

The concentration of HIV infections was greater among injection drug users, sex workers and their partners, and, to a much lesser extent, men who have sex with men.[15] In the Russian Federation, about 37% of the estimated 1.8 million people who were injection drug users were possibly living with HIV[15] compared to about 39 to 50% in Ukraine[16] with up to 88% in certain regions.[17] Prison population in the region also showed a high prevalence possibly due to injection drug use,[18] with an estimated 10,000 prisoners living with HIV in Ukraine.[17] Due to possible overlap of sex work and injection drug use, it was estimated that about 30% of sex workers in the Russian Federation could have been injection drug users.[19] An added factor of the increase in the HIV caseload could be the combined effect of injection drug users also being sexually active, thereby increasing the rate of disease transmission in this population.[20] While the estimate of HIV/AIDS for the Russian Federation was reported to be low, UNAIDS and the Head of the Russian Federal AIDS Center claim this is underestimating the number of cases by a factor of 3.[21] Recently collected data indicate that the number of new registered HIV cases in Russia during 2011 was 60,519, a 10% increase since 2010 when there were about 650,100 confirmed cases.[22]

Given the current increase in HIV caseload, it was found necessary to formulate meaningful guidelines and recommendations related to dental practice and, to an even larger extent, dental IC&S for the Russian Federation. One of the immediate actions was to set up an education and policy information website in Russia (www.hivdent.ru) by the Moscow State University of Medicine and Dentistry (MSUMD). In response to these efforts, the current study was conducted as an initial infection control needs assessment of practicing dentists in and immediately around the Moscow metropolitan region. The project also satisfied an academic requirement for the lead author's doctoral dissertation. This study will be followed by the development of guidelines and standards on dental IC&S for the Russian Federation and, subsequently, additional IC&S educational materials.

PURPOSE

The purpose of this study was to design, develop and use a simple data collection instrument to assess dental infection control status and needs in the Russian Federation.

MATERIALS AND METHODS

A dental safety needs assessment data collection instrument was developed from two versions (1998[23-25] and 2008[26]) of previously used data collection instruments and qualitatively tested. Most of the variables were based on the Centers for Disease Control and Prevention's 1993 Infection Control Recommendations for Dental Practitioners[27] and the 2003 Guidelines on Infection Control.[28] This study was approved by the Ethics Committee of MSUMD for use in the Moscow region of the Russian Federation. Only meaningful and locally applicable variables were used in this study. Questions were translated into Russian from English without loss of information during translation. This instrument was provided to a convenience sample of dentists in the city of Moscow and surrounding suburban regions in 2010 to 2011. No identification data of the respondents were collected. The approximate time taken to complete the instrument was 10 minutes per respondent (about 90% of respondents completed the survey in 10 minutes, while about 10% of respondents completed it in 15 minutes). A total of 510 questionnaires were distributed, and 303 were returned

completed and usable. Data from completed questionnaires were entered into a Microsoft Excel spreadsheet and cleaned for use in this study. Data analysis was conducted using IBM PASW statistical software. Statistics used were descriptive and Chi-square statistics at alpha = 0.05.

RESULTS AND DISCUSSION

Of the 510 dentists initially contacted, 468 (92%) consented to participate, but only 303 provided complete and usable information. Thus, the response rate was about 65%. About 92% of respondents were from within the city of Moscow and 8% were from the suburban areas of Moscow. The majority of respondents were female (63%). Most respondents (about 67%) were in practice for less than 20 years and about 25% were in practice for less than 5 years (Fig. 1). About 62% of respondents worked in town clinics (i.e. state run clinics in Moscow) while the remainder worked in private clinics, polyclinics and clinics belonging to the government (Fig. 2). With respect to position within the place of employment, about 83% worked as dentists providing clinical care, about 5% as postgraduate trainees, and the remainder as administrators (Fig. 3). Figures 4 and 5 describe the roles within the clinic as well as whether the respondents were general dentists or specialists respectively.

When clinician's experience a significant exposure, such as a percutaneous injury due to a sharp or a splash or spatter from blood, saliva and other body fluids (i.e. potentially infectious material with blood-borne pathogens), a test for HIV status must be carried out. Figure 5 describes the most recent test conducted on respondents with about 28.7% being tested within the recent 3 months. Only about 10% had been tested over a year prior to the interview. These responses are troubling as about 90% of respondents had significant exposures/injuries, which is higher than both exposure and rates reported elsewhere.[29-33] Most of the

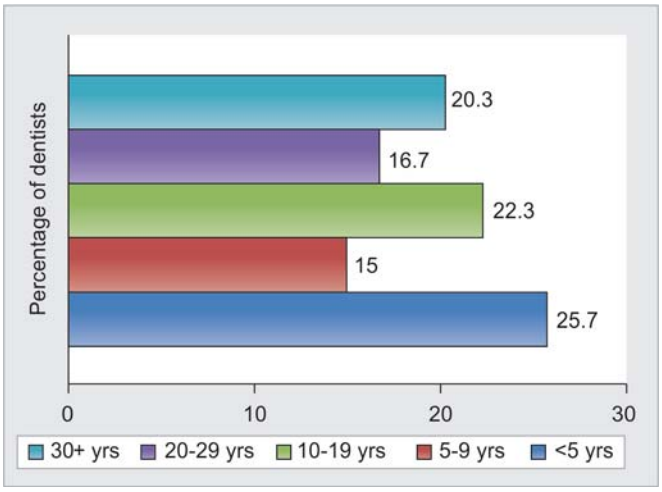

Fig. 1: Number of years in dental practice: Majority of dentists were in practice for less than 5 years postgraduation and less than one-third of respondents were in practice for 20 years or more

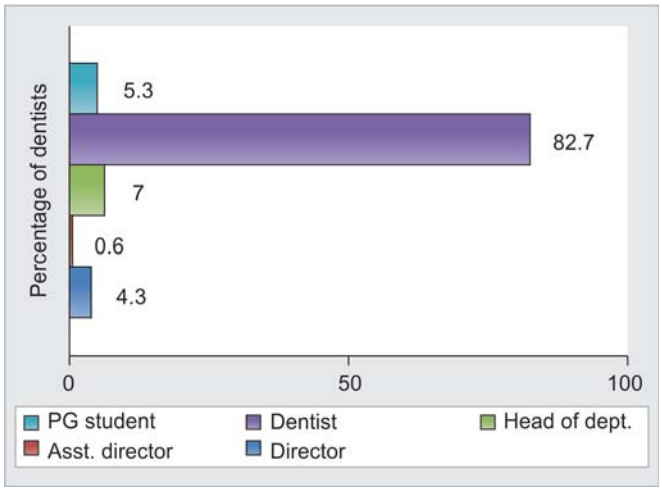

Fig. 3: Position of respondent in the clinic: Most respondents worked as dentists with less than 8% in the roles of administrators

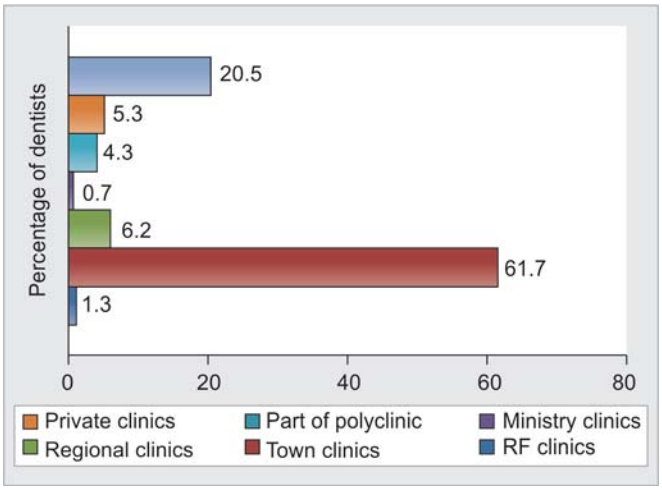

Fig. 2: Respondent's place of work: Most respondents worked in town clinics, while the remainder worked in privately owned clinics and those belonging to the government

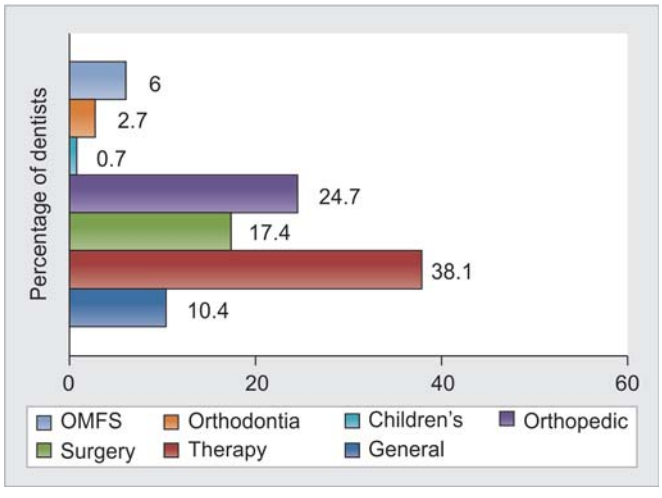

Fig. 4: Respondent's field of specialization: About 49% were general dentists with the remainder in specialty practice

respondents (68%) reported having less than three significant exposures in the past 6 months, while about 19% reported four to six exposures, and about 10% reported more than 10 exposures (Fig. 6). A postexposure protocol must be followed to determine whether the exposure was significant (i.e. an exposure of mucosa to blood and body fluids and other potentially infectious materials) through exposure of nonintact skin, percutaneous injuries or splash/spatter. The protocol should also involve testing the source patient and dental health personnel for blood-borne conditions (e.g. HIV) and obtaining immediate care (including antiretroviral therapy) to avert infection and disease. About 94.6% of respondents follow a prescribed protocol set by their place of practice or obtain care from an occupational medicine practitioner. The remainder did not follow any protocol, did not take action or they reported self-medication.

Personal protective equipment (PPE) should be used to protect the dental health care worker against biohazards, chemical hazards, dust and mist.[28] PPE commonly used in general dental care are single-use-disposable gloves (sterile or nonsterile), protective eyewear, face-shields, masks, gowns and utility gloves used to protect personnel from blood, other potentially infectious materials and chemical hazards. The main use of barriers is to control gross contamination and not to prevent spread of every single microbe. As an example, some pathogenic viruses are smaller than the microscopic pores in latex exam gloves and, therefore, have a probability of passing through the glove material. In this instance, one may safely infer that gloves are meant to reduce the amount of exposure to viral particles found in body fluids and not to totally prevent contact with the virus. Therefore, handwashing with an antimicrobial soap after removing gloves is necessary and pragmatic.[34] Proper use or choice of PPE is based upon anticipated exposures that are dictated by the dental procedure.[35] For example, if the dentist is only removing a suture or conducting an extraoral exam or simple radiographic procedure where there is no potential for splash or spatter but contact of hands with saliva and blood, then one only needs to use exam gloves. On the other hand, if the procedure dictates use of a coolant through a high speed handpiece, use of an ultrasonic scaler with coolant, or an air/water syringe, then one should wear protective eyewear (or side-shields on prescription eyewear) to protect the eyes, a face mask to protect the mucosa of the nose and mouth, a water resistant gown/jacket to protect regular clothes and scrubs (also referred to as street clothes), and gloves to protect the hands from saliva and blood. The use of a mask, protective eyewear, gown and gloves is commonly referred to as 'full PPE,' and is an integral component of universal or standard precautions.[27,28] Figure 7 shows that respondents did not understand the concept of universal or standard precautions but indiscriminately used PPE. Most (95%) used gloves and every one used protective eyewear, but only about 19.5% used protective gowns, 2% used face masks and 2.4% used side-shields. This shows a disparity in the use of PPE contrary to standard precautions in protecting oneself.

Before one uses any infection control measure, it is necessary to understand the criticality of surfaces. Earle H Spaulding categorized medical devices in 1968 based on risk of disease transmission and their reprocessing methods prior to their use in patient care. The same principles were modified by Favero and Bond[36] to include four categories (expansion to include environmental surfaces as a category). Table 1 is an explanation of this modified classification as it is applicable to dentistry. Instrument and

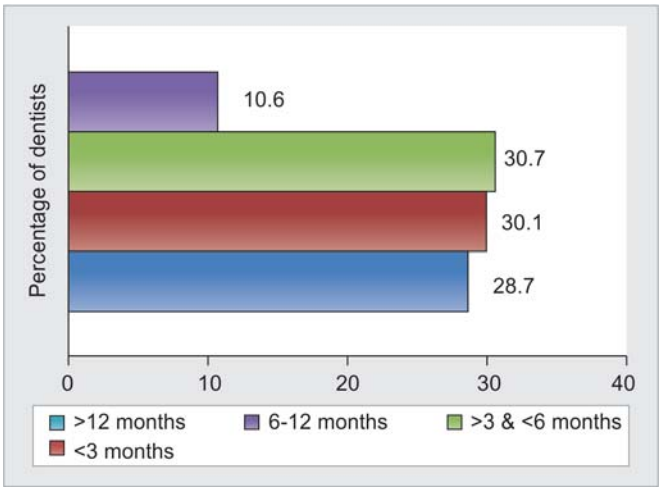

Fig. 5: Most recent HIV test of respondent, postsignificant exposure to blood and other potentially infectious material: More than 90% reported having been tested for HIV due to significant exposure to blood/body fluid within the past year

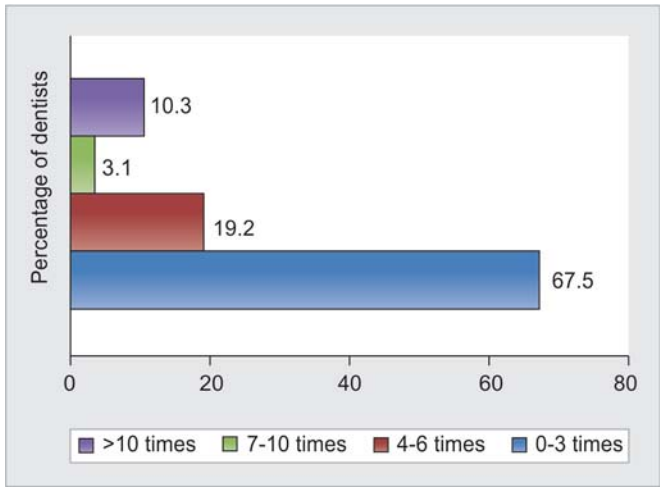

Fig. 6: Number of significant exposures at work in the recent 6 months: Most respondents had less than three significant exposures in the past 6 months while about 10% had more than 10 exposures

operatory surfaces can be classified as critical, semicritical, noncritical and environmental surfaces based on potential for disease transmission. All materials being used should be approved for patient care by a national governing body. Items which are considered single-use must be discarded after one use and not be reprocessed. Spaulding's classification provides guidelines for decontamination procedures based on the risk of disease transmission if surfaces and instruments are used in dental care. Figure 8 describes the respondents' understanding of this classification system. Critical instruments need to be soaked in a holding solution in order to prevent drying of the bioburden, sonicated or washed to loosen debris or bioburden, washed/rinsed to remove bioburden, and sterilized (bagged if being stored or unbagged if being used immediately). When tested on their knowledge, of Spaulding's classification with respect to decontamination, most study participants reported that they sterilize critical instruments and surfaces (correct response). About 55% stated that they should sonicate the instrument with a sterilant (wrong response), disinfect (wrong response). Only about 10% expressed understanding Spaulding's classification.

Table 2 lists the percentage of affirmative responses to questions on knowledge, attitudes and practice of infection control by respondents. Salient findings from Table 2 show that most of the respondents (86%) felt that they had adequate knowledge of infectious diseases to practice safe

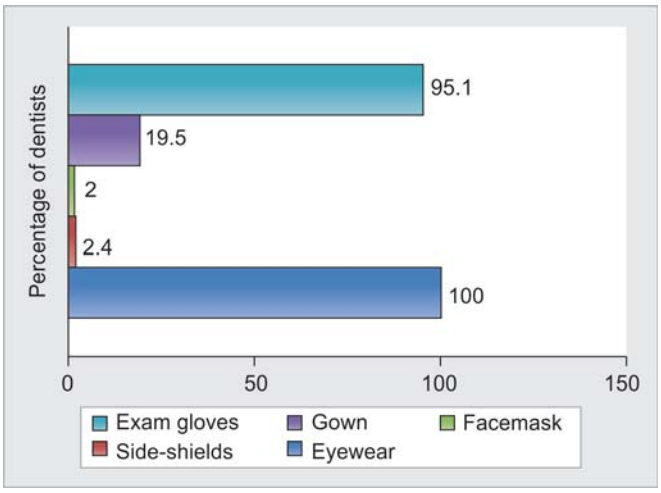

Fig. 7: Indiscriminate use of personal protective equipment: PPE is based on anticipated exposure to hazards. Ninety-five percent used exam gloves for all procedures, less than 20% used protective gowns, facemasks or side-shields for prescription eyewear but 100% used protective eyewear

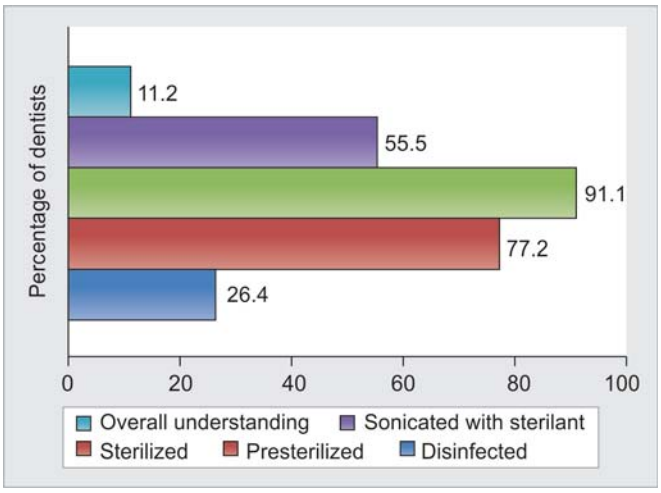

Fig. 8: Understanding of Spaulding's classification of surfaces: Overall understanding of Spaulding's classification and instrument reprocessing was poor (<10%). While most respondents agreed on sterilization of all critical instruments, close to one-fourth stated disinfection

Table 1: Adaptation of Spaulding's classification to surfaces based on the risk of disease transmission

Level	*Disease risk*	*Process*	*Materials*
Critical	High	*Sterilization:* Autoclave, chemiclave, dry heat or immersion in full strength glutaraldehyde (8 hours for sterilization and 30 minutes for high-level disinfection)	Items used in surgery that pierce soft and hard tissue, such as scalpel blades, burs, forceps, elevators, needles, files, bone rongeurs, periodontal instruments, surgical drains and any other instrument used in surgical sites, dental explorers and probes, biopsy punch
Semicritical	High	*Sterilization:* Autoclave, chemiclave, dry heat, immersion in full strength glutaraldehyde (8 hours for sterilization and 30 minutes for high-level disinfection)	Items that do not necessarily penetrate soft and hard tissues but which cross the vermilion border into the oral cavity, such as mouth mirrors, handpiece, anesthetic syringes, chip syringes, impression trays and spatulas
Noncritical	Moderate	*Surface disinfection:* Phenolics, iodophors, quaternary ammonia compounds *Sanitization:* Scrub wash with soap and water *Barriers:* Impervious barriers	Items used in dentistry which do not cross the vermilion border or penetrate the soft tissues, such as chair light handles, instrument trays, high touch work surfaces, bracket tables, chair controls, air/water syringes, hoses and dental chairs
Environmental	Low	*Disinfection:* Intermediate to low level disinfection, such as phenolics, iodophors, quaternary ammonia compounds *Sanitization:* Scrub wash with soap and water	Table and counter surface, floor, door handles

dentistry, and about the same proportion had attended continuing dental education (CDE) programs addressing dentistry (89%). Roughly 76% felt that CDE programs in other fields of dentistry should also address IC&S. Almost all (about 95%) felt that hepatitis B virus, hepatitis C virus, and other sexually transmitted diseases can be transmitted in the dental offices during patient care. While disease transmission routes include percutaneous, contact, inhalation and fomites,[37-39] respondents showed a very poor understanding of the potential methods of disease transmission. Only 65% of subjects thought that infectious diseases could be transmitted through splash or spatter (i.e. contact), while only 34% thought that there was a potential for transmission through the percutaneous route. This indicates that CDE programs in IC&S must emphasize the risks and routes of disease transmission.

Almost all respondents (96%) had been tested for HIV serostatus recently and felt that 'everybody should be tested for HIV serostatus.' Questions on attitudes revealed that only 9% of the respondents felt that a 'patient's HIV serostatus is always known.' About 17% responded that the dentist has the 'right to refuse care for patients with infectious diseases.' Only 23% felt that HIV seropositive patients must be treated in all clinics and schools. This alarmingly low percentage is of concern with respect to health policy and is evidence of a barrier to dental care access for HIV seropositive patients in the Russian Federation. Given the high HIV infection rate in Russia, all patients must be allowed access to care in any dental clinic irrespective of disease status.

Responses to questions on practice demonstrated lack of understanding 'universal or standard precautions'. About 14% had refused care, and a greater number 'double-gloved' for patients with blood-borne and sexually transmitted diseases. Some infectious diseases have symptoms and signs which are readily recognizable in a clinical situation, while other conditions are clinically unidentifiable without further laboratory tests. Therefore, it is recommended by the centers

Table 2: Percentage of affirmative response (knowledge, attitudes and practice)

	Variables	*%*	*n*
	Knowledge		
1.	Perceived adequate knowledge of infectious diseases to practice safe dentistry	86.1	302
2.	Attended continuing dental education programs that addressed infection control	88.7	300
3.	CDE programs in other fields of dentistry should include aspects of infection control	76.2	290
4.	Hepatitis B, C and other sexually transmitted diseases can be transmitted in dental clinics	94.6	296
5.	There is a potential for infectious disease transmission through splash/spatter	65.2	290
6.	There is a potential for infectious disease transmission through percutaneous route	34.2	295
7.	Must use 'antimicrobial irrigant or germ-free water' for patient care	91.4	289
	Attitude		
8.	Always knows HIV serostatus of all patients	8.7	299
9.	HIV seropositive patients must be treated in all clinics and schools	23.3	292
10.	Has the 'right to refuse care' for patients with infectious diseases	16.6	290
11.	I feel that everyone should be tested for HIV serostatus	98.3	296
12.	I have been tested for HIV serostatus (postsignificant exposure)	96.0	300
	Practice		
13.	Has 'refused care' for patients with blood-borne and STDs	13.8	297
14.	'Double-gloves' for patient with IDs and STDs	61.4	298
15.	Uses 'high volume evacuator' regularly	65.0	300
16.	Uses nontreated municipal water as irrigant while cutting teeth	92.2	295
17.	Uses 'self-contained reservoir' (bottle system) to introduce irrigants	63.3	286
18.	Understanding Spaulding's classification (knowledge)	11.2	303
19..	Reuses injection needles on more than one patient after reprocessing	1.0	303
20.	Reuse of anesthetic carpule on more than one patient	1.0	303
21.	Disinfects impressions after making	61.4	303
22.	Bags instruments, sterilizes and then stores instruments	75.9	303
23.	Reuses exam gloves after reprocessing	3.0	303
24.	Uses alcohol for disinfection	82.8	303
25.	Regularly uses sharps container to dispose contaminated sharps	89.8	303
26.	Sterilizes and then discards regulated waste into nonregulated waste containers	19.8	303
27.	Uses sterile water to clean sterile instruments that have been immersed in sterilants	77.6	303
28.	Changes surface barriers regularly between patients	16.8	303
29.	Always sterilizes critical instruments between patients	90.8	303
30.	Uses an autoclave for sterilization	72.9	303
31.	Uses dry heat sterilizer	64.4	303
32.	Uses glass bead sterilizer	34.2	303
33.	Uses other methods for sterilization	1.3	303
34.	Always sterilizes handpieces between patients	87.5	295

for disease control and prevention that all patients be treated as potentially infectious.[10,27,28,40] One should not discriminate the patient based on their appearance, medical history only or based on other possible tell-tale signs of disease. The protective or control measures to be used should be based on anticipated exposure during a procedure. Appropriate level of infection control measures, such as use of personal protective equipment or other levels of control should be the same for all patients given a common procedure. For example, the clinician should not double glove for only known HBV infected patients during a given surgical procedure but do so for all patients.[41] If one needs to double glove, it should be done for all patients and not only for known infectious disease patients. The level of infection control should be based upon the anticipated clinical procedures to be carried out and not on the knowledge of the patient's infectious disease status. About 83% used an antimicrobial soap for handwash.

Dental unit water systems must be cleaned and disinfected periodically to control environmental biofilms, and the treatment water/irrigant should be of good microbial quality containing fewer than 500 colony forming units per milliliter of heterotrophic, mesophilic organisms.[28,42] While most respondents felt that an antimicrobial irrigant or germ-free water must be used as a dental irrigant or coolant (91%), almost the same proportion of respondents used nontreated municipal water as an irrigant while cutting teeth. About 63% used dental units that were equipped with self-contained reservoirs (i.e. a bottle system instead of a dental unit connected to a municipal water source) that could potentially be used to introduce antimicrobial irrigants or cleaners to control biofilm contamination and provide high quality treatment water for patient care.

About 61% of respondents disinfected impressions immediately after being made, however, 82% used alcohol alone for surface disinfection purposes. Alcohol by itself is not an approved germicide cleared in the US or European Union for surface disinfection.[28] About 78% also washed instruments that were decontaminated using an immersion sterilant. The majority of participants (65%) regularly used a high volume evacuator (HVE) to control bioaerosols, and 90% regularly used sharps containers to dispose contaminated disposable sharps. Roughly 20% of respondents sterilized regulated waste before discarding it in regular trash (which is an acceptable measure in the United States when regulated waste disposal services are not available). Surface barriers (those impervious to liquids, e.g. plastic covers) may be used in lieu of surface disinfectants. Regular use of surface barriers was minimal (17%).

About 76% of all subjects used sterilization pouches, 91% always sterilized critical instruments between patients, and 72% used autoclaves for sterilization. About 64% used dry heat sterilizers. All handpieces must be sterilized between patients, but only 88% sterilized handpieces regularly. While use of glass bead sterilizers is not an acceptable method of decontaminating critical instruments, about 34% still used glass bead sterilizers.

Pearson Chi-square test was used to determine differences in this sample (Table 3). Sex *vs* type of practice/specialty ($p < 0.05$) showed that more female dentists (50.5%) practiced in town clinics in comparison to male dentists (16.5%), while more male (41.3%) practiced in orthopedic dentistry clinics as opposed to female (15.6%). More women were likely to undergo tests for HIV post-exposure than men ($p < 0.05$). Only 11% of female dentists refused care for HIV seropositive patients in comparison to 19% male dentists ($p < 0.05$). Female dentists were significantly more likely to double-glove while treating patients with a history of infectious diseases in comparison to male dentists ($p < 0.05$). Female dentists were

Table 3: Variables showing significant relationship ($p < 0.05$) using Pearson's Chi-square

	Variables	χ^2	*df*	*Cramer's V*
1.	Sex *vs* field of specialty	52.2	6	0.42
2.	Sex *vs* when the respondent was tested for HIV serostatus	20.3	3	0.27
3.	Sex *vs* possibility of ID transmission through splash/spatter	4.4	1	0.12
4.	Sex *vs* has 'refused care' for patients with blood-borne and STDs	3.7	1	0.11
5.	Sex *vs* double gloving for ID patients	3.9	1	0.12
6.	Sex *vs* use of HVE regularly	4.7	1	0.13
7.	Sex *vs* use of self-contained reservoir for dental irrigants/coolant	3.7	1	0.11
8.	Sex *vs* uses autoclave for sterilization of instruments	5.2	1	0.13
9.	Sex *vs* uses glass-bead sterilizer	5.6	1	0.14
10.	Sex *vs* always sterilizes handpieces between patients	9.8	1	0.18
11.	Years in practice *vs* place of practice	16.5	4	0.25
12.	Years in practice *vs* type of place of work	37.8	24	0.18
13.	Years in practice *vs* dental specialty of respondent	59.3	24	0.22
14.	Years in practice *vs* everyone should know their HIV serostatus	12.3	4	0.20
15.	Years in practice *vs* use of HVE regularly	9.3	4	0.18
16.	Years in practice *vs* must use 'antimicrobial irrigant or germ-free water' for patient care	10.1	4	0.19
17.	Years in practice *vs* uses autoclave for sterilization of instruments	18.7	4	0.25

significantly more likely to take precautions in controlling bioaerosols using HVE than their male counterparts ($p < 0.05$). More female dentists reportedly always sterilized handpieces ($p < 0.05$). Most of the dentists practicing within the city of Moscow were younger than those practicing outside the city ($p < 0.05$). Younger dentists were also more likely to work in the government-funded dental clinics and were less likely to be in senior or administrative positions ($p < 0.05$).

The Russian Federation is currently affected by a high caseload of HIV seropositive patients and is still in the process of assessing access and availability of dental care for these patients. To provide safe care to all patients, including HIV seropositive patients, dentists and auxiliaries must be properly trained in dental infection control. Furthermore, there should be training in occupational safety in an effort to prevent occupationally acquired infectious diseases. This survey was the first of its kind in the Russian Federation. This study paves the way for conducting a more systematic and thorough survey with a more comprehensive set of variables on a stratified sample across all regions of the Federation. Further, it provides a logical starting point in developing IC&S standards with respect to infectious diseases in dental practice. It is our hope that these standards are developed very soon and are applied in educating all dental health care workers in Russia. Similar studies have been done in India and elsewhere, and have impacted in developing safety standards.[23-25] In 2007, safety standards for dentistry were developed for India and published as a book under the auspices of The Dental Council of India.[43] This book was released by the Prime Minister of India, Dr Manmohan Singh, as a free publication. This publication is available for free download in a digital format from the web site of the Dental Council of India for all oral health professionals. Based on these standards, the government also issued a mandate that by the year 2014, all practicing dentists must have proof of CDE in IC&S and must have a minimum number of hours in dental safety for the annual renewal of their clinical practice license. Based on these standards, inexpensive and approved online CDE programs for India have been set up (www.dentalsafety.net) where dentists can access the state-of-the-art online programs without incurring expenses of traveling to access these programs.

CONCLUSION

The Russian Federation is currently experiencing a high caseload of HIV seropositive patients. In response, the national government has set up an information web site www.hivdent.ru in collaboration with www.hivdent.org, an educational and policy oriented organization comprised of infection control, infectious disease and public health experts based in the United States. As an outcome of high-level planning meetings and international collaborations, this initial step of assessing dental safety needs was conducted as an academic exercise in the hopes of taking further action of developing standards, a comprehensive education program and safety policies. Further actions must include developing meaningful standards in collaboration with other countries and universities to control the spread of infectious diseases during dental care. A comprehensive approach would also include making dental safety a requirement through CDE programs for all practicing dentists based on the standards and developing a didactic curriculum in dental safety for all dental educational institutions. The fundamental topics of dental safety in the curriculum must include the concepts of infection control, the rationale for infection control, the impact of infectious diseases on the practice of dentistry, immunization policies, aseptic techniques, PPE, surface barriers, proper use of germicides, instrument reprocessing methods (e.g. validation of sterilization processes), control of dental treatment water contamination, IC&S in radiology, emerging diseases and other relevant topics. There should also be a national policy on the control of blood-borne pathogens and hazard communications with respect to dentistry. Lastly, these policies must be implemented posthaste in order to make dentistry safe for both the patient and the practitioner.

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