

Dental Infection Control in India at the Turn of the Century

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Abstract

The purpose of this study was to assess the status of Dental Infection Control and Occupational Safety in India. 456 respondents (dentists) used this self-administered survey instrument containing about 96 variables. Over 95% of respondents felt that HIV and Hepatitis were infectious disease risks of concern and that infectious diseases were on the rise in India. Education and training in Dental Safety were lacking and that the latter are made mandatory in dental school curricula. Availability and access to safety materials and equipment were lacking in India and affordability was an issue. While respondents had adequate knowledge in the subject of infectious diseases, attitude (Stigma) towards treating infected patients was a negative factor with a significant number stating that double gloving was necessary, medical history dictated additional precautions and finally that care providers had the right to refuse care to Infectious patients. Although standards in Dental Safety are in place, implementation of educational (both didactic in schools and continuing education for practitioners) is a priority. Dental industry from within and outside India must play a role in this effort. In conclusion, significant structural and educational support activities are indicated with improvements in access and availability of materials and equipment to improve dental safety in India. Further, stigma of infectious diseases must be eradicated if not reduced towards infectious patients.

Keywords: Dental infection control, dental safety, occupational safety, surveys, stigma, infectious diseases, HIV, AIDS, India, curriculum, continuing dental education.

INTRODUCTION

This Dental Infection Control needs assessment study was conducted to assess the status of dental safety in India. Information on India was part of a larger data set that included China, United States, South Korea, Pakistan, Philippines, Taiwan and Thailand. Data were collected using a self-administered needs assessment survey instrument on a convenience sample of dental care providers in South India. Results of this study was used to help develop policy measures and in formulating guidelines in dental safety for Indian Oral Health Professionals. The information from this study is useful for educational institutions, central and state governments and dental industries interested in improving the quality of infection control in South Asia.

BACKGROUND

Dentistry is predominantly a surgical discipline, involving exposure to blood and other potentially infectious materials¹ and high standards of infection control and safety (IC&S) practice are necessary in improving patient safety and reducing occupational exposures to bloodborne diseases.

Apart from bloodborne diseases such as hepatitis B and C and HIV infections, dental health care workers are at risk of acquiring respiratory, sexually transmitted, and childhood diseases among others encountered in dentistry.^{2,3}

Although most dental IC&S principles were formulated in the 1960s, this subject gained importance in the past two decades due to the AIDS pandemic in the United States and other parts of the world.⁴ Control of communicable diseases has been achieved in the medically advanced countries through education, regulations, and public health measures such as dental infection control and safety.⁵⁻¹⁰ Infection control recommendations in the United States (US) by the Centers for Disease Control & Prevention (CDC) to reduce the risk of bloodborne disease transmission during dental care went into effect after the AIDS epidemic in 1985,^{11,12,18} and the Occupational Safety and Health Administration (OSHA) released the final standards on employee safety against bloodborne pathogens.¹³ Even as recently as December 2003, the CDC published detailed infection control guidelines to be followed by dental practitioners in the United States.¹⁷ The effects of these regulations have lead to an increase in the use of protective measures by US dental care providers.¹⁴

However, the incidence of HIV/AIDS and other bloodborne diseases has steadily been on the rise in Asia, and has been predicted to reach epidemic proportions.^{15,16} The entire population is at risk if strict IC&S procedures are not followed by health practitioners.^{17,18} During most dental procedures, both patient and practitioner are at risk for disease transmission since blood or saliva is invariably involved in disease transmission.

Due to the HIV pandemic, recommendations and regulations affecting dental practice in the US, there has been an increase in the use of protective measures by dental care providers.¹⁴ Further, improvements in dentists' attitudes related to universal/standard precautions and their ability to provide employee protection against occupationally acquired infectious disease, and finally attitude towards infectious patients still needed improvement. Studies in the past have addressed risks of bloodborne disease transmission, risk perceptions of dentists and patients with respect to bloodborne disease transmission have shown the need for improvements in understanding and implementing acceptable levels of control in clinical practice as well as providing comfort to patients in accessing safe dental care.¹⁹⁻²¹ Less than a decade ago, dentists were still wary of treating HIV infected patients in the US and other countries, while patients were wary of accessing care in facilities that treated HIV and/or HBV infected patients.²²⁻²⁴ Practitioner knowledge, attitudes and practice (KAP) and quality of care in the US have evolved concomitantly as the result of two decades of improvements in infection control and safety technology. However, for many countries in Asia, infection control and safety issues related to dental treatment have been recognized as public health issues only recently. Few studies in the US and elsewhere have addressed the use of equipment and materials utilization for IC&S.²⁵ Public health measures and improvement in the field of medicine are being disseminated in Asia, but the field of dentistry still requires the needed knowledge, training, materials and equipment compared to medically advanced countries such as the United States.²⁶

METHODS

A preliminary data collection instrument with about 100 variables on the knowledge, attitude and Practice regarding Dental IC and Safety was developed by the investigators. About 500 of this self-administered instrument were distributed in South India (Karnataka and Tamil Nadu States) among faculty members of dental schools, dentists

in private clinical practice, and dentists working for the governments. Completed instruments were edited for content and context and data were entered and analyzed using SPSS 12.0 for Windows. In this study analysis only included frequency distributions and descriptive statistics.

RESULTS

Of the 500 instruments distributed 456 (response rate 91.2%) returned completed instruments. About 63% of respondents were male and 36% female. The mean age of the respondents was 31 years. The mean amount of time involved in practice among these respondents was 6 days per week, 11.7 months per year, and about 6 years in practice treating about 12 patients per day. About 57.9% were dentists without postgraduate training and 42.1% trained in recognized specialty fields of dentistry. About 21% were in general practice, 10.4% had specialized in oral surgery, 7% in orthodontics, 5.8% in restorative dentistry, and 55.4% in other specialty fields. About 82% were involved in private clinical practice and about 16% were faculty in various dental schools (Tables 1 and 2 provide details on the Knowledge, Attitude, Practice and Needs of the respondents).

DISCUSSIONS

Preliminary analysis of data from this convenience sample showed a good response rate in completion of instruments. Most respondents were general dentists while a significant number were specialists. Each dentist treated about 2500 patients per year, which is about 25%, more patients in comparison to practitioners in the US. Therefore, the rate of exposure to infectious diseases could be higher in this sample due to practice profile and not disease prevalence in the patient population alone.

While the prevalence of HBV in South Asia is 2 to 7%, only about 80% of respondents reported being immunized against HBV. A significant number were not immunized against other immunizable diseases. At the turn of the millennium, most Indian dental schools did not have immunization requirements for student admissions. Most respondents (> 98.8%) recognized the risk of HIV infection and the need for formal training in IC, while only 61.5% reported using adequate practice measures, and 38.3% infection control materials. Variables demonstrating inadequacies and in need of improvement were—Germicide use, pre-procedural mouthrinse, antibacterial handwash soaps, disinfectants and liquid sterilants, personal protective

Table 1: Knowledge, attitude, practice and needs regarding infection control

Variable	Percent
1. <i>Epidemiological trend of "HIV on the rise in India" versus Perceived Level of Training</i>	
– HIV on the rise in India	98.2
– Have adequate training in Dental Infection Control and Safety	70.0
2. <i>Knowledge versus attitude regarding HBV and HIV among respondents</i>	
– Perception of knowledge on HBV as a disease	76.0
– Tested knowledge HBV as a disease	96.0
– Perception of knowledge on HIV as a disease	83.0
– Tested knowledge on HIV as a disease	99.0
3. <i>Knowledge versus attitude regarding HBV and HIV disease transmission</i>	
– HIV & HBV transmission possible in the dental office	94.8
– Potential for disease transmission through splash or spatter	73.0
– Infectious diseases transmitted through sharp injuries only	56.3
4. <i>Universal Precautions – Knowledge, Attitudes and Practice</i>	
– HIV and HBV status of patients is always known	15.2
– All patients to be treated as potentially infectious	69.3
– Medical history dictates the level of infection control practice	54.1
– Double-gloving practiced while treating infectious patients	77.7
– Right to refuse care for patients with infectious diseases	20.8
5. <i>HBV infections in dentistry</i>	
– Risk of transmission in dentistry	98.2
– Need for immunization for dental practitioners	99.6
6. <i>Immunization against infectious diseases</i>	
– HBV	80.7
– Influenza	58.1
– Polio	96.4
– Diphtheria	94.7
– Tetanus	96.1
– Rubella	79.3
– Measles	87.0
– Mumps	83.0
– Chicken pox	82.6
7. <i>HIV and AIDS in dentistry</i>	
– Risk of transmission in dentistry	94.9
– Need for improved infection control measures	99.1
– Practicing adequate infection control	61.5
– Having access to the needed infection control materials and equipment	38.3
8. <i>Perceptions of needs regarding dental infection control and safety</i>	
– Need more training	97.3
– Local agencies, organizations, associations and bodies to be more involved	98.2
– Can afford the costs for implementing infection control measures	80.3
– Need for local financial institutions to provide loans for upgrading the equipment	98.6
– Need for local manufacture of infection control equipment and materials	95.9
– Mandatory infection control and safety curriculum in dental schools	99.3

equipment, safety devices, high volume evacuators and rubber dams, ultrasonic instrument cleaners and sterilizers. Although, the respondents mentioned use of autoclaves, most were modified pressure cookers (locally manufactured) at the best. Some clinics still used boiler tanks and never packaged/bagged instruments for sterilization and storage. Other than some in institutional practices (Dental Schools attached to Medical Centers), none of the respondents individually practiced sterilization monitoring (periodic validation of sterilizer function/efficacy with biological indicators).

Although most respondents were willing to change and use IC materials and equipment, the latter were not locally available. Most respondents had the knowledge of HBV, HIV and other infectious diseases, but few were adequately trained in following Universal/Standard Precautions and use of PPE. Data showed a need for formal training and sustenance of Continuing Dental Education Programs. Data also demonstrated a multi-factorial need such as "Involvement" by—(a) Local and National Dental Associations to help with efforts on dental safety;

Table 2: Practice measures being implemented

<i>Variable</i>	<i>Percent</i>
1. <i>Use of antimicrobial handsoaps</i>	
– Carbolic acid-based	71.4
– Chlorhexidine gluconate-based	70.0
– Triclosan-based	36.0
– Parachlorometaxylenol-based	22.6
2. <i>Use of personal protective equipment (PPE)</i>	
– Single-use-disposable exam gloves	87.3
– Sterile single-use-disposable for surgical procedures	84.2
– Face masks	92.6
– Protective eyewear	46.6
– Protective gowns	48.7
3. <i>Safety on sharps</i>	
– Use of single-use-disposable syringe/needles	95.0
– Use of sharps containers for disposal of needles and other sharps	35.0
4. <i>Use of chemical germicides</i>	
– Pre-procedural antimicrobial mouthrinse	71.0
<u>Immersion disinfectant</u>	
– Glutaraldehyde	90.7
<u>Surface disinfectant</u>	
– Bleach (sodium hypochlorite)	79.1
– Phenolic disinfectant	43.0
– Quaternary ammonia compound	45.5
– Iodophors	27.8
5. <i>Use of surface barriers</i>	74.8
6. <i>Control of aerosols</i>	
– Rubber-dam	40.0
– High-volume-evacuator	54.0
7. <i>Use of instrument reprocessing devices</i>	
– Ultrasonic cleaners	46.9
– Autoclaves	81.9
– Chemiclaves	55.5
– Dry heat	62.5
– Glass bead (unapproved method)	67.6
– Immersion sterilant (Glutaraldehyde as a sterilant)	84.0
8. <i>Use of heat sterilizable instruments</i>	
– Highspeed handpiece	67.5
– Burs	67.1
– Endodontic instruments	72.2
– Orthodontic instruments	58.3
– Hand instruments	91.8
– Mouth mirrors	93.5
9. <i>Availability of infection control equipment and materials</i>	
– Local availability	76.2
– Willingness to use if made available	93.6

(b) Banking and Financial Institutions to help with financing improvements; (c) Local Manufacturing firms to produce materials and equipment needed for infection control; (d) Marketing firms to obtain licensing to market equipment and materials for infection control; (e) Dental schools to provide education and make education in IC mandatory for dental students.

Stigma in treating HIV/AIDS patients was one the main concerns. In Table 1, only 69% of respondents stated that all patients should be treated as potentially infectious (while

a 100% of patients should have been viewed as potentially infectious), 54% felt that medical history dictated the level of infection control and 78% felt that double-gloving (which is inappropriate) was appropriate while treating infectious patients. The most disturbing outcome was that about 21% of respondents felt that they had the right to refuse care to patients with infectious disease. These outcomes are ethically and morally very troubling, suggesting a stronger focus on educating dentists in the issues of stigma and care of infectious patients.

Only about 38% of respondents had access to dental infection control equipment and materials as very few local and international dental industry marketed dental safety materials and equipment in India. Today, India has over 275 dental schools graduating over 10,000 dentists per year and will surpass the number 120,000 dentists by 2015. The economy of India has improved to afford quality equipment and materials and therefore, dental industry from around the globe should consider India as the next biggest growth market for dental materials and equipment. While 70% felt that they had adequate training in dental safety, hardly any curriculum or continuing dental education programs were in place or being conducted in India in the field of Dental Safety. Organizations involved in education should set up good quality, easily accessible and locally affordable educational programs (both curriculum-based for dental schools and CDE programs for practicing dentists) for India. Local expertise in Dental Safety (Trained Personnel and a Representative Safety Organization) is much needed and should be set up post haste. Local and Regional Dental Journals should be the sounding board for quality Dental Safety information that could be used in dental practice.

As the prevalence of HIV infection and AIDS and other related conditions is on the rise, the loss of productive hours among the employed population will not only affect the internal economy of the South Asian countries, but will indirectly affect investment of the other countries in South Asia. Today, there are millions of Indians living in other countries, visiting India periodically and sometimes seek dental care. These patients also expect the same quality of Infection Control as provided in medically advanced countries. Apart from the expatriate Indians, travel dentistry is an ever growing field in India. Public health measures and improvement in the field of medicine are being addressed in South Asia, but the field of dentistry still lacks the needed safety regulations, knowledge, training and equipment. It would therefore be in the economic and social interest to facilitate and sustain a robust program in Dental Infection Control and Safety Program for India. The latter only shows that Infection Control and Safety Practice by all Dental Health Professionals in India should be a "high priority" item and must meet not only the international standards but the best available standards being practiced in the United States and Europe. An initial measure would be to craft the Infection Control Recommendations for Dental Professionals. As of September 2007, these recommendations for India have been developed, published and currently available at no cost to

practitioners to download from the website of the Dental Council of India (http://www.dciindia.org/book_page/pdf_files/Infectioncontrolbook.pdf). In addition to the recommendations, the Dental Council of India (2009) has mandated Dental Infection Control Continuing Education for Practitioners (up to 4 hours annually for license renewal). The next step is to set-up a Nationwide Train-The-Trainer Program in Infection Control and Safety for India, where future local experts would be trained.

CONCLUSIONS

The level of dental safety in India is still in its infancy and many years behind that of the United States and some European countries. Formal programs in infection control and safety must be developed not only for the Indian sub-continent but for the South and Southeast Asian Region and implemented immediately. Lack of Infection Control is life-threatening for the both the patient and the dental professional and should require more efforts than treating dental caries or periodontal disease, let alone cosmetic dentistry. In this context, infection control in dentistry is to prevent life-threatening diseases and communicable conditions. A pragmatic policy on Infection Control and Occupational Safety through comprehensive and mandatory education should address the following:

- Training for dental students (development of a didactic curriculum in IC&S)
- Training for practitioners (comprehensive continuing dental education programs)
- Introduction of dental safety materials and equipment
- Surveillance of safety in dental practices
- Reduce stigma while providing care to patients with infectious diseases
- Dissemination of information on dental safety for patients to inform them of the measures being taken in preventing spread of infectious diseases in the clinic
- Setting-up HIV and other bloodborne disease dental care centers at dental schools in addition to HIV sero-positive patients being treated at private clinics along with other presumably noninfectious patients
- Expanding duties of the Public Health Dentistry/Community Dentistry Departments of Dental Schools to provide out-reach dental care to rural HIV and other BBP infected patients
- Eventually make all clinics provide dental care to all patients including HIV and other BBP infected patients.

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