Knowledge, attitude, and practices of cross-infection and infection control in dentistry among clinical students in a private dental college in Chennai

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ABSTRACT

Background: Dentistry is predominantly a surgical discipline which is more prone to blood and other potentially infectious materials. Some diseases can be transmitted through infected droplets by contacting surfaces of eye, nose, or mouth. Center for Disease Control and Prevention of the United States of America (CDC) updated guidelines for infection control in dental setup. The guidelines involve standard precautions which intend to make sure a safe working environment associated with preventing the potential transmission of professional and nosocomial infections among dentists, dental health-care professionals, and their patients. Aim: The aim of the study was to assess the level of knowledge, attitude, and practice toward cross-infection and infection control between undergraduate dental students. Materials and Methods: The sample size of this questionnaire-based study is 150. This was conducted with 100 participants; thus, it is sufficient for the required sample size. After collection of data had been done, it was analyzed using Microsoft Excel 2007 and presented into a graph. Data were collected and statistical analyses for knowledge, attitude, and practice descriptive statistics were computed using Microsoft Excel and presented into graphs. Results: The specific sample study on the 3rd-year students is a poor reflection when compared to final years in terms of knowledge, attitude, and practice on cross-infection and infection control in dentistry. A total of 50 3rd-year dental students and 50 final year dental students participated in this current study. The questionnaires survey for undergraduate dental students was distributed randomly among the 3rd year and final year students. Conclusion: A moderate level of knowledge and attitudes toward cross-infection and infection control can be seen among the 3rd-year students in comparison to final year dental students in this present study.

KEY WORDS: cross-infection, Infection control, Knowledge, Undergraduate dental students, Universal

INTRODUCTION

Dentistry is predominantly a surgical discipline which is more prone to blood and other potentially infectious materials.[1,2] Infection control can be referred as Measures practiced by health-care personnel to decrease the risks of transmission of infectious agents toward patients and employees such as the use of personal protective equipment, masks or respirators, gloves, gowns, and eye protection. The measures were based on how the infectious agents were being transmitted and it involves components such as standard, contact, droplet, and airborne infection.[10] There is a chance of coming in contact with the blood of infected patients during an oro-dental examination without proper protective medium, and dental health-care practitioners are easily get infected by pathogens that are directly enter the host’s body. In addition, these infectious agents can also get transmitted indirectly either by improper handling and contact with unsterilized instruments or through contaminated needle stick injury. Droplets of blood, serum or airborne will be another type of route of transmission of the infectious agents toward dental health professionals.[4,5] Some diseases can be transmitted through infected droplets by contacting surfaces of eye, nose, or mouth. Droplets comprising microorganisms can be produced when an infected person sneezes, coughs, or talks. Droplets are too large to be maintained as airborne for a long period of times; therefore, it will be quickly settled out of air. Oral fluids may also become aerosolized during dental
treatments, and microorganisms from the oral cavity will lead to the spread of the infection.\[6\]

In the late 1970s, a study found that dentists were 3 times more likely than the general population to contact with hepatitis B. With the emergence of AIDS in the 1980s, even more stringent precautions became compulsory to effectively protect health care workers and the public, leading to the recommendations by the U. S. CDC concerning the prevention of HIV transmission in health-care settings and universal precaution guidelines.\[5\] However, the limitations of universal precautions were recognized subsequently, and CDC adopted the term “standard precautions” in 1996 to embrace a broader concept of the prevention and transmission of infections.

Hands are considered to be a major source of infection, and potentially infected blood may be retained beneath the fingernails for up to 5 days.\[7\] It is difficult to remove contaminated material from the hands, particularly from the subungual and nail fold areas, unless there is meticulous mechanical cleansing. Exposure to infected blood can result in transmission from patient to dentist, from dentist to patient, and from one patient to another. The opportunity for transmission is greatest from patient to dentist, who frequently encounters patient blood and blood-contaminated saliva during dental procedures. Paramount to the prevention of infectious disease is the strict adherence to standard precautions for all dentists. This includes, though not limited to, eye protection with lateral shields, facemask, and protective clothing.

In dentistry, cross-infection can occur through many pathogenic agents which commonly found in the oral cavity and respiratory tract. Examples are mycobacterium tuberculosis, hepatitis B Virus, hepatitis C Virus, herpes simplex virus, and hepatitis B and C virus. Organisms such as Ebola, Middle East Respiratory Syndrome coronavirus, H1N1, and others can be also transmitted during dental practice. Hence, it is compulsory for dental health professionals to use all protective agents, especially during ongoing dental treatment. CDC of the United States of America updated guidelines for infection control in dental setup. The guidelines involve standard precautions which intend to make sure a safe working environment associated with preventing the potential transmission of professional and nosocomial infections among dentists, dental health-care professionals, and their patients.\[8\] Even though most dental infection control and safety were designed in the 1960s, this matter gained importance in the past two decades because of AIDS pandemic in the United States and other parts of the world. All patients are considered as an infectious patient based on Universal precaution, and all the precautions mentioned should be applied to all patients either young or adult patients. Dental institutes or colleges are the place that responded to give and provide sufficient training for dental students regarding infection control measures.\[9\] Few studies have addressed that some dentists not adhere to the standardized infection control procedures in their daily practice, although the adequate emphasis is placed on the importance of adherence to these protocols.\[10,16-12\]

Other studies worldwide have investigated knowledge, attitude, and practice regarding infection control among undergraduate dental students, finding very poor compliance with infection control guidelines and the need to enhance the knowledge and attitudes toward infection control.\[14-16\] Thus, this study was aimed to assess knowledge, attitude, and practices regarding cross-infection and infection control among clinical students.

**MATERIALS AND METHODS**

A cross-sectional study was conducted during the academic year of 2018 among clinical students in a private dental college and hospital in Chennai. A total of 100 students were randomly enrolled in the study involving the 3rd year and final year students. All students in the study completed a questionnaire consisting of close-ended and multiple choice questions [Table 1]. The questionnaire was taken from previous research, which is related to the current topic, and few amendments in the questionnaire were made with the help of professionals. The questions in the questionnaires were created and designed to assess their basic knowledge, attitude, and practice toward infection control and dental safety among clinical students. The sample size of this questionnaire-based study is 150. This was conducted with 100 participants; thus, it is sufficient for the required sample size. After collection of data had been done, it was analyzed using Microsoft Excel 2007 and presented into a graph. Data were collected and statistical analyses for knowledge, attitude, and practice descriptive statistics were computed using Microsoft Excel and presented into graphs.

**RESULTS**

The specific sample study on the 3rd-year students is a poor reflection when compared to final years in terms of knowledge, attitude, and practice on cross-infection and infection control in dentistry. A total of 50 3rd year dental students and 50 final year dental students participated in this current study. The questionnaires survey for undergraduate dental students was distributed randomly among the 3rd year and final year students.

Regarding whether they have been vaccinated against HBV or not, most of the 3rd year and final year students...
with percentage of 68% and 84%, respectively, had been vaccinated with HBV with the rest of them had not been vaccinated against HBV [Figure 1].

According to the results, majority of the 3rd-year students (56%) had been vaccinated with only two doses or less while most of the final year students (50%) had been vaccinated themselves against HBV for at least three doses. Both categories have a low percentage for three doses followed by booster dose [Figure 2].

Based on the result, most of the final year students think that hepatitis B vaccination is mandatory for all dental practitioners with a percentage of 72% while only 44% of the 3rd-year students agreed with it. The rest of the 3rd year with a percentage of 56% still unaware about the importance of hepatitis B vaccination in the dental environment [Figure 3].

According to the result, the 3rd-year students with a percentage of 52% and final year students (12%) believed that HIV disease has the highest risk of transmission in dental setup while rest of them agreed that HBV, TB and all the diseases concerned have the highest risk of transmission in dental setup [Figure 4].

Based on question no 5, more than half of the 3rd-year and final year students aware of the universal precautions and personnel protective equipment. The percentage is 62% for the 3rd year and 84% for final year students. It shows that they have good knowledge of it [Figure 5].

Regarding their frequency of practicing the universal precautions especially wearing of eye protector during ongoing dental treatment, it can be stated that most of the 3rd-year dental students still at the moderate level with a percentage of 52% when compared to final year students in which their highest percentage at 42% at frequent level [Figure 6].

Based on Figure 7, it has been shown that only a percentage of 36% of the 3rd-year concern regarding changing the gloves between patients while a
percentage of 56% belong to final year dental students. The rest of them still do not or rarely change the gloves between patients during dental treatment [Figure 7].

When dental students being asked about methods of washing their hands in clinic, majority of the 3rd year (36%) and final year dental students (44%) preferred only using plain water to wash their hands rather than washing using povidone-iodine, antiseptic, or handwash. According to Figure 8, the lowest percentage is using povidone-iodine with 10% for the 3rd year and 14% for final year students [Figure 8].

Regarding the awareness toward postexposure prophylaxis (PEP), only with a percentage of 18% of the 3rd year and 44% for final year students are fully aware of PEP while the others with a percentage of 82% for the 3rd year and 56% still unaware about it and its role especially in dentistry [Figure 9].

In this study, 80% and 86% of the 3rd year and final year students preferred to clean handpieces and other dental instruments by wiping them using disinfectants with the rest of them preferred autoclave for sterilize handpiece and other dental instruments [Figure 10].

Based on the result, most of the 3rd year and final year dental students with a percentage of 4% and
36%, respectively, are willing to treat patients with history of getting infectious disease while 96% 3rd year students and 64% final year dental students are not ready to treat patients with a history of getting infectious disease [Figure 11].

Based on the results, 89% and 70% of the 3rd year and final year students believed that more emphasis and training in infection control during dental curriculum are to be necessary [Figure 12].

DISCUSSION

This study was conducted to assess the knowledge, attitude, and practice of cross-infection and infection control among dental students. In this study, it is noted that both categories of dental students still at moderate level regarding the importance of infection control and cross-infection and the knowledge among all the students about the infection control are quite good but practice is low. Although vaccination against HBV is mandatory for all clinical students in dental colleges, only 64% 3rd year students and 84% final year students are vaccinated which is low when compared to the study conducted by de Souza et al., which stated that 90.8% of students being vaccinated. The Dental Council of India has made hepatitis B vaccination mandatory for dental students before admission, although the school has not listed it as a requirement. Regarding the awareness about the universal precautions and personnel protective equipment, it is seen that 62% and 84% of the 3rd-year and final year students aware of the importance of using it in infection control. Other than that, it has been shown that only a percentage of 36% of the 3rd-year concern regarding changing the gloves between patients while a percentage of 56% belong to final year dental students. The rest of them still do not or rarely change the gloves between patients during dental treatment. The possible reason for not changing gloves between patients may be due to short timing of procedure undertaken for that patients and maybe because they are still unaware that infection can be spreading even through contaminated gloves. It is seen also that the use of protective barriers such as gloves, mask, gown, and eye protector varied among both years. Based on the results, majority of the 3rd-year dental students still at the moderate level with a percentage of 52% when compared to final year students in which their highest percentage at 42% at frequent level. Common reasons for not wearing protective barriers may be due to time consumption since it was to be changed for every patient and low level of knowledge regarding their importance toward infection control in clinical practice.[16-18]

Cross infection can be considered a major concern in infection control. One of the most successful methods for prevention and control on infection is by maintaining good hand hygiene.[19] Even though the students are taught to use antiseptic solution but majority of the 3rd year (36%) and final year dental students (44%) preferred only using plain water to wash their hands rather than washing using povidone-iodine, antiseptic, or handwash. The lowest percentage is using povidone-iodine with 10% for the 3rd year and 14%

Figure 10: The percentage of the 3rd and final year students against respective choices

Figure 11: The percentage of the 3rd and final year students against respective choices

Figure 12: The percentage of the 3rd and final year students against respective choices
for final year students. This is in contrast with a study done in Chennai shown that the highest percentage of respondent washed their hands is using antiseptic soap with water, and the lowest percentage is washing their hands using only plain water. In this study, 80% and 86% of the 3rd year and final year students preferred to clean handpieces and other dental instruments by wiping them using disinfectants with the rest of them preferred autoclave for sterilize handpiece and other dental instruments. However, it is known that live blood cells, viral particles, and bacteria can still survive inside handpieces even after thoroughly being disinfected. Many authors have emphasized the hazard of cross-infection by the use of dental instruments.[20] Some of these authors showed that 94% of dentists in Kuwait used an autoclave to sterilize handpieces.[21] Morris et al[22] showed that 30% of dentists in Saudi Arabia had sterilized handpieces with autoclave, and 90% of them autoclaved their instruments at the end of the day. According to a study conducted by Miller,[23] the most common reason for not sterilizing handpieces is the fear to damage the equipment.[24] With respect to attitudes toward adherence to infection control measures, the majority of the participants believed that more emphasis and training in infection control during the dental curriculum to be necessary. The level of knowledge about and compliance with infection control measures was poor among the students. Attributable reasons could be inadequate training for infection control measures, inadequate supply of personal protective equipment, and carelessness. Similar results were found in studies by Askarian and Assadian[25] Abreu et al., and Ogden et al.[26] regarding dental students in Iran, Brazil, Nigeria, and the UK.

CONCLUSION

A moderate level of knowledge and attitudes toward cross-infection and infection control can be seen among the 3rd year students in comparison to final year dental students in this present study. Improving compliance toward infection control will remain a challenge if they did not take seriously about this matter. Seminars of lecturers on universal infection control measures for each academic year can be done to improve and refresh students’ knowledge about cross-infection and infection control.

REFERENCES


Source of support: Nil; Conflict of interest: None Declared