

SURVEY



Cross infection and sterilization methods: A survey among dental practitioners in Chennai

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Abstract

Transmission of any infectious diseases is possible from one individual to another during dental procedures, including blood-borne infections such as hepatitis B, hepatitis C and human immunodeficiency virus (HIV). Therefore in dental clinics, the significance of sterilization and personal protection procedures is of utmost important. The aim of this study is to evaluate the knowledge, attitude, and practice of sterilization and infection control procedures among dental practitioners in Chennai. In this descriptive study, 100 dental practitioners working in private clinics in Chennai were randomly chosen to evaluate the knowledge, attitude, and practice of sterilization and infection control procedures using a self-administered questionnaire. 88 dentists considered their patients as suspected of infection. 94% of the respondents are aware that sterilizing instruments at boiling temperature could not kill all type of microorganisms. About 82% has answered that the time required for complete sterilization in an autoclave is 20 min. To sterile the instruments in the clinic, 37 dentist use autoclave. Of 100, only 44 responded that the critical instruments (which penetrate the mucous membrane and skin) should not be sterilized by disinfectants. 66 practitioners are aware that the blood-borne infections are HIV, hepatitis B virus, and hepatitis C virus. 86 participants are aware that the sharps should be discarded in a separate container. The attitude toward the cross infection is satisfactory nevertheless no adequate knowledge on blood-borne infections among the practitioners. Even though most of the practitioners follow proper sterilization methods, improvement in the practice of handling disinfectant solutions and methods of sterilization of hand pieces are required. We would conclude that the regular continuing education program and short term courses about cross-infection and infection control procedures are essential.

Keywords: Contamination, dental practitioners, infection control, sterilization methods

Introduction

Dental care professionals are more prone for the exposure of any infectious materials, including body fluids such as blood, droplets either directly through needle stick injury, splash or indirectly through contamination of instruments or equipments. Infection control now has become an important part of the practice in dentistry to the extent that the dentists or dental assistants no longer question its necessity.

Cross infection can be defined as the transmission of infectious agents between patients and staff within a clinical environment.^[1] Dental clinic is an environment where disease transmission occurs. This occupational potential for disease transmission becomes evident when it is considered that most human microbial pathogens have been isolated from oral

secretions.^[2,3] Also, majority of carriers of infectious disease cannot be easily identified. For this reason, at the end of 1980 many surveys have been carried out in several countries including North America and Europe to investigate the practices to control infection and compliances with universal precautions in dental procedures.^[4,5]

The use of following proper procedures to control infection is effective in preventing the microbial pollution and cross contamination and is strongly supported by organizations such as centers for disease control and prevention.^[6] Universal precautions consider that all patients have to be accepted as infectious patients and apply these precautions to all patients.^[7] Most hospitals have no infection control program due to lack of awareness of infection control or absence of properly trained individual.

Though there are many surveys regarding cross infection control procedures which have been carried out in several countries, there is no report in recent literatures about how the dentists in south Indian population manage the control of cross infection in their practice. The aim of this descriptive study is to evaluate the knowledge attitude and practice of sterilization methods and infection control procedures among dental practitioners in Chennai city.

Materials and Methods

The study was conducted as a descriptive survey of private dental practitioners in the Chennai city, Tamil Nadu, India. A self-administered questionnaire containing 10 questions was prepared to obtain information about sterilization procedures used for the prevention of cross infection in dental practices and determine the knowledge and attitude towards infection control. The questions were divided based on the knowledge of sterilization, awareness, and attitude toward sterilization and prevention of cross infection.

Results

Out of 100 practitioners, those who consider their patients as infectious are 88. 10 practitioners considered their patients as healthy and 2 practitioners did not respond to the question, and the response is shown in Graph 1. The awareness of dental practitioners toward the eradication of organisms with boiling water is shown in Table 1.

50 dentists out of 100 are not aware that the critical instruments should not be sterilized by disinfectant solutions. Six of them have not responded. The results are represented in Graph 2. To assess the knowledge on minimum time required for the complete sterilization in an autoclave by dental practitioners 82 out of 100 are knowledgeable about the sterilization time of autoclave is represented in Table 2.

66 practitioners out of hundred are aware that the blood-borne infections are human immunodeficiency virus (HIV), hepatitis B virus and hepatitis C virus. 14 of them have included tuberculosis as blood borne infection. HIV alone is considered as blood borne infectious disease by 20 practitioners.

Table 1: Boiling water kills microorganisms

Boiling water kills all type of microorganisms	Respondents (%)
True	6
False	94
Not responded	2

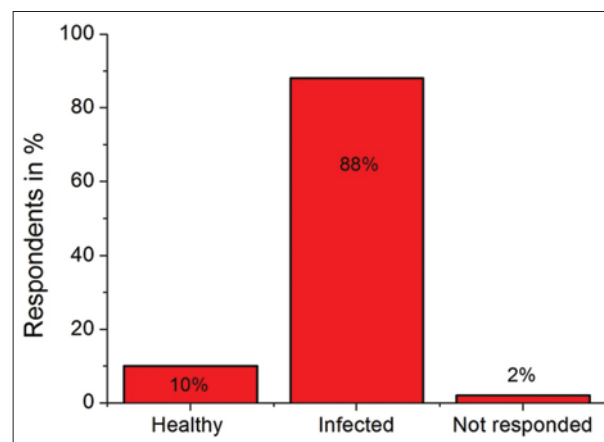
Table 2: Time requirement of complete sterilization in autoclave

Time required for sterilization	Respondents (%)
20 min	82
10 min	16
5 min	2

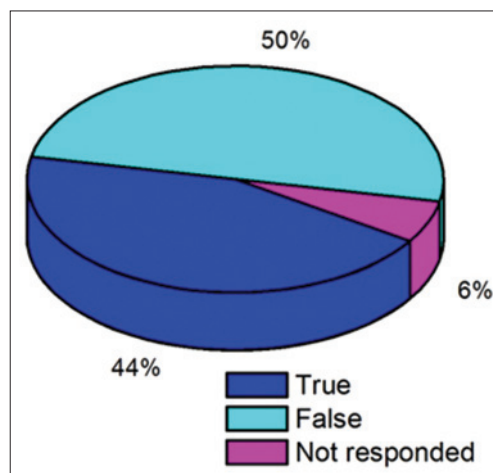
54 out of 100 are aware of changing the glutaraldehyde solution for sterilization of burs and files every day. 24 dentists felt that the solution should be changed when there is a change in color. Six of them assumed the change is required when suspected of infection. The monthly once solution change is followed by 10 of them. No response was received from four practitioners. The results are displayed in Graph 3.

The awareness among the dental practitioners toward the use of protective measures during the procedures is discussed. Six of the practitioners are alone aware that gloves, mask and hand washing are considered as staff protective measures. But 72 of them considered wrongly that the above mentioned materials as well as barrier protection for patient in the handle of the dental unit and gowns/apron are staff protective measures while 22 thought that the barrier protection in the handle of the dental unit is the only one staff protective measure that has been used for patient.

The attitude of 86 practitioners toward the disposal of sharp materials such as needle, scalpel blade should be discarded in separate containers. 14 of them said that it should be disposed



Graph 1: Patients considered as healthy or infected



Graph 2: Sterilization of critical instruments by disinfectant solution

with infectious materials, and the details are depicted in Table 3. The methods to sterilize the dental instruments were analyzed. Autoclave is used by 74 dentists for sterilization in their clinic whereas hot air oven is used by 18 dentists. Two dentists use disinfectant solutions to sterilize the instruments while four of them use boiling water. Combination of boiling water, autoclave and hot air oven is used by two practitioners to sterilize the instruments. The details are shown in Table 4.

On the analysis about the sterilization of hand piece and ultrasonic hand piece in hot air over, 20% of the dentist said it can be sterilized but 80% of them said it cannot be sterilized in hot air oven shown in Graph 4.

Discussion

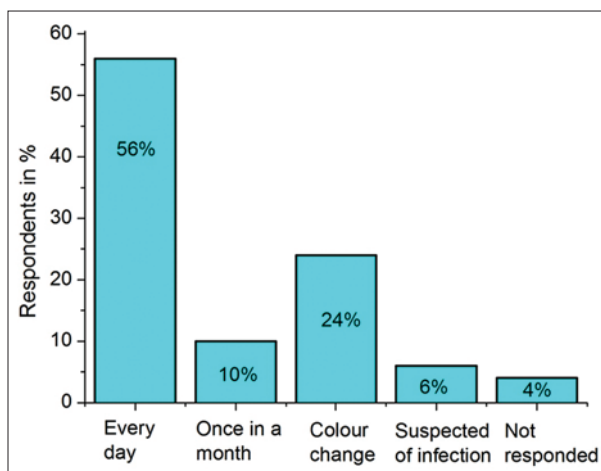
The dental health care professionals should consider the risk of treating the patients with probability of infectious disease due to the nature of the profession. The infections can also spread from health care professional to the patients and also from one patient to the other. The dentists considering their patients as healthy probably may not follow the universal precautions whereas majority of the practitioners treat their patients as infectious as they follow universal precautions.^[8]

In assessing the knowledge on sterilization a good number (94%) of the participants are aware that boiling water sterilization cannot kill all type of organisms. Furthermore, 82 practitioners are aware of the time required for complete sterilization in an autoclave. These clearly reveal their adequate knowledge on the sterilization method. The awareness of the dentists about the critical instruments (penetrate the mucous membrane and skin) which should not be sterilized by disinfectants reveals that almost half of the study group is lacking the knowledge on the use of different types of sterilization.

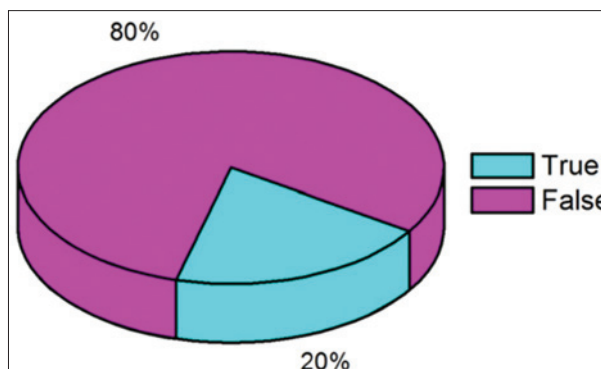
The data presented in this study reveal that only 66% are aware of blood borne diseases. There is a lack of knowledge on blood borne infections among the practitioners. This study also reveals an additional finding that only 6% are knowledgeable on the use of materials for staff protective measures. This clearly indicates the need of knowledge towards the use of protective measures.

This survey identified that most of the dentists involved in this study use either an autoclave or Hot air oven for sterilization and two of them also use only disinfectant solutions for sterilization. A lack of attitude is observed in this study toward the different exposures of sterilization methods in their dental clinics. The study shows that only 54% are aware that changing the glutaraldehyde solution every day. This emphasizes the attitude towards the use of disinfectants is not satisfactory.

The assessment on the awareness of disposal of sharp materials revealed that 86 practitioners are aware that the sharps need to be discarded in separate containers. The participants demonstrated a positive attitude towards the method of sterilization of hand-piece. The hand pieces can easily get damaged if it is sterilized in hot air oven.



Graph 3: Duration of changing the glutaraldehyde solution



Graph 4: Sterilization of hand piece in hot air oven

Table 3: Disposal of sharp materials

Disposal of sharp materials	Respondents (%)
Separate container	86
Along with infectious materials	14
Along with non-infectious materials	0

Table 4: Sterilization methods

Sterilization methods	Respondents (%)
Autoclave	74
Hot air oven	18
Disinfectant solutions	2
Boiling water	4
Autoclave, hot air oven and disinfectant solutions	2

According to the infection control guidelines for the prevention of transmission of infectious diseases in the health care setting (2004), the universal application of standard precautions is the minimum level of infection control required in the treatment and care of all patients to prevent the transmission of blood-borne viruses. These include personal

hygiene practices particularly hand-washing; the use of personal protective equipment such as gloves, gowns and protective eyewear; aseptic techniques; the safe disposal systems for sharps and contaminated matter; the adequate sterilization of reusable equipment; and environmental controls. Standard precautions should be implemented for all the patients, regardless of existent information or assumptions about a patient's blood borne virus status. This process would ensure the reduction of potential stigma and discrimination in the health care setting.^[8]

Conclusion

From the present study, it can be concluded that the attitude towards the cross infection and the knowledge on sterilization method are agreeable however the dental professionals do not possess adequate knowledge on blood-borne infections. Even though most of the practitioners follow proper sterilization methods, improvement in the practice of handling disinfectant solutions and methods of sterilization of hand pieces are required in practice. The different types of sterilization are employed for the particular instruments and equipments and the knowledge on this is mandatory for all the dental practitioners. The knowledge on the list of staff protective measures and patient protective measures among the dentists should also be improved. Improved compliance with recommended infection control measures is required for all the dentists.^[9] Health administrators should be oriented towards the importance of the Infection control program. Health care workers should be equipped with the requisite knowledge, skills and attitudes for good infection control practices.^[10]

Every health care institution including dental institutions should have an infection control team. The infection control team should assess training needs of the staff. They should provide required training through awareness programs,

in-service education, and on-the-job training. They can also organize regular training programs for the staff for essential infection control practices that are appropriate to their job description and provide periodic re-training or orientation of staff and review the impact of training.

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