Knowledge and attitude of Dental Practitioners regarding sterilization protocol in Kanpur City: A questionnaire based study

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Abstract

Introduction: In dental clinics, the significance of sterilization and personal protection procedures is of utmost important. The aim of this study to assess the level of knowledge, attitudes, and practices regarding sterilization/infection control measures among dental practitioners in Kanpur City.
Material and Methods: In this descriptive study, 100 private dental practitioners in Kanpur City were randomly chosen to evaluate the knowledge, attitude, and practice of sterilization and infection control procedures using a self-administered questionnaire.
Results: 85% dentists considered their patients as suspected of infection. 95% of the respondents are aware that sterilizing instruments at boiling temperature could not kill all type of microorganisms. About 85% has answered that the time required for complete sterilization in an autoclave is 20 min. 70% of dental practitioners use autoclave to sterilize instruments.
Conclusion: The Knowledge and attitude of dental practitioners towards sterilization procedures used in clinics was found to satisfactory. Even though most of the practitioners follow proper sterilization methods, improvement in the practice of handling disinfectant solutions is required. We would conclude that the regular continuing education program and short term courses about cross-infection and infection control procedures are essential to upgrade knowledge of the dental practitioners

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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] Sterilization is defined as the process by which an article, surface, or medium is made free of all microorganisms either in the vegetative or spore state. Disinfection means the destruction or removal of all pathogens or organisms capable of producing infections.[2] Barrier protection of personnel using masks, protective

eyewear, gloves and gowns, instrument sterilization, and methods of avoiding direct contact with various surfaces are mandatory.[3] Dental health personnel is at high risk of exposure to cross-infection with blood-borne pathogens such as hepatitis B virus, other viruses, and bacteria that colonize the oral cavity and the upper respiratory tract.[4]

As most instruments directly contact mucosa or penetrate oral tissues, it is essential that contaminated reusable instruments be cleaned and sterilized thoroughly by using accepted methods that can be tested and monitored routinely.[3] Rotary instrumentation can expose personnel to heavy spatter of >50 mm particles and mists.

According to the Centers for Disease Control, dental instruments are classified into three categories depending on the risk of transmitting infection, that is, critical, semi-critical, and noncritical, based on the following criteria:[5]

(1) Critical instruments are those used to penetrate soft tissue or bone, or enter into or contact the bloodstream or other normally sterile tissue. They should be sterilized after each use. Sterilization is achieved by steam under pressure (autoclaving), dry heat, or heat/chemical vapor. Critical instruments include forceps, scalpels, bone chisels, scalers, and surgical burs

(2) Semi-critical instruments are those that do not penetrate soft tissues or bone but contact mucous membranes of non-intact skin, such as mirrors, reusable impression trays, and amalgam condensers. These devices also should be sterilized after each use. In some cases, however, sterilization is not feasible and, therefore, high-level disinfection is appropriate

(3) Noncritical instruments are those that come into contact only with intact skin such as external components of x-ray heads, blood pressure cuffs, and pulse oximeters. Such devices have a relatively low risk of transmitting infection; and, therefore, may be reprocessed between patients by intermediate-level or low-level disinfection.

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.[6,7] 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.[8,9] 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.[10] Universal precautions consider that all patients have to be accepted as infectious patients and apply these precautions to all patients.[11]

Materials and Methods

The study is a descriptive survey of private dental practitioners in the Kanpur city, Uttar Pradesh, India. A selfadministered questionnaire containing 10 questions was prepared to obtain information about sterilization procedures used for the prevention of cross infection in dental clinics and hospitals and also determine the knowledge and attitude of the dental practitioners towards infection control. The questions were divided based on the knowledge of sterilization, awareness, and attitude toward sterilization and prevention of cross infection. A total of 100 dental practitioners participated who completely filled the questionnaire were included in this study and their identity was kept confidential.

Results

A total number of 100 dental practitioners completed the questionnaire completely and were included in this study. Out of 100 practitioners, 85 considered their patient as infectious. 13 practitioners considered their patients as healthy and 2 practitioners did not respond to the question, and the response is shown in Table 1.

Dental practitioners considering their patients as infectious	Respondents (%)
Infected	85
Healthy	13
Not Responded	02

Table 1: Dental Practitioners considering their patients as infectious

Regarding the use of boiling the instruments in water which help in the eradication of all forms of organisms 95 responded this as false 3 considered this as true and 2 did not responded. Table 2

Boiling water kills all forms of microorganisms	Respondents (%)
True	03
False	95
Not Responded	02

Table2: Boiling water kills all forms of microorganisms

40 dental practitioners were aware of the fact that the critical instruments should not be sterilized by disinfectant solutions, 55 were having incorrect knowledge of the fact and 5 of them did not responded. The results are represented in Table 3.

Sterilization of critical instruments by disinfectant solution	Respondents (%)
True (should be sterilized in disinfectant solution)	55
False (should not to be sterilized in disinfectant solution)	40
Not Responded	05

Table 3: Sterilization of critical instruments by disinfectant solution

To assess the knowledge on minimum time required for the complete sterilization in an autoclave by dental practitioners 85 out of 100 are knowledgeable about the sterilization time of autoclave and is tabulated in table 4.

Time required for sterilization	Respondents (%)
20min	85
10min	12
05min	03

Table 4: Time requirement of complete sterilization in autoclave

60 out of 100 are aware of changing the glutaraldehyde solution for sterilization of burs and files every day. 20 dentists felt that the solution should be changed when there is a change in color. 10 of them assumed the change is required when suspected of infection. The monthly once solution change is followed by 5 of them. No response was received from 5 dental practitioners. The results are displayed in Table 5

Duration of changing the gluteraldehyde solution	Respondents (%)
Changing Glutraldehyde solution everyday	60
Changing the solution when color changes	20
Changing when suspected of infection	10
Changing once a month	05
Not responded	05

Table 5: Duration of changing the gluteraldehyde solution

The attitude of 80 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 with infectious materials, and the details are depicted in Table 6.

Disposal of Sharp Instruments	Respondents (%)
Discarded in separate containers	80
Disposed along with other infectious material	20
Disposed along with other non-infectious material	00

Table 6: Disposal of sharp materials

The knowledge of various methods to sterilize the dental instruments was also analyzed. Autoclave is used by 70 dentists for sterilization in their clinic whereas hot air oven is used by 05 dentists. 05 dentists use disinfectant solutions to sterilize the instruments while four of them use boiling water which is depicted in Table 7

Methods used for sterilization	Respondents (%)
Autoclave	70
Hot air oven	05
Disinfectant solutions	05
Boiling water	20

Table 7: Sterilization Methods

Discussion

It is of great importance for any healthcare center to set up and govern its own measures to prevent the spread of infectious and communicable diseases. To achieve this, it is important that health care professionals be aware of the protocols and risks involved in the practice. The aim of this study was to assess the level of knowledge, dental practitioners regarding sterilization and infection control protocols.

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.[11]

In assessing the knowledge on sterilization 95 of the study participants are aware that boiling water sterilization cannot kill all type of organisms and also 85 practitioners are aware of the time required for complete sterilization in an autoclave. These show their adequate knowledge on the sterilization method. The awareness of the dental practitioners about the critical instruments (penetrate the mucous membrane and skin) which should not be sterilized by disinfectants reveals that more than half of the study group is lacking the knowledge on the use of different types of sterilization.

This survey shows that most of the dental practitioners 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 60% 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 80% practitioners are aware that the sharps need to be discarded in separate containers.

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.[11]

The attitude towards infectious control measures was positive, but greater compliance with comprehensively about infection control measures which should be strictly followed. One of the limitations that we found to our study was the method for assessment. We could not supervise the responders' actual practice and, therefore, had to rely on their self assessment. Therefore, the responses might have not accurately reflected the true knowledge and attitude in practice. Dental Practitioners are more likely to comply with an infection control program only if they understand the basic motive behind it.

Conclusion

Dental practitioners in this study displayed a positive level of knowledge regarding sterilization and infection control practices. However, the knowledge acquired must be practically administered into daily practice. Compliance can be improved by upgrading their knowledge through educational programs and making them aware of the various health hazards that can occur following malpractice of sterilization and infection control measures. Improved compliance with recommended infection control measures is required for all the dentists. 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.

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References:

1. Mutlu S, Porter SR, Scully C. Cross-infection control in dentistry. Istanbul, Turkey: Erofset; 1996.
2. Ananthanarayan and Paniker's Textbook of Microbiology, Seventh Edition, Chapter - 3: Sterilization and Disinfection.
3. Sturdevant's Art & Science of Operative Dentistry, South Asian Edition, Chapter - 5: Infection Control.
4. Rahman B,Abraham SB,AlsalamiAM,Alkhaja FE, Najem SI.Attitudes and practices of infection control among senior dental students at college of dentistry, university of Sharjah in the United Arab Emirates. Eur J Dent 2013;7(Suppl 1):S15-9.
5. American Dental Association. Available from: https://www.ada.org/. [Last updated on 2009 Jul 09].
6. Cottone JA, Terezhalmy GT, Molinari JA. Practical Infection Control in Dentistry. 2nd ed. Baltimore: Williams and Wilkins; 1996.
7. Samaranayake L. Rules of infection control. Int Dent J 1993;43:578-84. 4. Bentley EM, Sarll DW. Improvements in cross-infection control in general dental practice. Br Dent J 1995;179:19-21.
8. DiAngelis AJ, Martens LV, Little JW, Hastreiter RJ. Infection control practices of Minnesota dentists: Changes during 1 year. J Am Dent Assoc 1989;118:299-303.
9. Centers for Disease Control. Update: Transmission of HIV infection during an invasive dental procedure - Florida.

MMWR Morb Mortal Wkly Rep 1991;40:21-7.
10. Centers for Disease Control (CDC). Update: Transmission of HIV infection during invasive dental procedures – Florida. MMWR Morb Mortal Wkly Rep 1991;40:377-81.
11. Centers for Disease Control (CDC). Recommended infectioncontrol practices for dentistry. MMWR Morb Mortal Wkly Rep 1986;35:237-42