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Knowledge and attitude towards sterilization amongst dentists in Ludhiana, Punjab- A survey or cross sectional study

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***Abstract*---**The omnipresent microorganisms are a constant threat to the health care personnel and patients by their ability to cause life threatening diseases. These microorganisms can transmit from various routes including fomites, airborne, aerosols and so on. Strict sterilization protocols and maintaining asepsis are the prerequisites to prevent cross contamination and subsequent development or establishment of disease/s. The sterile instruments are the best tools in hands of a dental health care provider. The procedures of sterilizing various reusable instruments include there cleaning after use, drying, packaging, labeling and autoclaving them. Equally important are the maintaining records of the same and checking the efficacy of the sterilizer as recommended by the authorities. This survey was done to understand the knowledge and attitude of dentists in Ludhiana towards sterilization practices. Continual in-service training is essential to expand, supplement, and refresh knowledge of different sterilizing processes and techniques to ensure safe practice for all.

***Keywords*---**Knowledge, attitude, sterilization, dentists.

Introduction

The field of Dentistry deals with a wide array of microorganisms and needs more competent dentists for the management of infection control during dental procedures, both in terms of knowledge and aptitude. In terms of time management in a clinical practice, the correct management of the disinfection,

pre-sterilization and sterilization of the instruments plays a fundamental role in the speed with which a given intervention is carried out and it affects the team's ability to deal with emergency situations [1-3]. It's vital to properly manage equipment and utilise the most efficient tools and sterilizers in order to have a big volume of sterile material on hand and ready to use. [4] The instrument sterilizers available nowadays, ensure that materials are sterile and ready to be supplied in a equitable time and they are efficient in attaining the required results, both in terms of quantity and quality.[4] Sterilization is a technique that destroys all living organisms, pathogenic & non-pathogenic, in spore or vegetative form that are existing on the surface of the material to be sterilized. [4, 5] Sterilization can be achieved by various methods like heat sterilization and chemical sterilization. Steam sterilization under pressure, also known as Autoclaving, which a type of heat sterilization, is the preferred method used for most reusable dental instruments. Chemical sterilization is used for the decontamination of instruments which cannot endure heat.[13]

According to the Centres for Disease Control and Prevention, dental instruments are categorized as critical, semi critical, or noncritical depending on the risk of transmission of infection.[17] (1) Critical tools are those that are used to infiltrate soft tissue or bone, or to enter or contact the bloodstream or other generally sterile tissue. They should be sterilized after each use. [17] Sterilization may be accomplished using steam under pressure (autoclaving), dry heat, or heat/chemical vapour. Surgical burs, forceps, scalpels, bone chisels, scalers, and surgical burs are all required instruments. [17] (2) Semi-critical instruments such as mirrors, reusable imprint trays, and amalgam condensers do not puncture soft tissues or bone, but they do come into contact with mucous membranes or non-intact skin. These gadgets should also be sterilized after each use. However, in certain cases, sterilization is not practicable, thus high-level disinfection is necessary. [17] (3) Noncritical devices, such as blood pressure cuffs, x-ray heads, and pulse oximeters, only come into contact with undamaged skin. Because these devices provide such a little risk of infection, they may be reprocessed amid patients using low or intermediate level disinfection. [17]

Sterilization in Dental Clinics

The main aim of establishing and following a strict sterilization protocol at a Dental Clinic is to maintain the highest level of infection control, in order to avoid any contamination and transmission of pathogenic diseases. [7] This can usually be done by following an order for the maintenance of used instruments. This includes a washer, an ultrasonic cleaner, wrapping of instruments in cassettes or self-seal pouches and sterilization.[7,11] Sterilization with steam under pressure using Autoclaves, is the most common method of sterilization used at dental clinics. [5, 7] The autoclaves use steam under pressure for the sterilization process and the chamber must reach a minimum temperature of 121°C at 15 Psi for a minimum of 30 minutes, for adequate sterilization.[5] The method of autoclaving offers a number of advantages, including high microbiological lethality, cheap cost, no toxic residues, and the ability to be well regulated and monitored. The instrument surface must, however, be in direct contact with saturated steam at the right temperature and duration in the absence of air for the method to work. [5] For the bench-top autoclaves, also known as class B, the load's maximum

temperature 134-137°C at 2.25 bars for a minimum hold time of 3 minutes is recommended. [5] The sterilizer must be installed, commissioned, and validated before use in order to fulfil these requirements. The machine must be checked on a regular basis after commissioning to ensure that the settings established during installation are still valid. [6-8] Clearly visible chemical indicators help to segregate sterile and unsterile instruments. [5,7] The chemical indicator also indicates any possible malfunction or error in packaging or loading. In-built chemical indicator on a package indicates exposure to steam at desired temperature but does not confirm sterilization process. In case the indicator fails, the sterilizer should not be in use. The other parameters like temperature, pressure and timing of each cycle should be within normal limits as recommended by the manufacturer.[8,11]

Materials and Methods

This survey, also known as a cross-sectional study, was conducted in Ludhiana to measure dentists' sterilization knowledge and attitudes. The ethical approval was provided by the institute's management. In all, 150 people took part in this study. Only people who agreed to take part in the study were considered. Each person was asked to provide their informed permission. The study included only registered dental surgeons with the Punjab Dental Council. Individuals' sterilization knowledge, practices, and attitudes were assessed using a self-administered questionnaire in the local language. In the knowledge component, four questions were asked regarding the kind of autoclave used in practice, the use of a heat sensitive chemical indicator in each cycle, the use of biological indicators weekly, the type of instrument packaging, disinfection, and sterilization and disinfection knowledge. The attitude questions were on post-operative infection control gear including gloves, masks, protective eyewear, a head helmet, and an apron, among other things. All of the questions had to be answered by the participants. After each participant had completed all of the questions in each component of knowledge and attitude, the questionnaire was compiled. Name, age, gender, educational status, work experience, kind of employment, and whether or not sterilization training was acquired were all questions on the questionnaire. The data was then processed and analysed using the SPSS statistical package version 25.0, which includes the Chi square and one-way ANOVA tests. Statistical significance was defined as a p value of less than 0.05.

Questions and results

We included 150 dentists from Ludhiana, Punjab in this cross-sectional survey study. We found most of the dentist (90) used class B autoclave and followed by class N (51), class S autoclave were not used by any dentist.

Table 1
Type of Autoclave used in practice

Class B	Class N	Class S	Do not know	No response
90	51	-	-	9

Table-2 shows the heat sensitive Chemical Indicator used in each cycle by 120 dentist and 21 were not using any kind of heat sensitive Chemical Indicator in autoclave.

Table 2
Use of heat sensitive Chemical Indicator used in each cycle

Yes	No	Do not know	No response
120	21	-	9

16 dentists don't know about Biological Indicators and 100 dentists don't used biological indicator during autoclave, only 25 dentists have knowledge about biological indicator.

Table 3
Use of Biological Indicators weekly

Yes	No	Do not know	No response
25	100	16	9

Table 4 showed that for packing of instruments Self-seal Pouch were used by most of the (114) dentist and followed by Reusable cloth (15), Disposable Sheets (7).

Table 4
Type of packaging of instruments

Self-seal Pouch	Reusable cloth	Disposable Sheets	None	Do not know	No response
114	15	7	5	-	9

Discussion

Receiving the right information and using the right attitude may go a long way toward boosting one's skills. In a professional situation, this might be achieved by a number of ways. Dentists and medical professionals should be aware of the risk of treating infected patients, owing to the nature of their job. [2] Health care professionals are in the very high-risk category, since they are more likely to come into touch with some of the world's deadliest pathogens. Disease transmission among people has become a serious concern as many new trends and practices in health care are applied. [18]

Sterilization must be carried out in a repeatable, standardised, verifiable, and recorded manner. Chemical sterilization is a method of disinfection for thermo sensitive items that cannot withstand autoclaving cycles. For the remainder, autoclave sterilization should be regarded the preferred method. [4, 5] Chemical steam, saturated steam, and dry heat have long been the most prevalent methods of physical heat sterilization in dental clinics. These two techniques are viewed as untrustworthy and ineffective. [4, 5, 11]

The majority of dental procedures use critical or semi-critical equipment because they often breach the mucosa or gingivae of patients. [19] Even though it has been challenging to prove or refute direct links to a lack of disinfection of dental equipment, there have been a number of documented hepatitis B transmissions in dentistry. [19] Nonetheless, cross-infection is a significant possibility if some essential requirements are not met. This is reinforced by in vitro evidence of transmission potential. [20]

The outcomes of this study indicated that most Ludhiana dentists had poor knowledge of infection prevention, sterilization, waste disposal, and other areas. Data on the true number of practising and registered dentists is difficult to get, and much more difficult to trust, since a huge portion of dentists and assisting staff working in dental clinics and hospitals are unqualified and unregistered. There are few dental education and training programmes in Ludhiana, and the sector is unregulated. The majority of dentists in Ludhiana get on-the-job training in clinics or hospitals. [21] Dentists with less than two years of experience had better knowledge scores than those with greater experience. This outcome might be explained by the recent increasing focus on infection control strategies and standards. We discovered no significant variations in age. According to a hospital-based cross-sectional study carried out in Japan, acquiescence with infection control procedures was strongly related to age, dental department, patient frequency, knowledge, and desire to treat HIV/AIDS patients. [22]

Because of the convenience sample, the generalizability of the results is unknown, and the findings cannot be generalised to all dentists in Ludhiana. Other limitations include the inability to control confounders and a variety of other factors such as educational content, standardisation of dental facilities, organisational culture, stress, anxiety, and economic status, all of which influence discernment, attitude, awareness and knowledge of asepsis and sterilization.

Conclusion

The purpose of this study was to examine the sterilization knowledge, attitudes, and practices of health-care personnel. According to the results, continual in-service training is essential to expand, supplement, and refresh knowledge of different sterilizing processes and techniques. Sterilization is the most important step in avoiding cross infection and is of utmost importance for safe practice for all. Continued education in the form of lectures is required to educate, update and motivate health-care personnel, while workshops may give hands-on training. Health-care worker orientation programs should also attempt to create awareness and give knowledge about the regulations and legislation that pertain to their occupations.

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