

# Sterilization Protocols Followed by Dentists during Covid-19 Pandemic Awareness and Practice Based Survey

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## Abstract

**Background:** Novel Coronavirus 2019 (Covid-19) has become an emerging public health emergency condition and it has created a panic in many countries. Worldwide strict lockdown and social distancing procedures have been followed to prevent the spread of Covid-19 infection. Yet a large number of emergency patients still go to the dental clinics and hospitals for treatment. Dental practitioners use a set of hand instruments to treat patients such as excavators, mouth mirrors, probes etc. It is mandatory for dentists to have knowledge and awareness about diagnosis, precaution and the management of any epidemic infection. **Objective:** The aim of the study was to assess the knowledge and awareness of instrument sterilization by dental practitioners during Covid-19 pandemic. **Materials & Methods:** A self-developed questionnaire was developed and distributed among the dental practitioners in Chennai, India. A convenient sampling technique was used for the survey. Data was collected from 100 dental practitioners and analyzed statistically using SPSS software. **Results:** The findings show that most of the practitioners have good knowledge and are aware of instrument sterilization and different techniques are employed in general before and after the treatment. All the responses were statistically analyzed using SPSS software. Chi-square test was used to find the correlation between parameters (P value>0.05), correlation of age and mode of transmission was done where the P value was 0.120 which is statistically non-significant. **Conclusion:** The results of the present study show that the knowledge and awareness of instrument sterilization among dental practitioners is adequate during this Covid-19 pandemic.

**Keywords:** Sterilization; Dental instruments; Covid-19; Knowledge; Awareness; Practitioners

## Aim

This study was conducted to assess the knowledge and awareness of instrument sterilization among the dental practitioners during the Covid-19 pandemic.

## Introduction

Covid-19 is a new disease that is distinct from other SARS, MERS and influenza. Although coronavirus and influenza infections may present with similar symptoms, but Covid-19 is different with respect to community spread and severity. This new infectious agent is more likely to affect older males to cause severe respiratory diseases. Studies have suggested that 2019-nCoV may be airborne through droplet aerosols. The common transmission routes of novel coronavirus include direct

transmission cough, sneeze, and droplet inhalation transmission and contact transmission contact with oral, nasal, and eye mucous membranes.

Dental patients and professionals can be exposed to pathogenic microorganisms that infect the oral cavity and respiratory tract. Dental care settings invariably carry the risk of 2019-nCoV infection due to the specificity of its procedures, which involves face-to-face communication with patients, and frequent exposure to saliva, blood, and other body fluids, and the handling of sharp instruments.

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**How to cite this article:** Kiren J, et al. Sterilization Protocols Followed by Dentists during Covid-19 Pandemic Awareness and Practice Based Survey. Ann Med Health Sci Res.2021;11:239-244

The pathogenic microorganisms can be transmitted in dental settings through inhalation of airborne microorganisms that can remain suspended in the air for long periods.<sup>[1]</sup> Infections could be present through any of these conditions involved in an infected individual in dental clinics. In addition to the infected patient's cough and sneezing, dental devices such as high-speed dental handpiece, high-speed air to drive the turbine to rotate at high speed and work with running water. When dental devices work in the patient's oral cavity, a large amount of aerosol and droplets mixed with the patient's saliva or even blood will be generated.<sup>[2]</sup> Particles of droplets and aerosols are small enough to stay airborne for an extended period before they settle on environmental surfaces or enter the respiratory tract. A dental professional's frequent direct or indirect contact with human fluids, patient materials, and contaminated dental instruments or environmental surfaces makes a possible route to the spread of viruses.<sup>[3,4]</sup> Dental care professionals are at an increased risk of cross infection as well as its transmission while treating the patients.<sup>[5]</sup>

Dental procedures frequently cause bleeding and exposure to infected blood, saliva and aerosol are a known means of infectious disease transmission.<sup>[6]</sup> A study was conducted by Humayun et al 2014 in Karachi, Pakistan in 6 dental teaching and private hospitals. The results showed that 97.4% respondents believed that sterilization is a very important part of the daily routine. The most common method of sterilization reported by the respondents was autoclaving 93.2%. Very few of the respondents had a poor knowledge about the proper sterilization. This study concluded that knowledge of sterilization among different levels of dental professionals was adequate.<sup>[6]</sup>

In a small and medium-sized dental facility, the correct management of the sterilization and pre-sterilization phases plays a fundamental role in good management of instruments and personnel, in order to ensure conditions that are more efficient with less down time. Nowadays, instrument sterilizers are increasingly efficient in achieving results, both in terms of time and size, and ensure that materials are sterile and ready to be stocked in a reasonable time.<sup>[7]</sup>

Mahdipour et al concluded in their study that dental practitioners working in state clinics had greater awareness of infection control procedures compared to dental practitioners working in private offices, which might be attributed to the younger population of the practitioners working in state clinics. There were no statistically significant differences in the level of knowledge between male and female dental practitioners regarding infection control; however, there was a decline in awareness as age increased.<sup>[8]</sup>

A pilot study conducted in Jaipur, Rajasthan by Siddharth et al on infection control practices among dental clinics shows that Isolation protocol is loosely followed among dental professionals. Most of the respondents used the sterilized instruments within a week of packaging. However, a significant aspect of this study was that

19% of workplace had no preferred protocol for disinfection suggesting lack of proper sterilization protocol.<sup>[9]</sup>

Sterilizing contaminated instruments is an essential component of an effective infection-control program to protect the patient and staff. There are a variety of sterilization methods available for use in reprocessing instruments depending on needs and the type of instruments being processed. In the dental practice setting, the most commonly used and recommended sterilization method is steam autoclaving.<sup>[10,11]</sup> Other options include dry heat sterilizers and chemiclaves using chemical vapor sterilization.<sup>[12]</sup> Today's busy dental practices face a serious challenge to maintain or increase productivity while ensuring that patient safety remains a top priority. At times, these may seem like incompatible goals. Advances in dental processing equipment, however, have empowered practices to develop safer processes while realizing efficiencies and ultimately, saving money. A cleaning and sterilization process that meets ADA and CDC guidelines is vital to an effective infection control program.<sup>[13-34]</sup>

Understanding the mode of transmission, the causes of spread of infection and importance of sterilization practices in the dental clinics, this study was conducted to assess the knowledge and awareness of instrument sterilization among the dental practitioners during the Covid-19 pandemic.

## Materials and Methods

This was a cross-sectional survey study done to assess the knowledge and awareness of sterilization protocol followed during Covid pandemic by the dental practitioners. The online questionnaire was distributed *via* Google forms. The questionnaire was self-developed with 15 items including the demographic details and questions on knowledge and awareness regarding instrument sterilization. The study was conducted after getting approval from the research board, Saveetha Dental College and Hospital. All the participants consented to participate in the study. There were a total of 100 participants. Convenient sampling technique was used for data collection and data was collected from the DCI registered dental practitioners practicing privately and in an institutional environment. The data from the Google forms was collected and tabulated in the excel sheets. The data tabulated was exported to SPSS software for statistical analysis. The statistical analysis was done using SPSS software by IBM. The independent variables were the age, gender, years of experience and additional qualifications of the dental practitioners, while the dependent variables were the knowledge and awareness about sterilization protocols. Association between variables was tested using chi-square test between the variables Any P value less than 0.05 was considered statistically significant.

## Results and Discussion

There were a total of 100 participants in this study. The results of the demographic data show that there were 60% male and 40% female practitioners. All the practitioners were between the age group of 22 to 56 years.

The results of the present survey of awareness on Covid-19 shows that about 100% of the participants know about Covid-19. With regards to the mode of transmission, 83% of them are aware about how Covid-19 is transmitted [Figure 1]. There were about 40% who were aware of the sterilization techniques and used autoclave in their practice for sterilization. About 21% of them used hot air oven and autoclaves together in their practice for sterilization, 11% of them used alcohol, 1% used autoclaving and surface active agents together [Figure 2, Figure 3]. The responses for the question on “How often do you fumigate your clinic?” is as follows: There were 38% of them who selected to fumigate their clinic at the end of the day; 22% fumigated at the end of each treatment; 40% of them fumigated once in a week [Figure 4].

FIGURE 3 Cumulative Percent

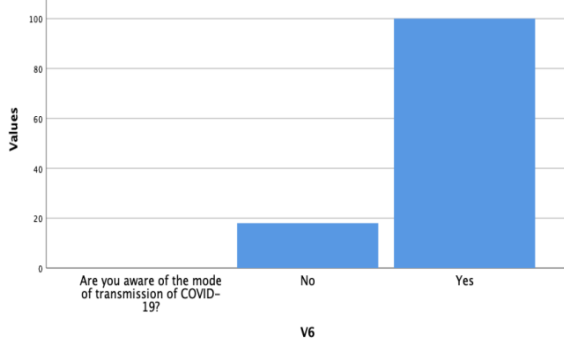


Figure 1: Depicts the responses related to the question regarding the awareness of mode of transmission of Covid-19. 83% responded yes and 17% responded no.

FIGURE 4 Cumulative Percent

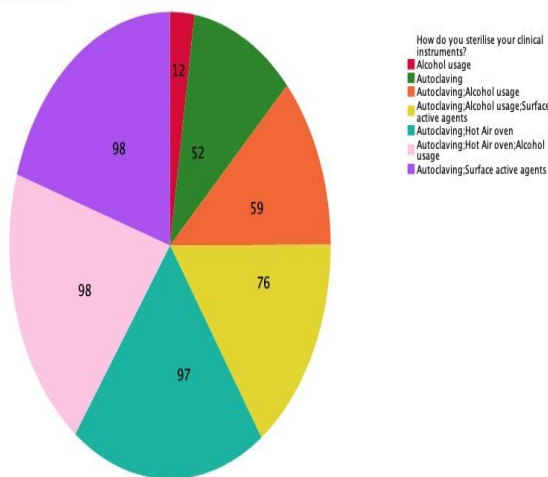


Figure 2: Depicts the responses related to the question regarding how to sterilize your instruments. 12% responded for alcohol usage, 52% responded for autoclaving, 59% responded for autoclaving and alcohol usage, 76% responded for autoclaving; alcohol usage; surface active agents, 97% responded for autoclaving and hot air oven, 98% responded for autoclaving; hot air oven; alcohol usage, 98% responded for autoclaving; surface active agents.

FIGURE 5 Cumulative Percent

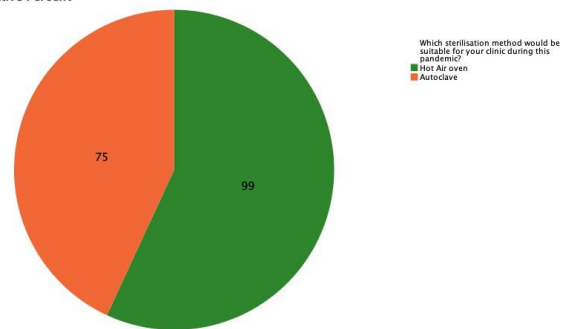


Figure 3: Depicts the response related to the question regarding which sterilization method would be suitable for your clinic during this pandemic. 75% responded for hot air oven, 99% responded for autoclave.

FIGURE 6 Cumulative Percent

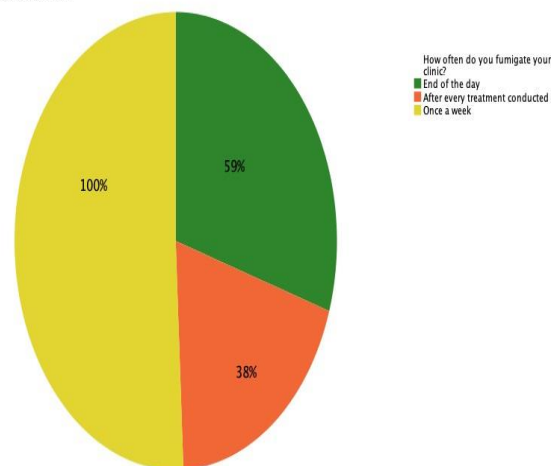
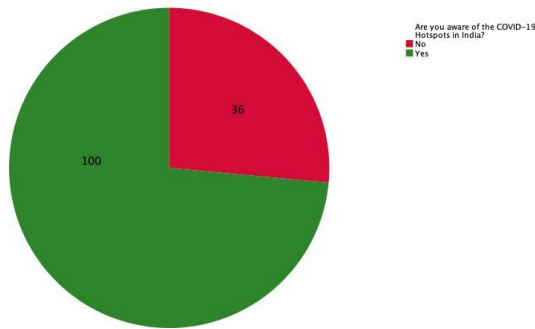


Figure 4: Depicts the response related to the question regarding how often do you fumigate your clinic? 59% responded to end of the day, 38% responded to after every treatment conducted, 100% responded to once a week.

About 66% of them were aware of the Covid-19 hotspots and 34% of them were not sure of the hotspots [Figure 5]. Effective infection control strategies are needed to prevent the spread of 2019-nCoV through these contact routines. Human Corona Viruses (HCoV) can persist on surfaces like metal, glass or plastic for up to a couple of days.

Therefore, contaminated surfaces that are frequently contacted in healthcare settings are a potential source of coronavirus transmission. Dental practices derived droplets and aerosols from infected patients, which likely contaminate the whole surface in dental offices.

In this present study, the results show there is adequate knowledge and awareness about sterilization of instruments among dental practitioners as 89% of them know about the sterilization techniques. About 90% of them are aware of the protective measures to avoid contracting Covid-19 infection.

FIGURE 7  
Cumulative Percent

**Figure 5:** Depicts the response related to the question regarding awareness of Covid-19 hotspots in India. 34% responded are not aware and 66% responded are aware.

The most important concern in dental clinics is the transmission of 2019-nCoV *via* droplets and aerosol because, despite all of the precautions taken, it is almost impossible to reduce droplet and aerosol production to zero during dental procedures. Dental hand pieces utilize high-speed gas to rotate with running water, which leads to the generation of a considerable number of droplets and aerosol mixed with patients' saliva and/or blood. Coronaviruses can actively maintain their virulence at room temperature from 2 hrs up to 9 days. Their activity at 50% humidity was significantly higher than 30%. Therefore, in the dental environment, it seems that keeping surfaces clean and dry will play a significant role in preventing 2019-nCoV transmission.<sup>[35]</sup> Dental professionals should be familiar with how 2019-nCoV is spread, how to identify patients with 2019-nCoV infection and what extra-protective measures should be adopted during the practice in order to prevent the transmission of 2019-nCoV.<sup>[36]</sup> Clear and unambiguous advice must be provided to the dental team on appropriate equipment, chemicals and environment for cleaning dental instruments.<sup>[37]</sup>

The results obtained in this present study is similar to the study results conducted by Sachdeva *et al.* to assess the level of knowledge, attitudes and practices regarding sterilization/infection control measures among undergraduate dental students shows that a majority of the students were highly concerned regarding the sterilization and infection control protocol. About 89% are aware of the exact specifications of sterilization *via* autoclave. A large fraction of students comprising about 85% believed that proper sterilization could not be achieved by simple boiling of instruments. The authors concluded that the level of knowledge and attitude of sterilization measures were acceptable.<sup>[38-47]</sup>

## Conclusion

The results of the present study show that the knowledge and awareness of instrument sterilization among dental practitioners is adequate. Barrier-protection equipment, including protective eyewear, masks, gloves, caps, face shields and protective outerwear is strongly recommended for all healthcare givers in the clinic/hospital settings during the epidemic period of Covid-19. Dental professionals should be

familiar with the mode of spread and what extra-protective measures should be adopted during the practice in order to prevent the transmission of Covid-19. Though in this present study, the knowledge and awareness of instrument sterilization among dental practitioners are adequate. In many dental practices, the cleaning of reusable dental instruments is undertaken using poorly controlled processes and procedures, which increase the risk of cross infection. Clear and unambiguous advice must be provided to the dental team on appropriate equipment, chemicals and environment for cleaning dental instruments.

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