



## **Day to Day Use of Disinfectant Methods for Different Impression Materials among Dental Practitioners**

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### **Authors' contributions**

*This work was carried out in collaboration between both authors from saveetha dental college. Author SPS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author VR managed the analyses of the study. Author VR managed the literature searches. Both authors read and approved the final manuscript.*

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### **ABSTRACT**

One of the major problems which most dental professionals face is cross contamination and cross infection. During the fabrication of dental prosthesis, special care should be taken for every step, especially impressions as they are one of the main concern. This is because impressions are one of the most known to be the main source of infection for any potentially infectious material. To check the practice of disinfection level among the dental practitioners, a questionnaire containing 15 questions was prepared. This survey was carried between the month of June 2019 to March 2020 among the dental practitioners living in Chennai, Tamil Nadu, India. This survey was carried under an online platform where the participants responded to their answers. Based on their responses, the result was tabulated. We got a result of about 64% practitioners practicing protocol to disinfect impressions 65% use alginate to take impressions. 44% use 2% glutaraldehyde to disinfect impressions. 46% prefer spraying disinfectant over impression tray. Based on much research, it was reported that dental technicians were suffering from infections in hand restoratory

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systems, so on humanitarian basis we dentists can take better measures ourselves in avoiding cross contamination to fellow dental technicians by following proper and simple methods for disinfection of impressions before sending them to dental laboratories. To conclude awareness workshops, programs must be organised to create awareness among dentists to prevent cross infections.

*Keywords: Disinfectant; chemicals; uv chamber; impressions; dental practitioners.*

## 1. INTRODUCTION

One of the major problems which most dental professionals face is cross contamination and cross infection. During the fabrication of dental prosthesis, special care should be taken for every step, especially impressions as they are one of the main concerns. This is because impressions are one of the most known to be the main source of infection for any potentially infectious material [1,2]. According to some researchers, approximately 70% of materials which are being sent to dental laboratories contain various infectious microorganisms. These microorganisms include Streptococcus species, Staphylococcus species, Anitratus species, Klebsiella species, and Candida species, etc [3]. The American Dental Association has also urged dental practitioners for the need to practice disinfecting impression trays beforehand as a protocol [4].

In most dental practices, it has become a common method to just wash the impression under running tap water. However, studies have shown that tap water only removes 30% of the present bacteria [5]. Taking this into account, as an alternate option, the most frequently used chemical disinfectants include aldehydes, alcohols, chlorine and ammonium [6].

Although many chemicals are described as suitable to use for disinfection, it does not necessarily mean that it has high compatibility with all forms of impression materials. When a disinfectant is being chosen, there are two main factors that come into consideration; which in this case is its capability to remove the microbial infection and the effect it puts on the material that is used [7-9].

Since these are chemical agents, it should be used as instructed by the manufacturer. Chemicals work as a surface agent by eradicating any present blood and saliva initially through a method of brushing and rinsing. However, out of all the available methods, immersion is considered to be the most effective

[10-13]. When compared to spraying, this method will lessen the possibility of inhaling the disinfectant and at the same time providing an even better surface coverage. According to the British Dental Association, more recently, it was advised to only practice the method of either immersion or dipping, more so the latter to prevent the distortion of the impression material [14]. Through this survey, a better understanding can be established from the perspective of dentists in regard to the current ways of decontaminating and disinfecting impression materials.

Previously our department has published extensive research on various aspects of prosthetic dentistry [15-26], this vast research experience has inspired us to research about Day to day use of disinfectant for various impression materials among dental practitioners.

## 2. MATERIALS AND METHODS

This cross sectional survey was carried out in between the month of June 2019 - March 2020. To check the awareness level about disinfecting among the dental practitioners a questionnaire containing 15 questions was prepared. This survey was carried between the month of June 2019 to March 2020 among the dental practitioners living in Chennai, Tamil Nadu, South India. This survey was carried under an online platform where the participants responded to their answers. Around 100 dental practitioners participated in the survey. Simple randomised sampling method was used to categories the sample population (online survey participants). 100 participants who are dental practitioners and had the ability to give informed consent, who had the ability to read and understand English were included to participate in the survey. In order to reduce multiple attempts of single participants, demographic details of participants including name, age, gender, occupation, and email id was made mandatory to mention by participants before starting the survey. Based on their response, data were tabulated in excel sheets. Excel tabulated data was transferred to SPSS

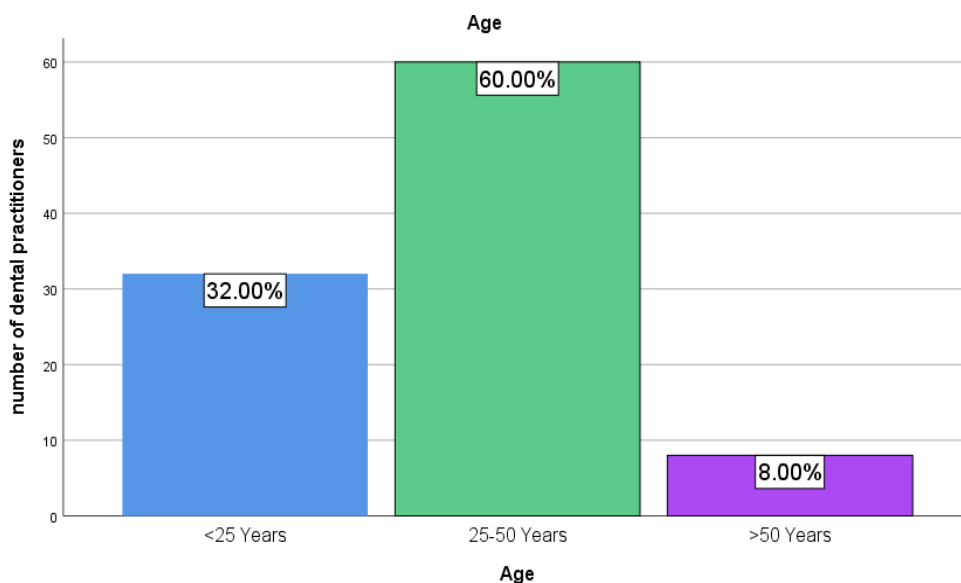
software version 26.0 for software analysis. Statistical tests used in software analysis where participants age and gender are mentioned as independent variables, Knowledge, educational status were listed under dependent variables. Based on analysis results were tabulated.

### 3. RESULTS

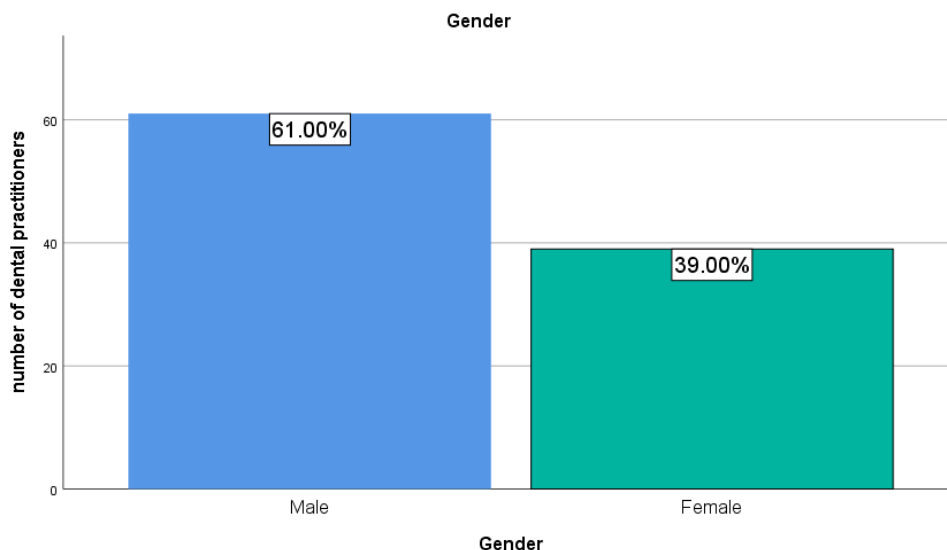
In this study we observed the awareness level about the disinfecting impressions among the dental practitioners - South India. We got 100% response from participants. Around 60% of the participants were aged between 25-50 years, 32% of the population were aged <25 years and 8% were >50 years (Fig. 1). Around 61% were males and 39% were females (Fig. 2). Around 68% participants were MDS graduates and 32% were BDS graduates (Fig. 3). Almost 90% of participants responded to disinfect impression trays before giving to dental labs and 10% responded no need to disinfect (Fig. 4). Around 90% of the dental practitioners who participated in the survey thought disinfecting impressions were necessary. But only 64% of participants practice disinfecting impressions and 36% neglect to practice disinfecting impressions (Fig. 5). Around 46% responded disinfect can reduce cross infection and protect from physical change, 34% said disinfect prevents cross infection, 16% said disinfect protects impressions from physical change and 4% had no idea (Fig. 6). Around

41% of the participants washed impressions with running tap water, 24% washed with chemical agents, 25% sprayed disinfectant over impressions and 8% didn't practice disinfecting impressions (Fig. 7). According to Fig. 8, 59% preferred to use chemical agents, 29% preferred to use chemical agent/uv chamber/sunlight exposure to disinfect impressions. 92% participants were aware of uv chambers which can be used to disinfect and 8% were not aware (Fig. 9). About 44% use 2% glutaraldehyde, 22% use ethanol, 21% use sodium hypochlorite and 13% use hydrogen peroxide to disinfect impressions (Fig. 10). According to Fig. 11, 58% participants responded to maintain the wavelength of the uv chamber in between 200-300nm fog disinfection.

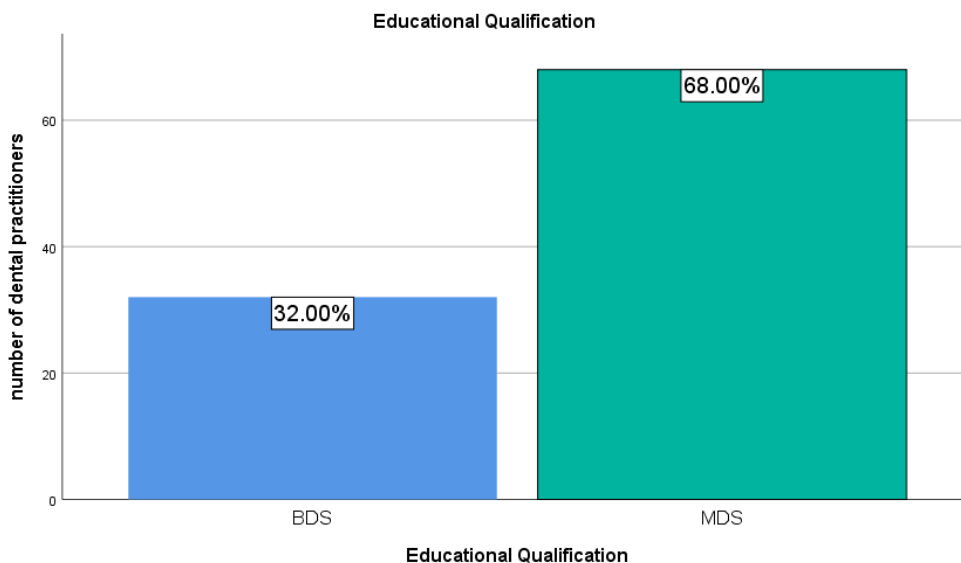
Around 65% of the participants use alginate, 24% use addition silicone, 5% use condensation silicone and 4% use polyether to take impressions (Fig. 12). According to Fig. 13, 46% participants practice spraying disinfectant over the surface, 33% practice immersion of impressions method, 16% do not practice disinfection protocol and 5% use radiation to disinfect impressions (Fig. 13). Around 88% of the dental practitioners who participated in the survey said that there is a need to have separate training sessions about disinfecting dental impressions in order to reduce spread of infection. Fig. 14 shows association between age and gender of participants (dental practitioners)



**Fig. 1. Bar graph representing percentage distribution of age of participants where 60% participants were aged between 25-50 years**



**Fig. 2. Bar graph representing percentage distribution of gender**



**Fig. 3. Bar graph representing percentage distribution of educational qualifications of participants where 68% participants were MDS graduates and 32% were BDS graduates**

who participated in the survey. Chi square test shows p value=0.234 (>0.05) which is statistically not significant. Fig. 15 shows association between educational qualifications and methods preferred by dental practitioners to disinfect impressions. Chi square test shows value=0.234 (<0.05) which is statistically not significant. Fig. 16 shows association between methods preferred by dental practitioners to disinfect impressions and material used by dental

practitioners to take impressions. Chi square test shows p value=0.496 (>0.05) which is statistically not significant. This survey was made to check day to day use of disinfectant for various impression materials among dentists in regard to the current ways of decontaminating and disinfecting impression materials. Thus in future this survey can be carried out with a large number of sample populations.

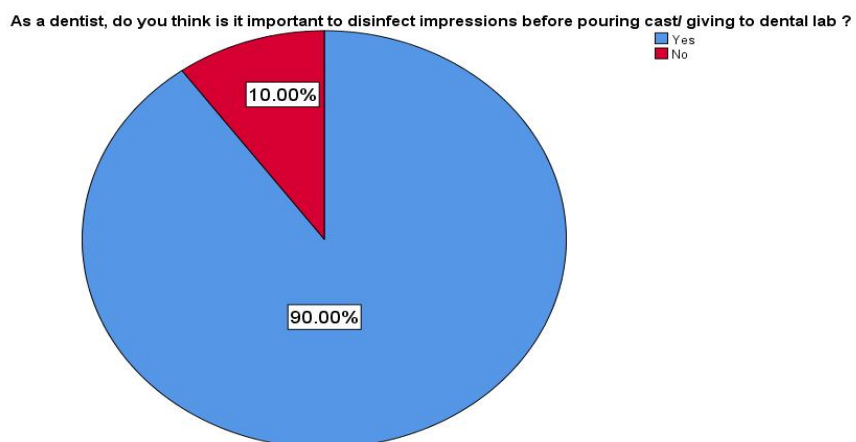


Fig. 4. Pie chart representing importance of disinfecting impressions by dental practitioners

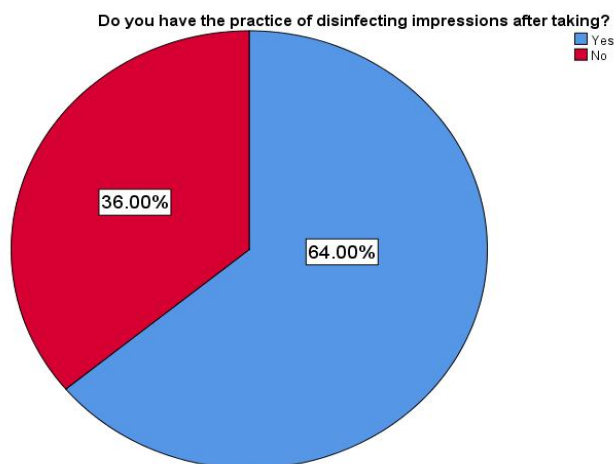


Fig. 5. Pie chart representing practice of disinfecting impressions by dental practitioners

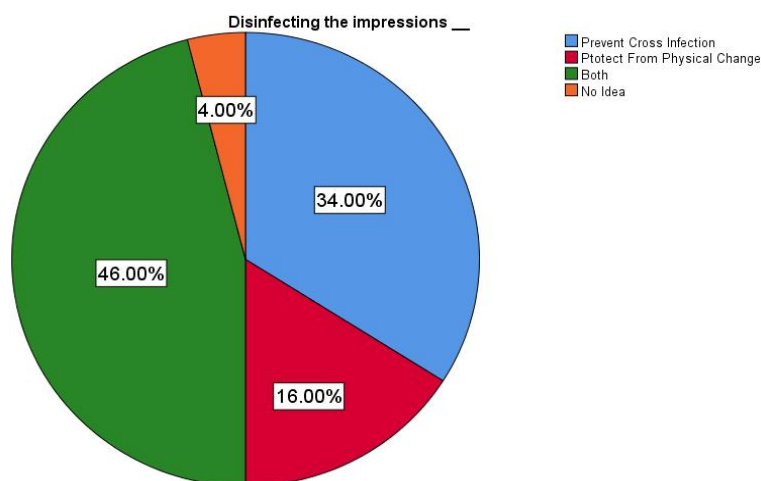


Fig. 6. Pie chart representing ill effects of improper disinfection of impressions by dental practitioners

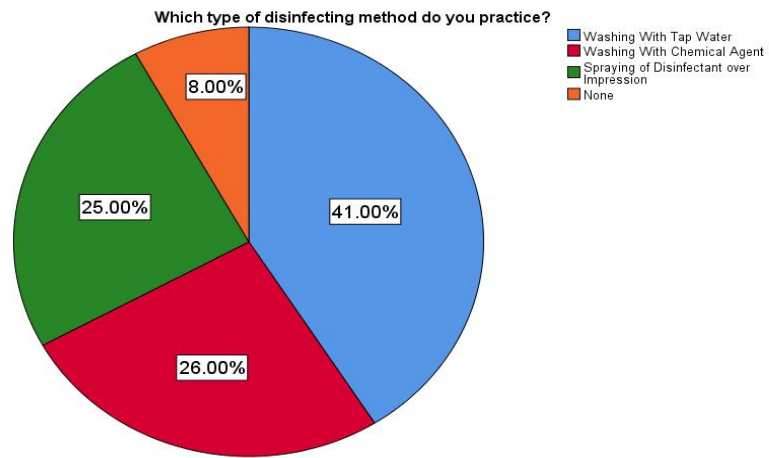


Fig. 7. Pie chart representing method to disinfect impressions

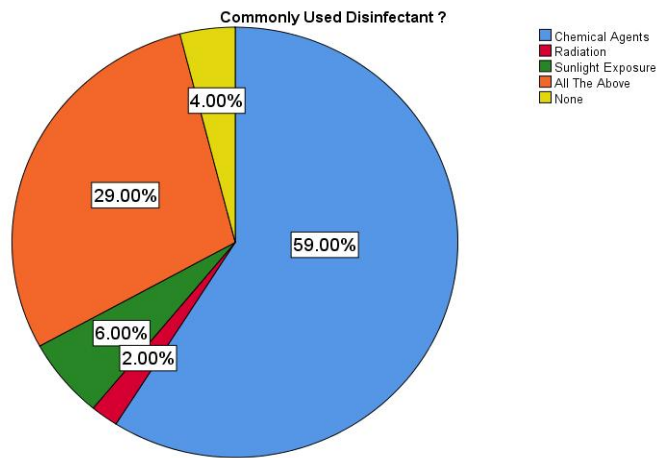


Fig. 8. Pie chart representing commonly used disinfectant material

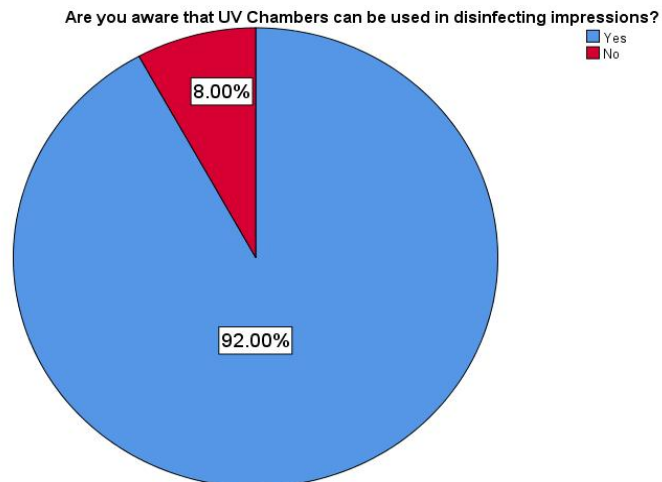


Fig. 9. Pie chart representing awareness about UV chambers to disinfect impressions

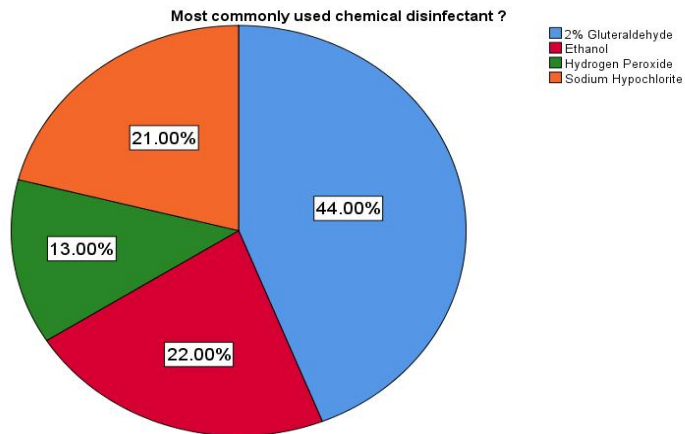


Fig. 10. Pie chart representing commonly used chemicals for disinfecting impressions by dental practitioners

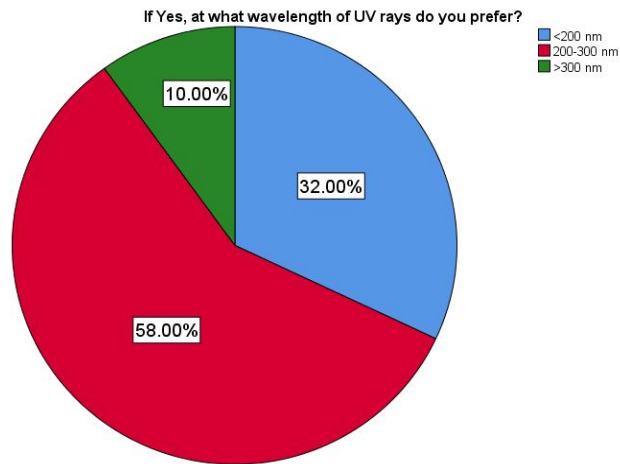


Fig. 11. Pie chart representing wavelength maintained in UV chambers to disinfect impressions

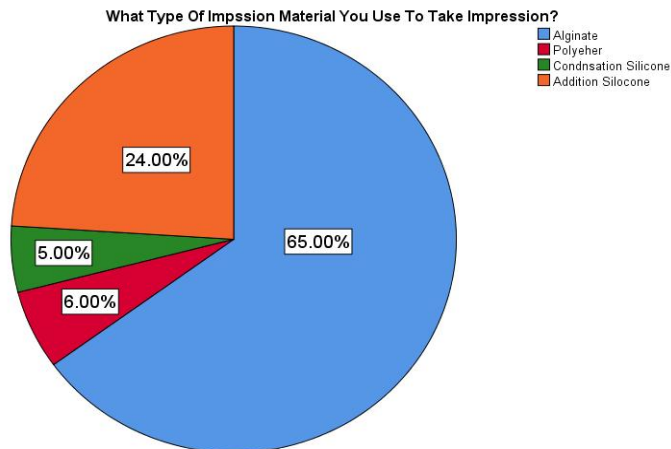
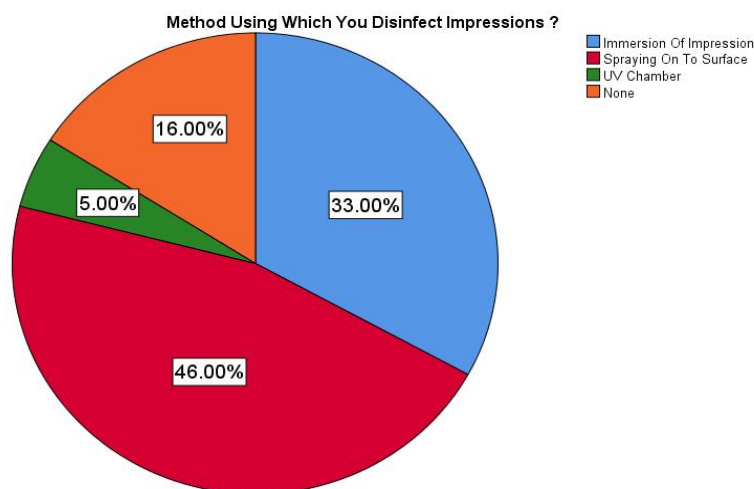
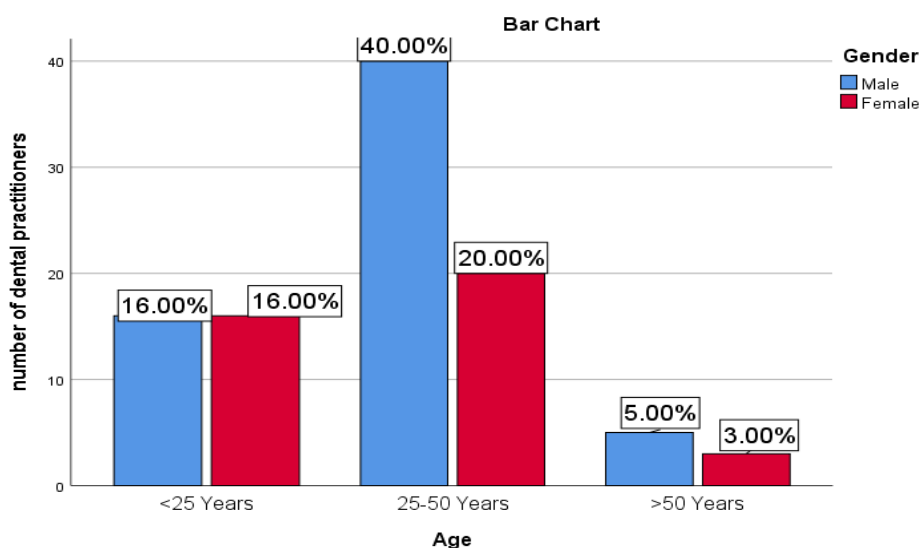


Fig. 12. Pie chart representing commonly used impression materials among dental practitioners to take impressions



**Fig. 13. Pie chart representing method to disinfect impressions by dental practitioners**



**Fig. 14. Bar graph showing association between age and gender of participants (dental practitioners) participated in the survey. p value=0.234 (>0.05) which is statistically not significant**

#### 4. DISCUSSION

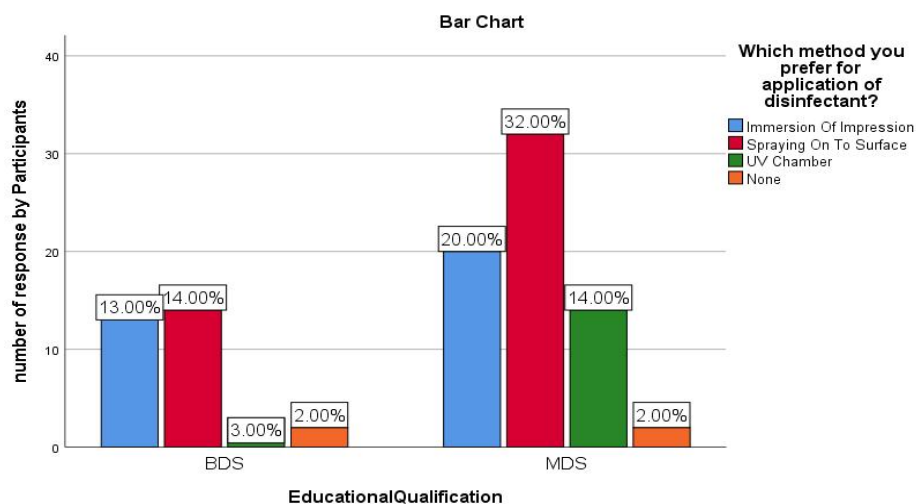
In this study we observed the knowledge and awareness level among dental practitioners about the disinfecting impressions - South India. Disinfection of dental impressions is an essential routine that aims to protect dental personnel, who handle impressions or casts, against exposure to diseases brought about by contact with microorganisms such as viruses; Covid 19, influenza, hepatitis B, hepatitis C, herpes, and HIV, and Mycobacterium tuberculosis. Disinfecting impressions trays also prevents the spread of infection to dental technicians.

According to our study 64% of participants practice disinfecting impressions and 36% neglect to practice disinfecting impressions (Fig. 5). This result is similar to study made by Almortadi and Chadwick, where almost all of the participants (70%) practice disinfecting their impressions after it was made [27]. Around 46% responded disinfect can reduce cross infection and protect from physical change, 34% said disinfect prevents cross infection, 16% said disinfect protects impressions from physical change and 4% had no idea (Fig. 6). Several studies had shown that there is a higher chance of microbial flora present in impression

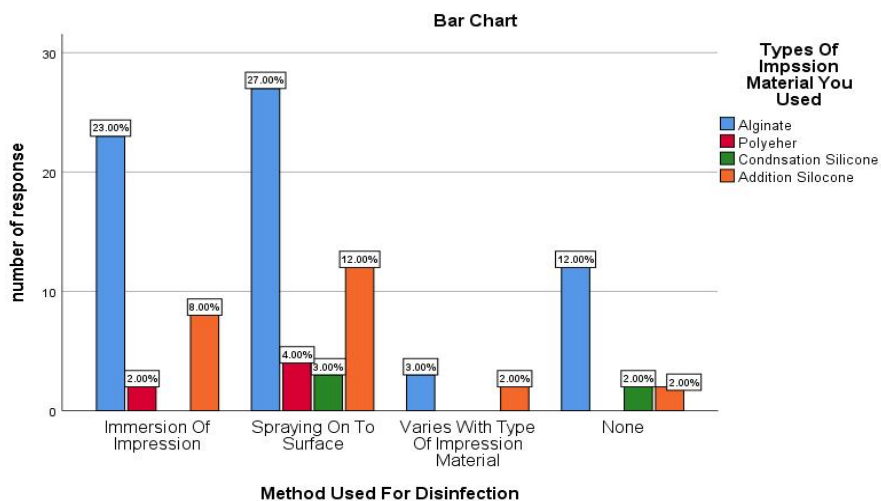


trays that are specifically porous and that requires manual cleaning. It has been a known, recognized fact that cross-contamination is highly potential in regard to dental impressions [28,29]. About 44% use 2% glutaraldehyde, 22% use ethanol, 21% use sodium hypochlorite and 13% use hydrogen peroxide to disinfect impressions (Fig. 10) which goes in hand with Thouati A,et al 1996. Aldehydes are the most commonly used chemicals for disinfection of any surface [30].

According to Fig. 11, 58% participants responded to maintain the wavelength of the uv chamber in between 200-300nm fog disinfection. It has been a known fact for a long while that UV rays are effective in killing microbes and having the ability to do so without any chemicals or heat. Most UV chambers are available in most dental clinics as a way to sterilize the dental instruments that are being used. These UV rays efficiency will depend on the wavelength that they have; which in this case is between 200 and 280 nm [31]



**Fig. 15.** Bar graph showing association between educational qualifications and methods preferred by dental practitioners to disinfect impressions. p value=0.234 (<0.05) which is statistically not significant



**Fig. 16.** Bar graph showing association between methods preferred by dental practitioners to disinfect impressions and material used by dental practitioners to take impressions. p value=0.496 (>0.05) which is statistically not significant

During pandemic situations live Covid 19 chance of spread of coronavirus to dentist is high. Coronavirus can also spread via infectious aerosols, impression trays, etc. So each and every dentist must follow a proper protocol for disinfection. This survey was made to check day to day use of disinfectant for various impression materials among dentists in regard to the current ways of decontaminating and disinfecting impression materials. Thus in future this survey can be carried out with a large number of sample populations.

## 5. CONCLUSION

In this present study it was evident that the awareness about the usage of disinfectant among dentists for disinfecting various impression materials in regard to the current ways of decontaminating and disinfecting impression materials. Our study showed that 90% of dentists considered the usage of disinfectant is important after taking impressions but only 64% follow a protocol to disinfect. Even though having a good amount of knowledge and awareness on disinfection methods, doctors following those methods are less predominant. The best and easiest method of disinfection impressions would be spray method. Specifically due to this covid 19 situation it's more likely every practitioner follows the disinfection protocol to major cross infection and spread of infection.

## CONSENT

As per international standard or university standard, Participants' written consent have been collected and preserved by the author(s).

## ETHICAL APPROVAL

For this survey we got approval from the Institutional Ethical Review Board.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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