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Original Article

Awareness On the Usage of Various Air Filters Among Dental Students

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ABSTRACT

Introduction: air filters are one of the recently employed preventive measures in dental clinics to reduce the infectious spread of the pandemic outbreak covid19 through aerosol generated during dental procedures.the current study focuses on analysing the importance of air filters among dental population. Materials and method: an online survey was conducted with a self structured questionnaire comprising 10 questions.the questionnaire was designed using the online survey platform google forms and the link was circulated through the social networking platforms to the participants. The results were analysed and with the collected responses a descriptive statistical test was performed using the statistical software "spss version 20" and the result was represented in the pie chart form. Results: the current study results depicts clearly that around 99% of the participants are aware about the importance of air filters and among them around 97.6% of them possess the facility of air filters in their clinic among them around 76% believe hepa filters to be effective among the available air filters.the association test performed in the study clearly depicts that the results obtained were statistically significant because of the p value less than the standard 0.05. Conclusion: the present survey study within the limitations concludes that most of the respondents are aware about the importance of air filters installation in dental clinics particularly during this pandemic outbreak time to reduce the transmission rate of covid19 infections through the aerosol generated.

Keywords: Knowledge, Awareness, Occupation, Air Filters,Innovative technology.

INTRODUCTION

Air filters have become mandatory as a preventive measure in dental clinics to reduce the infectious spread of the pandemic outbreak covid19 through aerosol generated during dental procedures(1,2). Covid19 the most infectious pneumonia associated viral outbreak which originated from Wuhan city in China in December 2019. The novel coronavirus was first described in 1966 by Tyrell and Bynoe, by cultivating the viruses from patients with common colds(3)The virus is named 2019- Ncov by the WHO, the international committee on taxonomy of viruses terms it to be SARS-COV-2.The pandemic global outbreak covid19 is a new human infecting betacoronavirus is likely to be originated from the chrysanthemum bats(4).The novel virus SARS-CoV-2 is found to cause a type of pneumonia associated problem termed Severe Acute Respiratory Syndrome. The virus appears to be spherical and have proteins called spikes protruding from their surface(5). The pandemic outbreak COVID-19 spreads mainly by droplets produced as a result of coughing or sneezing of a COVID-19 infected person(6,7). The spread of novel coronavirus occurs through direct close contact with COVID-19 patients within one Metre of the infected person and the rate of spread is enhanced especially if they do not cover their face when coughing or sneezing(8,9). The novel virus also spreads by the droplets surviving on surfaces and clothes for many days(10). Therefore, touching any such infected surface or cloth and then touching one's mouth, nose or eyes can transmit the disease. The current study focuses on analysing the importance of air filters among dental populations.Our team has extensive knowledge and research experience that has translate into high quality publications(13–21),(22–27),(28–32)

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

MATERIALS AND METHOD:

Study design: A cross-sectional survey was conducted among dental students to know about the significance behind the usage of air filters in clinics among dental students. The sampling method is a simple random sampling method. The sample size of this study is 100. The participants did the survey voluntarily and no incentives were given to them. Ethical approach and informed consent from the participants were obtained.

Questionnaire preparation: A self designed questionnaire was prepared after extensive review of the existing literature. The questionnaire was reviewed and amendments were made to improve clarity of the questions to eliminate ambiguous responses. The questionnaire consisted of 10 questions with both open and closed ended questions. The questionnaire was shared to students using the online survey platform.

Data Analysis: Only completed surveys were taken for analysis and the uncompleted surveys were eliminated. A statistical analysis test "chi square test" was performed.

All the responses obtained were tabulated in Excel and reliability of the data was checked. Frequency tables were prepared for each question and analysed using IBM SPSS data analysis software version 23.

Results:

The final results obtained after the Analysis in the current study was displayed in the form of pie charts and bar graphs.

RESULTS:

In the current study (Figure 1) depict the ratio of participants from various age groups in the overall population, 96% of the participants were from the age group of 18-20 years,around 4% of the participants were from the age group of 21-24 years. The results of (Figure 2) depicts the ratio of male and female population in the total survey population,61% of the participants were male and around 39% were female. Figure 3 depicts the distribution of participants based on their awareness about the role of "HEPA filter" in sterilization, where 99% of the study participants were aware, 1% of the study population were not aware that HEPA filter play a part in the sterilization procedure followed in hospital. The findings of Figure 4 shows the level of knowledge among participants about the effectiveness of filters in reducing the number of viable particles involved in the air contamination,99% believed filters are effective against the sources of air contamination and around 1% responded negatively that they are disagree. Figure 5 shows that 76% of the people answered HEPA filter to be the most effective filter,15% of the participants believe ESP to be the effective filter,and the remaining people believe that HEPA as well as ESP are equally effective.Figure 6 shows that 70% of the participants believe glass fibre to be the behind property,around 24% of the people believe polymer sheets in the filter is the reason behind the filter effectiveness in reducing viable particles and the remaining person consider the v pattern arrangement to be the reason.Figure 7 represents the association between gender of respondents and awareness of the role of HEPA filters in hospitals.Figure 8 of the current study represents the association between gender of respondents and awareness about the effectiveness of filters in reducing viable particles in the dental operating room.Figure 9 represents the association between age of respondents and perception of the participants regarding the effective dental operating filters.Figure 10 depicts the association between age of respondents and the reason behind the effectiveness of Filters.

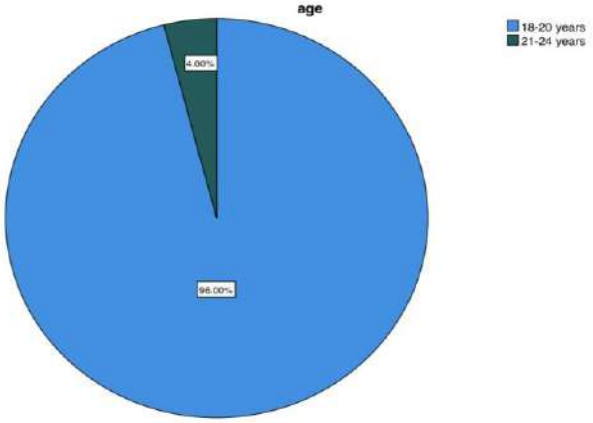

FIGURE 1: The pie chart depicts the ratio of participants from various age groups in the overall population, 96% of the participants were from the age group of 18-20 years(blue),around 4% of the participants were from the age group of 21-24 years(green).

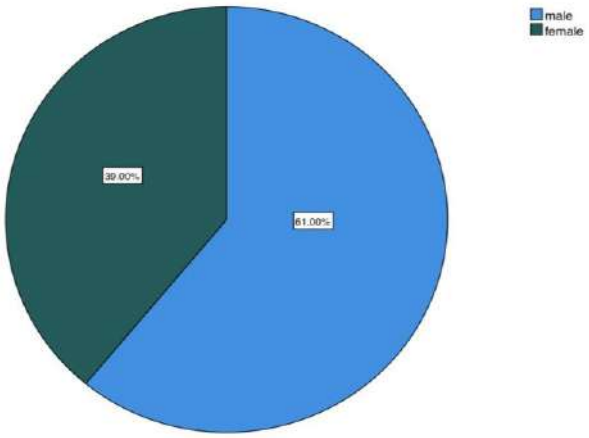

Figure 2: This pie chart depicts the ratio of male and female population in the total survey population,61% of the participants were male(blue) and around 39% were female(green).

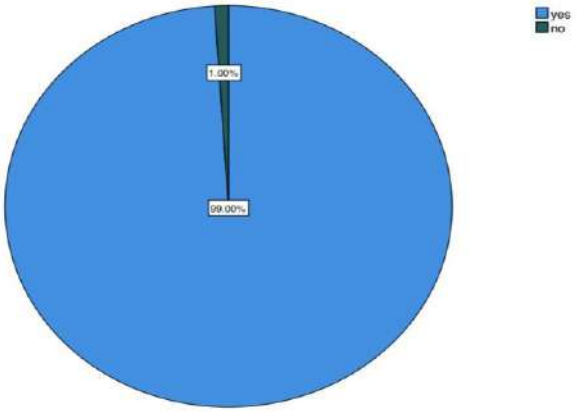

Figure 3: Distribution of participants based on their awareness about the role of "HEPA filter" in sterilization, where 99% of the study participants (blue) were aware, 1% of the study population (green) were not aware that HEPA filter play a part in the sterilization procedure followed in hospital.

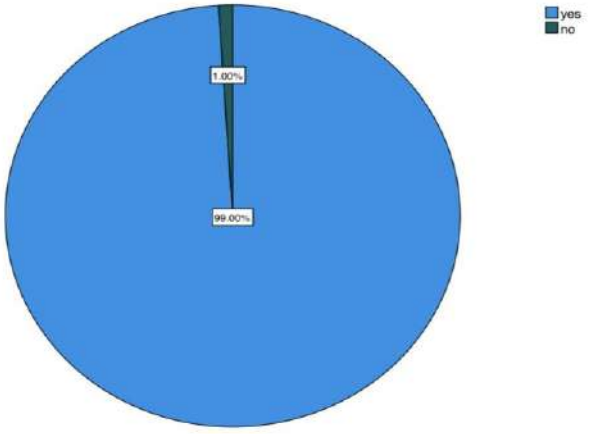

Figure 4: Pie chart reveals knowledge among participants about the effectiveness of filters in reducing the number of viable particles involved in the air contamination,99% believed filters are effective against the sources of air contamination(blue) and around 1% responded negatively that they are disagree the fact (green).

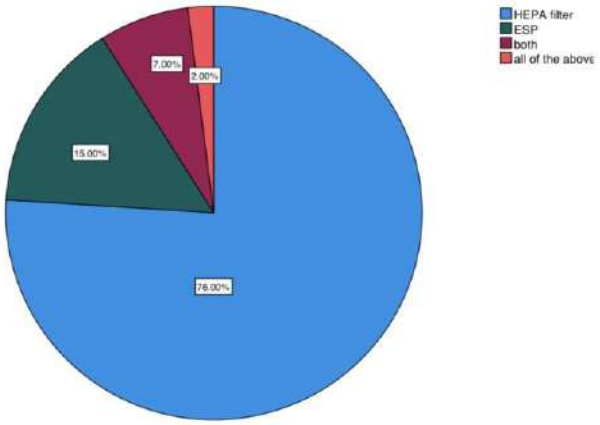

FIGURE 5: The pie chart depicts the most effective filter among various filters used in dental operating room, 76% of the people answered HEPA filter to be the most effective filter(blue),15% of the participants believe ESP to be the effective filter(green),and the remaining people believe that HEPA as well as ESP are equally effective(orange,pink).

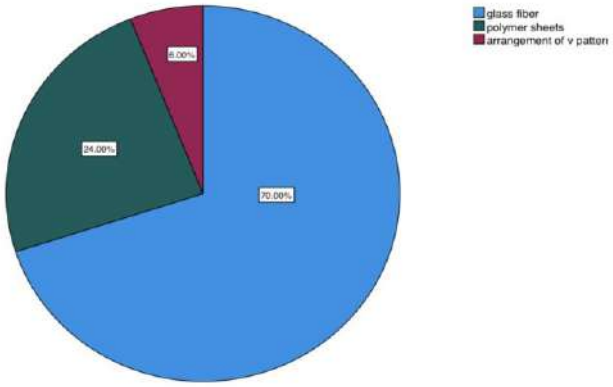

FIGURE 6: The pie chart depict the property responsible for the filter effectiveness, 70% of the participants believe glass fibre to be the behind property(blue),around 24% of the people believe polymer sheets in the filter is the reason behind the filter effectiveness in reducing viable particles(green) and the remaining person consider the v pattern arrangement to be the reason(pink).

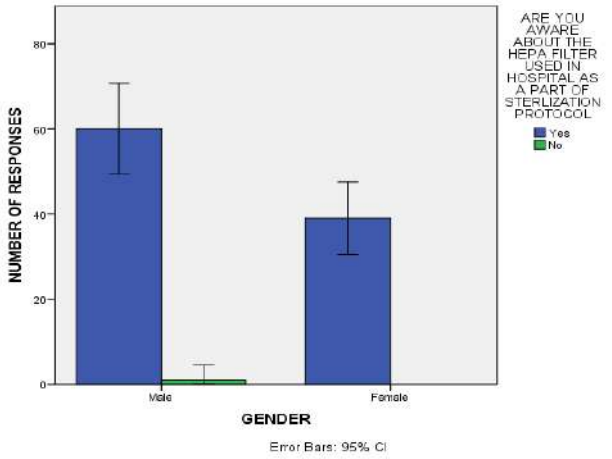

FIGURE 7: The bar graph represents the association between gender of respondents and awareness of the role of HEPA filters in hospitals.X axis represents the gender and Y axis represents the frequency of responses. Majority of the male participants are aware about the fact that air filters are used as a part of sterilization protocol. P value=0.000,p value<0.05 hence statistically significant.

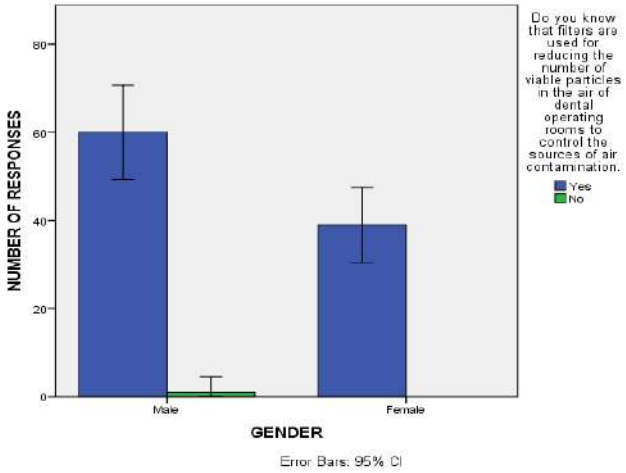

FIGURE 8: The bar graph represents the association between gender of respondents and awareness about the effectiveness of filters in reducing viable particles in the dental operating room.X axis represents the gender and Y axis represents the frequency of responses.Majority of the male participants are aware about the fact that air filters are installed in dental operating rooms. P value=0.000,p value<0.05 hence statistically significant.

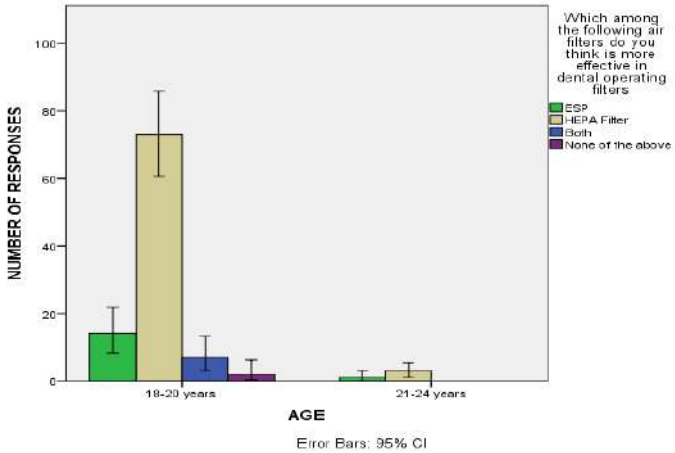

FIGURE 9: The bar graph represents the association between age of respondents and perception of the participants regarding the effective dental operating filters.X axis represents the age and Y axis represents the frequency of responses.Majority of the participants belonging to 18 to 20 years believe HEPA Filters to be effective when compared with other Filters. P value=0.884,p value>0.05 hence statistically insignificant.

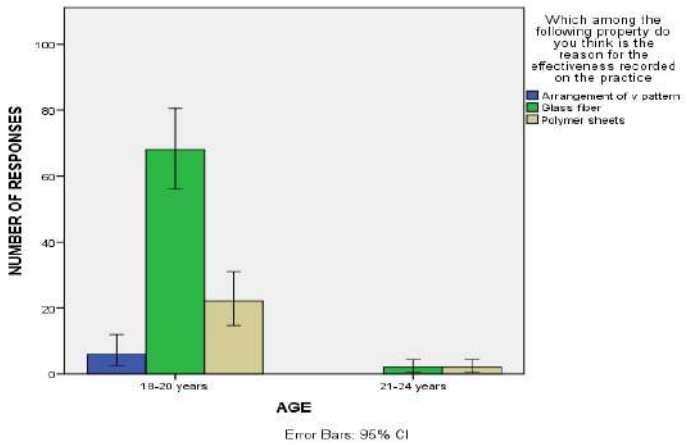

FIGURE 10: The bar graph represents the association between age of respondents and the reason behind the effectiveness of Filters.X axis represents the age and Y axis represents the frequency of responses.Majority of the participants believe glass fibre to be the reason. P value=0.436,p value>0.05 hence statistically insignificant.

DISCUSSION

The findings of the current study depicts that glass fibre material in filters to be the potential reason behind the effectiveness of filters in reducing the infectious particles in dental clinics. Previous studies conducted by (Yadav N,et.al and Curtis L,et.al) to analysing the role of HEPA filter in controlling air borne infections proved that High-efficiency particulate arresting (HEPA) air filters are very effective in reducing bioaerosols, and hence, preventing air borne infection which was similar to the finding of the current study(11,12).

So, the knowledge and awareness level regarding the use of air filters and their significance in reducing the incidence rate of Covid19 Pandemic outbreak on dental populations is specifically demonstrated in the current study. The present study possesses limitations such as the small sample size, homogeneous population and the study deals only with one particular parameter. Further studies with a large sample size, focus on detail concerned with many parameters should be done to significantly demonstrate the merits, demerits and benefits associated with the installation of air filter systems in dental clinics to prevent the spread of Covid19.

CONCLUSION

The present survey study within the limitations concludes that most of the respondents are aware about the importance of air filters installation in dental clinics particularly during this pandemic outbreak time to reduce the transmission rate of covid19 infections through the aerosol generated.

AUTHORS CONTRIBUTION

N. Mohamed Arsath has done the questionnaire preparation and the data collection, statistical analysis and manuscript preparation. Dr. Keerthi Sasanka had edited and revised the manuscript of the present study.

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CONFLICT OF INTEREST

All the authors declare no conflict of interest in the study.

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