Knowledge, Attitude and Practices regarding Pre-procedural Mouthwash use amidst the COVID-19 Pandemic among Dental Students.

Srijan Sunar[1], Parkavi Arumugam[2]

[1]Saveetha Dental College,Saveetha Institute of Medical and Technical Sciences(SIMATS),Saveetha University.Chennai 600077, India

[2]Senior Lecturer, Department of Periodontics,Saveetha Dental College,Saveetha Institute of Medical and Technical Sciences Saveetha University.Chennai 600077, India

ABSTRACT

COVID-19 created an abnormal scenario worldwide, altering the integral dynamics of medical dentistry. This KAP survey was carried out to evaluate the knowledge, attitude and practices among dental students regarding the use of pre-procedural mouthwashes. An online questionnaire based cross-sectional study was conducted from 1st July to 12th July 2021, among undergraduate and postgraduate dental students of Saveetha Dental College. The survey form consisted of 12 questions, which were circulated among the participants and the responses were subjected to statistical analysis. The data was imported and analyzed through SPSS software. 70.6% of the participants were aware that Transmission of SARS-CoV-2 in the dental setting commonly by means of respiratory droplets and aerosols throughout a dental procedure.Within the limitations of the study, there is adequate knowledge regarding preprocedural use of mouthwash that can effectively reduce the bacterial viral load in dental aerosols.

Keywords: mouthwash, povidone-iodine, PVP-I, SARS-CoV-2, COVID-19, Innovative technique.

1. INTRODUCTION:

The novel beta-coronavirus SARS-CoV-2, has led to an ongoing pandemic of COVID-19 as declared by the World Health Organization (WHO) and the Public Health Emergency of International Concern (PHEIC)(1). The highly infectious virus of zoonotic origin, spreads through airborne transmission and direct contact and has a broad clinical spectrum of disease ranging from being asymptomatic to severe acute respiratory syndrome with associated mutli-organ failure (2,3). Manifested as a pandemic, COVID-19 affected multitudinous individuals across the globe thus altering the fundamental dynamics of clinical dentistry. With emerging variant strains and increase in cases, the practising dentists and auxiliary dental staff are at highest risk for contracting the infection(4,5). Symptomatic patients are predominantly responsible for transmission while asymptomatic patients are also known to be potential carriers of the disease thus augmenting the spread of the virus, and making the control of these infections even more challenging.(4)

As the oral cavity and saliva behave as a reservoir for the virus, dental procedures using high speed aerators, ultrasonic scalers generate and release microbe-laden aerosols (0.2–2.0μm in diameter) into the dental clinic environment. These aerosols can travel upto a distance of 3 feet (1m) and remain suspended in the air for 10 minutes, posing a health risk for dental teams and may act as a source of spread of infection(6)(7). Effective strategies to deactivate these viruses need to be focussed upon to limit cross-infections in dental settings(8). Preprocedural mouth rinses may offer a solution as studies have shown different mouthwashes like hydrogen peroxide, chlorhexidine (CHX) and Cetylpyridinium-chloride to have virucidal effects by exterminating the lipid membranes of the virus(7,9).

Fortified on the guidelines provided by Centre for Disease Control (CDC), CHX oral rinses gained widespread recognition to diminish the spread of COVID-19 virus via aerosols, however, literature mentions its poor antiviral properties in contrast to its antibacterial property (10). PVP-I dissociates into free iodine, which is capable of destroying the cell membrane of the virus and altering its metabolic pathway thus causing irreversible damage (10,11). Citrox's oxidizing ability exposes and damages the viral lipid envelope, therefore significantly reducing the viral load while Cyclodextrin has a potential to attract and subsequently inactivate the outer shell of virus thus destroying it completely. Hydrogen peroxide disrupts the lipid membrane of a virus by its oxygen-free radicals(12–15). Our team has extensive knowledge and research experience that has translated into high quality publications (16–28),(29–33)(34)(35).

The prospect of this study is to assess the knowledge, attitude, and practices (KAP survey) regarding the use of pre-procedural mouthwashes amidst COVID-19 pandemic among dental undergraduate and postgraduate students of Saveetha Dental College, Chennai.

2. MATERIAL AND METHODS:

This cross-sectional questionnaire based study was conducted among dental undergraduate and postgraduate students of Saveetha Dental College, Chennai, through an online survey. The online survey with a 12 point validated questionnaire with 6 questions to assess knowledge, 3 questions to assess attitude and 3 questions to assess practices, was conducted and a total of 100 dental students from different years of dental undergraduate and postgraduate study participated. Anonymity was maintained, the purpose of the study was explained to the participants in detail and the questionnaire was filled with their consent. The extracted data were tabulated in MS Excel sheets and were subjected to statistical analysis using SPSS software. The descriptive data obtained were plotted in bar graphs and Chi-Square test was the statistical test used SPSS software. Gender and year of study were considered as independent variables.

3. RESULTS AND DISCUSSION:

A total of 100 respondents participated in this survey, of which 57% were female and 43% were male (fig 1). In this survey, 55% participants were dental postgraduate students, 20% participants were dental interns, 17% participants were final year dental undergraduate students, 8% participants were 3rd year dental undergraduate students (fig 2).
In the present study, 98% participants were aware that in the dental setting, transmission of SARS-COV-2 infections is mainly via respiratory droplets and aerosols produced during dental procedures (fig 3). The findings of our study were in accordance with a previous KAP analysis by Al-Mawari et al 2020(36), who documented 97% awareness level among dental practitioners regarding the mode of SARS-CoV-2 transmission. In this survey, 61% of the participants responded that SARS-CoV-2 virus remains viable in suspended aerosols for upto 72 hours while 21% of the participants responded that SARS-CoV-2 virus remains viable in suspended aerosols for upto 3 hours and 18% responded that SARS-CoV-2 virus remains viable in suspended aerosols for upto 24 hours (fig 4). The SARS-CoV-2 virus has been found to remain viable in aerosols for 3 hrs, while it, in the form of droplets, is more

stable on plastic and stainless steel, copper, cardboard, and glass with durations detected up to 72, 4, 24, and 84 h, respectively (van Doremalen et al., 2020)(37). The half lives of the SARS-CoV-2 and SARS-CoV are almost the same in aerosols, with median estimates of approximately 1.1–1.2 hours, indicating that both viruses have similar stability characteristics in transmitting through the air (37). However, more profound epidemiological sustenance of SARS-CoV-2 virus may, therefore, be because of some other factors, including high viral loads in the upper respiratory tract and the capability of persons infected with COVID-19 to shed and transmit the virus while remaining asymptomatic(38). Another study suggests SARS-CoV-2 in respirable-sized aerosols could persist and maintain infectivity for up to 16 h (39). Sullivan et et al. have reported measuring viable SARS-CoV-2 in air collected in hospital wards with COVID-19 patients, which is consistent with detection of airborne SARS-CoV-2 RNA in patient areas(40). These results indicate that SARS-CoV-2 could survive in aerosols for a relatively long time under favorable conditions and potentially spread through aerosols(4,41)(42,43).

Regarding the procedures causing highest incidences of transmissions, 89% of the participants were aware that ultrasonic, sonic and high speed handpiece instrumentation causes the highest incidence of particle transmission while 11% of the participants were unaware about it (fig 5). Regarding the ability of aerosols to spread, 56% participants stated that aerosols could spread to a distance of 6 feet from dental chair, 43% stated 20 feet from dental chair, 1% stated 2 feet from dental chair (fig 6). Zhu et al. (2007) have reported that pathogen-bearing droplets of all sizes can travel for almost 7–8 m during sneezes and for more than 2 m (approx 6 feet) during coughs(44,45). Another study by Imran et al in 2021 states that aerosols produced during dental procedures can travel up-to a distance of 3 feet (1m) and remain suspended in the air for 10 minutes (4,46).

In the present study, 88% of the participants were aware that preprocedural use of mouthwash can effectively reduce the microbial load in dental aerosols and only 12% were unaware about it(fig 7). Regarding the most effective mouth rinse against SARS-CoV-2, 54% of the participants answered 0.12% chlorhexidine for 30 seconds, while 35% of participants answered 0.23% PVP-I for 15 seconds and 11% of the participants answered 0.05% Cetylpyridinium for 15 seconds(fig 8). These responses are suggestive that the participants were adequately aware regarding the mode of spread of SARS-CoV-2 infection in the dental setting though more information regarding the different mouthrinses, their concentrations and duration of rinsing and their effectiveness against the virus needs to be imparted.

In the present study, 72% of the participants believed that transmission of SAR-COV-2 through aerosol inhalation in dental settings is high (fig12) and 88% participants believed that dentists are at highest risk for contracting SARS-CoV-2 infections. 89% of the participants believed that pre-procedural mouthrinse is an effective infection control measure against SAR-COV-2 virus transmission in dental settings. These responses indicate that the participants had a positive attitude towards the use of preprocedural mouth rinses during the pandemic. This is in contrast to the findings by Nimbulakar et al in 2020, where a total of 71.1% of DHCPs did not agree with the statement that standard precautions should be followed, especially during an outbreak(47).

Regarding the practices followed by the study participants, 72% of them educated their patients regarding COVID-19 disease and its transmission (fig 10). Most of the participants followed the practice of administering pre-procedural mouthrinses. 38% administered chlorhexidine mouthrinse, 35% administered Povidone-Iodine mouth rinse, 15% administered Hydrogen peroxide and 12% administered Cetylpyridinium-chloride as pre-procedural mouthrinses(fig 11). These responses indicate that the participants were adequately practicing infection control protocol in regard to SARS-CoV-2 infections, though more information along with scientific evidence can be given to them to follow evidence-based effective measures with regard to the viral transmission control.
Statistically significant differences were noted regarding the practices of pre-procedural mouthwashes between the different years of study (undergraduates and postgraduates) of the participants with a p-value of 0.03. Postgraduates were more knowledgeable than the undergraduates, which is attributed to their experience. On comparing the awareness of preprocedural mouth wash with different gender, no significant difference was seen between females and males, with a p-value =0.08 (> 0.05).

4. CONCLUSION:

From this survey, it is evident that most dental students are aware of the potential importance of preprocedural mouthrinse for effective infection control measures against SARS-COV-2 virus transmission in dental settings though more clarity regarding the most efficacious mouthrinse in the correct concentration, amount and duration can be given through continuing education programmes. However, they showed a positive attitude and an acceptable level of practice, as they were abiding by guidelines issued from various international and national health agencies.

GRAPH:

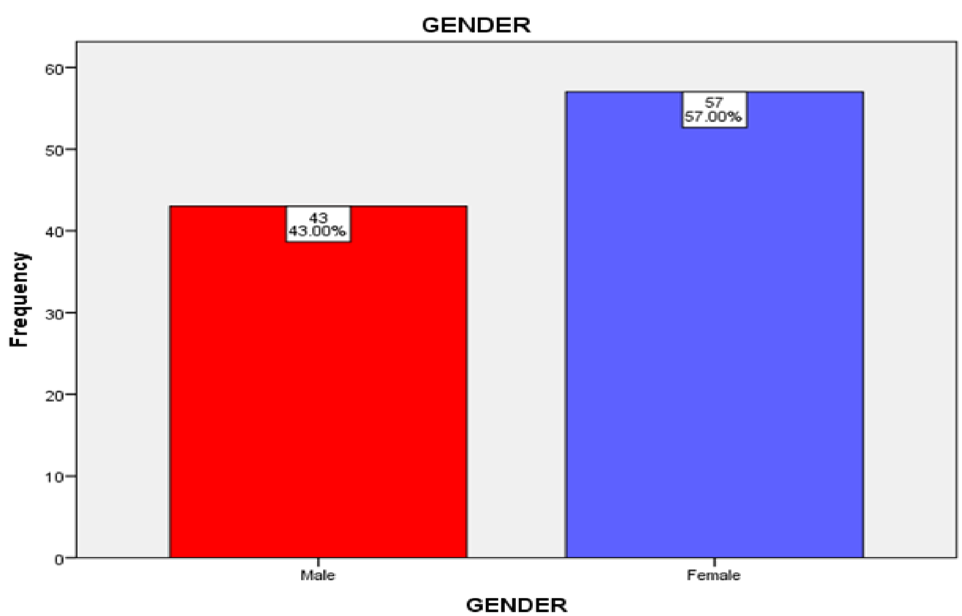

FIG 1: The bar graph shows the distribution of gender, 57% female and 43% male where red denotes Male and blue denotes Female.

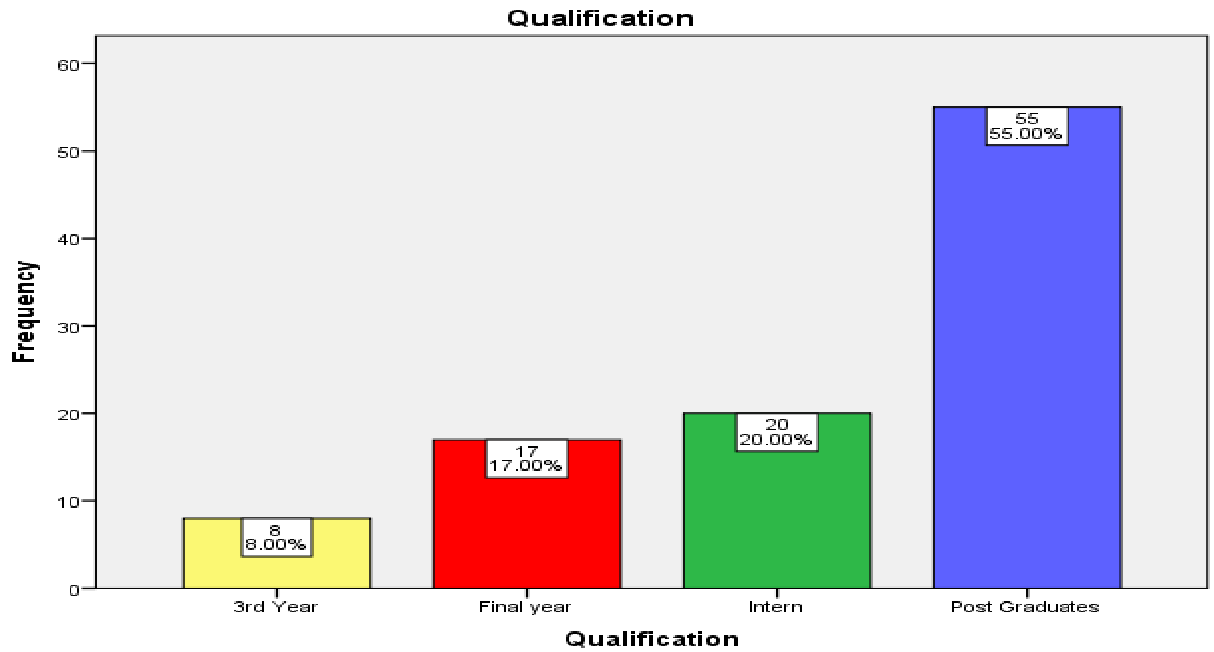

FIG 2: The bar graph shows the distribution of qualification of the participants, 55% post graduates, 20% intern, 17% final year, 8% 3rd year student, where blue denotes post graduates, green denotes interns, red denotes final year and yellow denotes 3rd years.

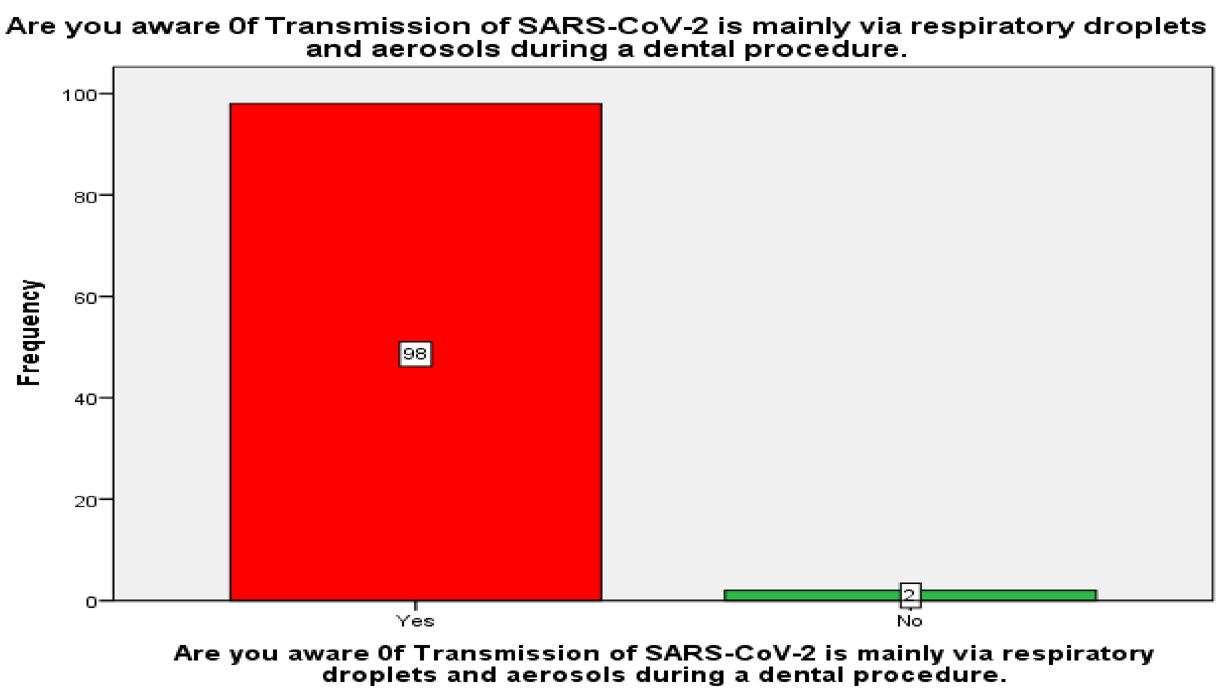

FIG 3: The bar graph shows the distribution of awareness of transmission of SARS-CoV-2 . 98% of the participants were aware of transmission of SARS-CoV-2 (RED) and 2% were not aware that transmission of SARS-CoV-2 is mainly via respiratory droplets and aerosols during a dental procedure(GREEN).

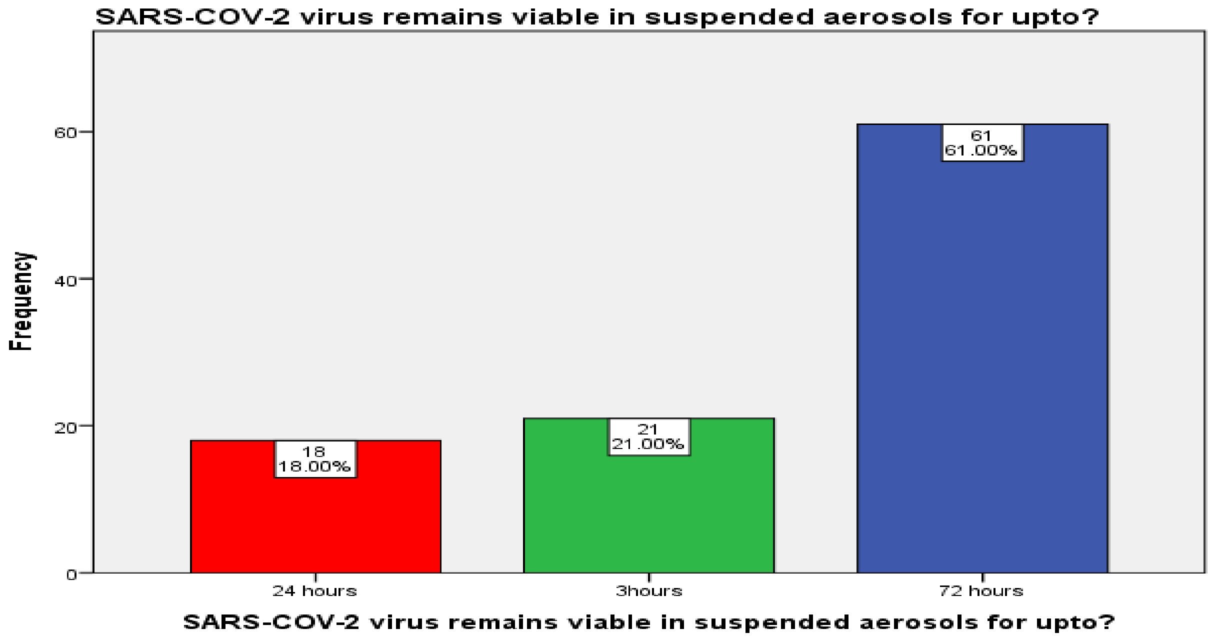

FIG 4: The bar graph shows the distribution of the participants on the awareness of the duration the SARS-CoV-2 remains viable in suspended aerosols, 61% -72 hours, 21%- 3 hours, 18%- 24 hours , where blue denotes 72 hours, green denotes 3 hours and red denotes 24 hours.

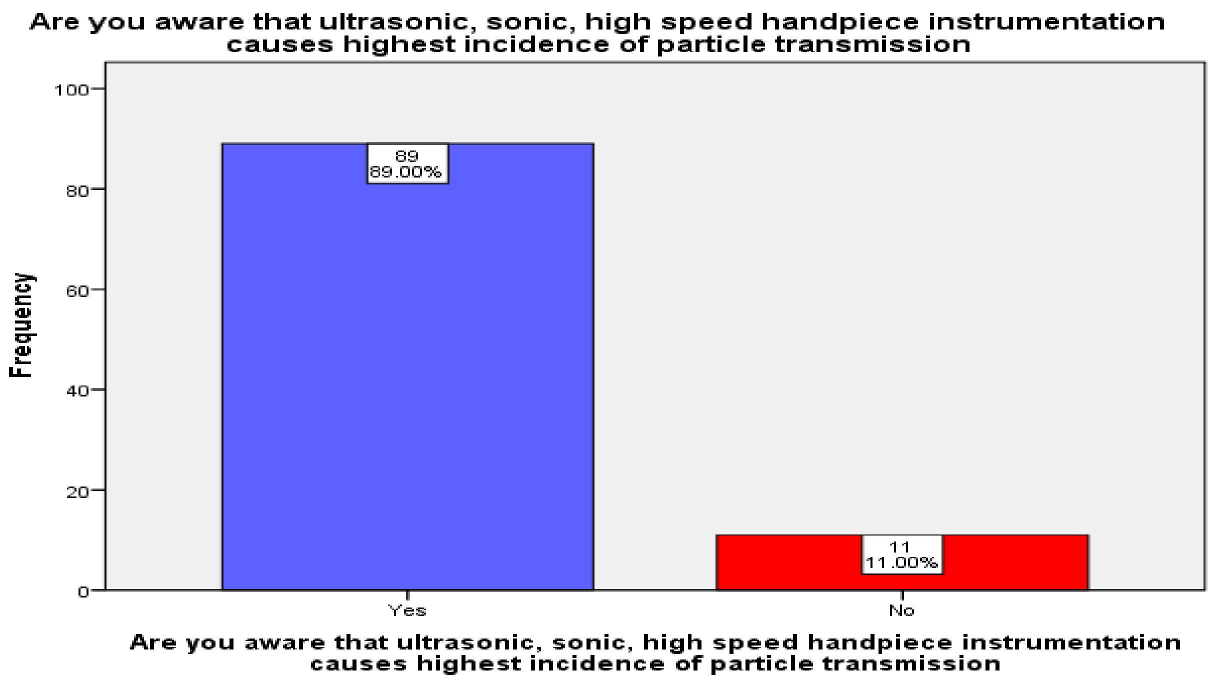

FIG 5: The bar graph shows the distribution of awareness of ultrasonic, sonic speed handpiece instrumentation causing the highest incidence of particle transmission. 89% of the participants were aware that ultrasonic, sonic, high speed handpiece instrumentation causes the highest incidence of particle transmission and 11% of the participants were unaware, where blue denotes Yes and red denotes No.

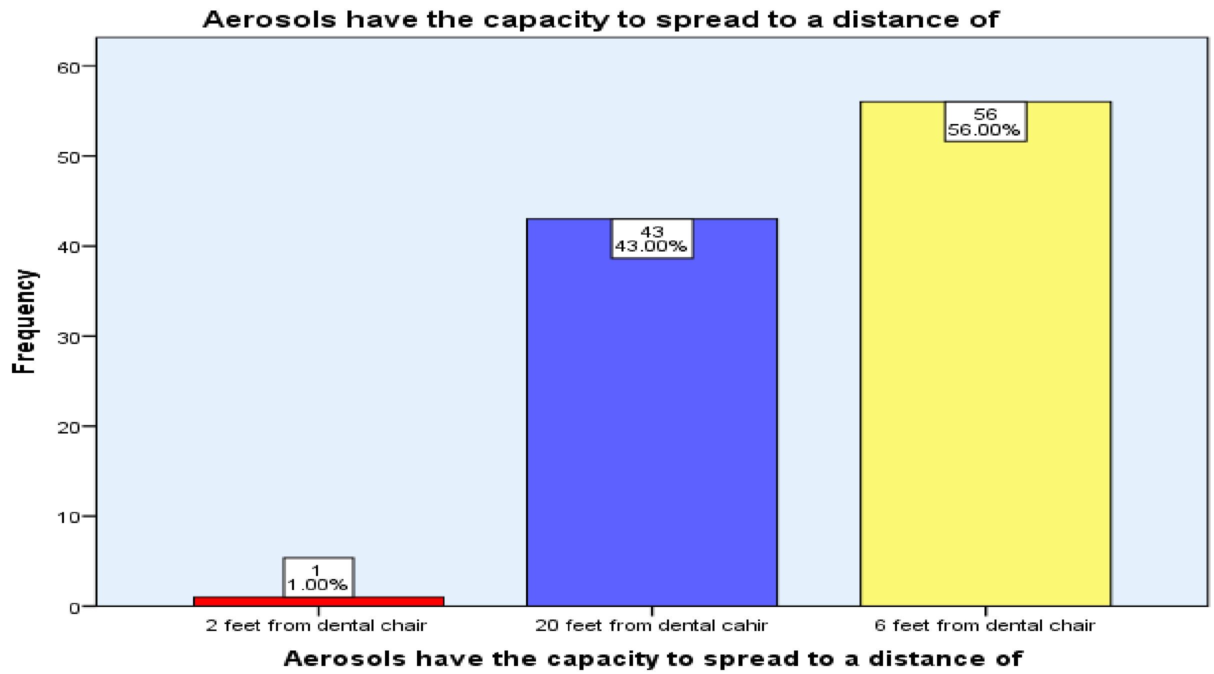

FIG 6: The bar graph shows the distribution of awareness on the capacity of aerosols to spread , 56% - 6 feet from dental chair, 43% - 20 feet from dental chair, 1% - 2 feet from dental chair, where yellow denotes 6 feet from dental chair, blue denotes 20 feet from dental chair, red denotes 2 feet from dental chair.

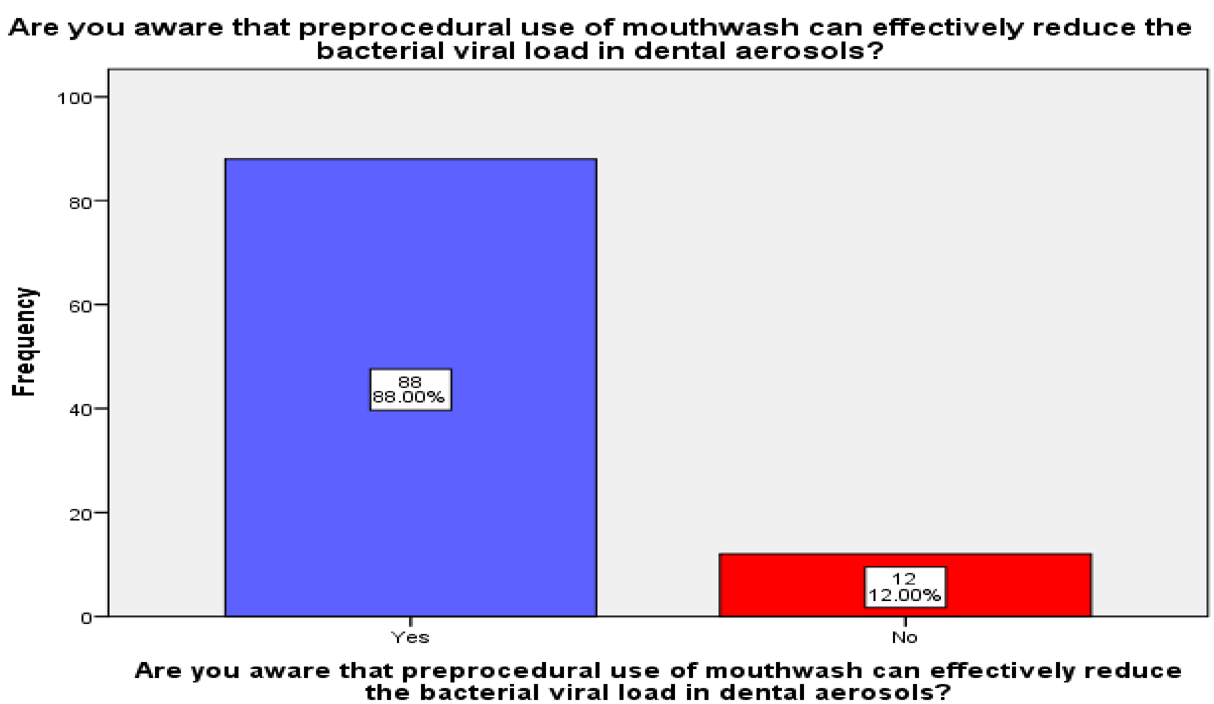

FIG 7: The bar graph shows the distribution of awareness on the effectiveness of preprocedural mouthwash against the bacterial and viral load in dental aerosols, where blue denotes Yes(88%) and red denotes No(12%).

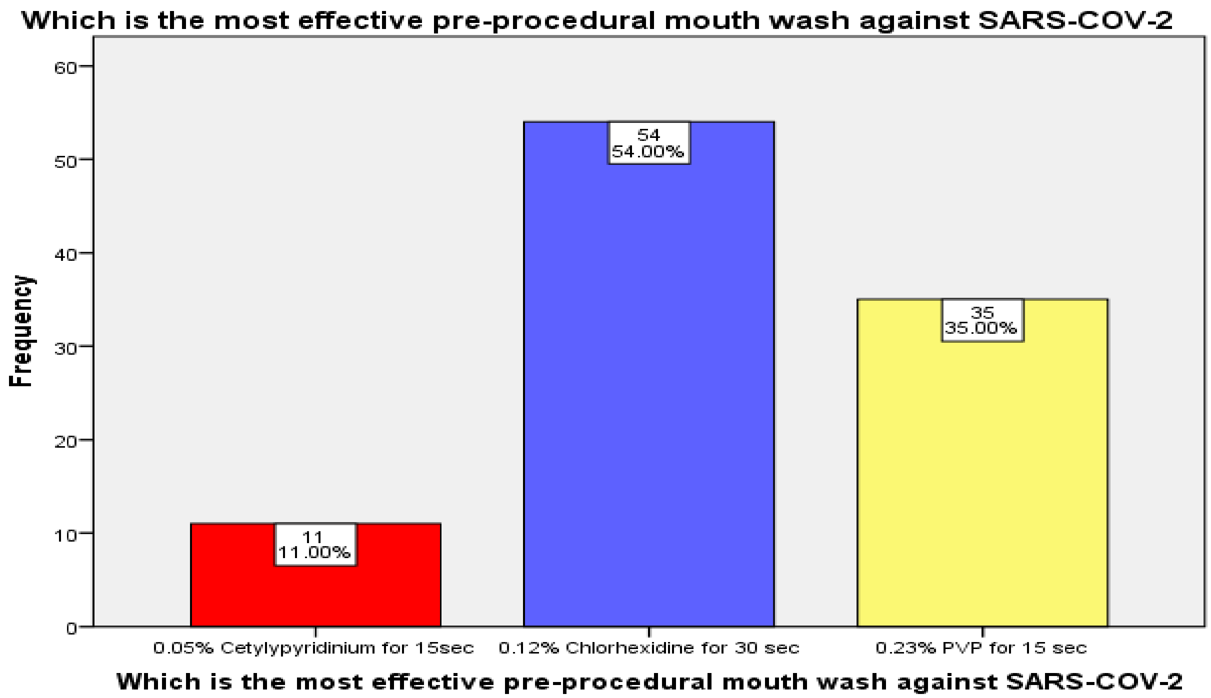

FIG 8: The bar graph shows the distribution of awareness on the most-effective pre-procedural mouthwash against SARS-CoV-2. 54% - 0.12 Chlorhexidine for 30 seconds (BLUE), 35% - 0.23 PVP for 15 seconds (YELLOW), 11% - 0.05% cetylpyridinium(RED)

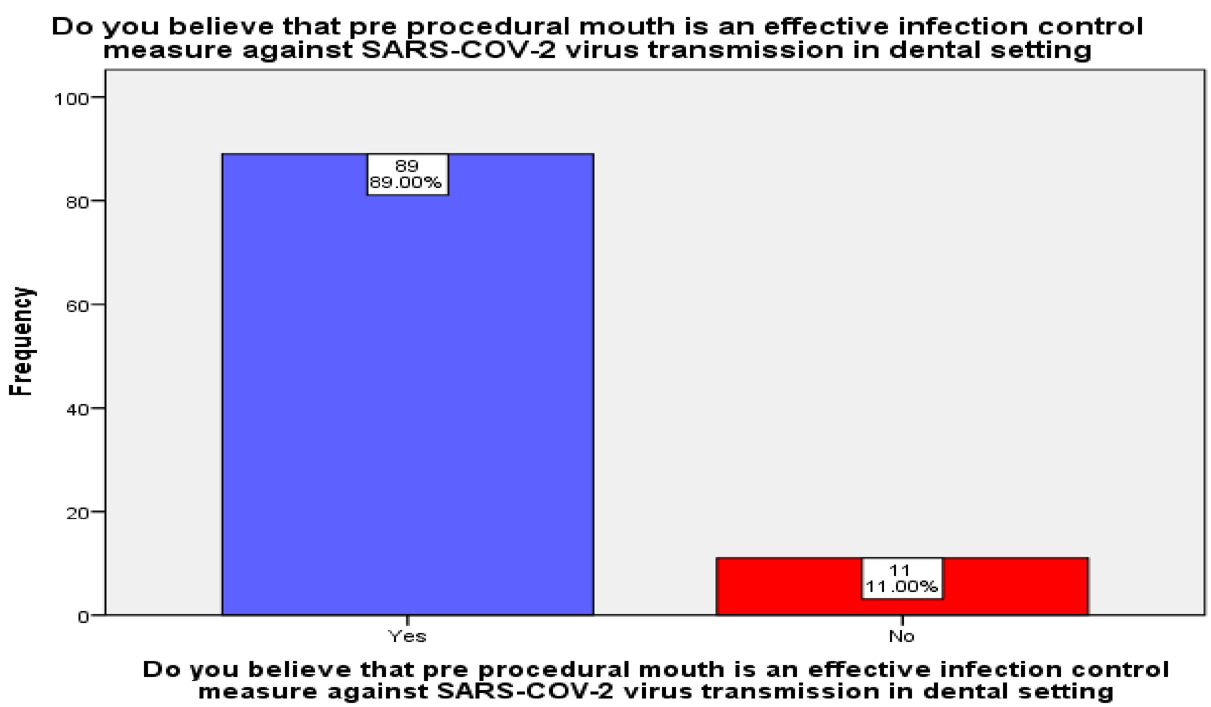

FIG 9: The bar graph shows the distribution of the attitude of the participants regarding the effectiveness of pre-procedural mouthwash as an infection control measure.

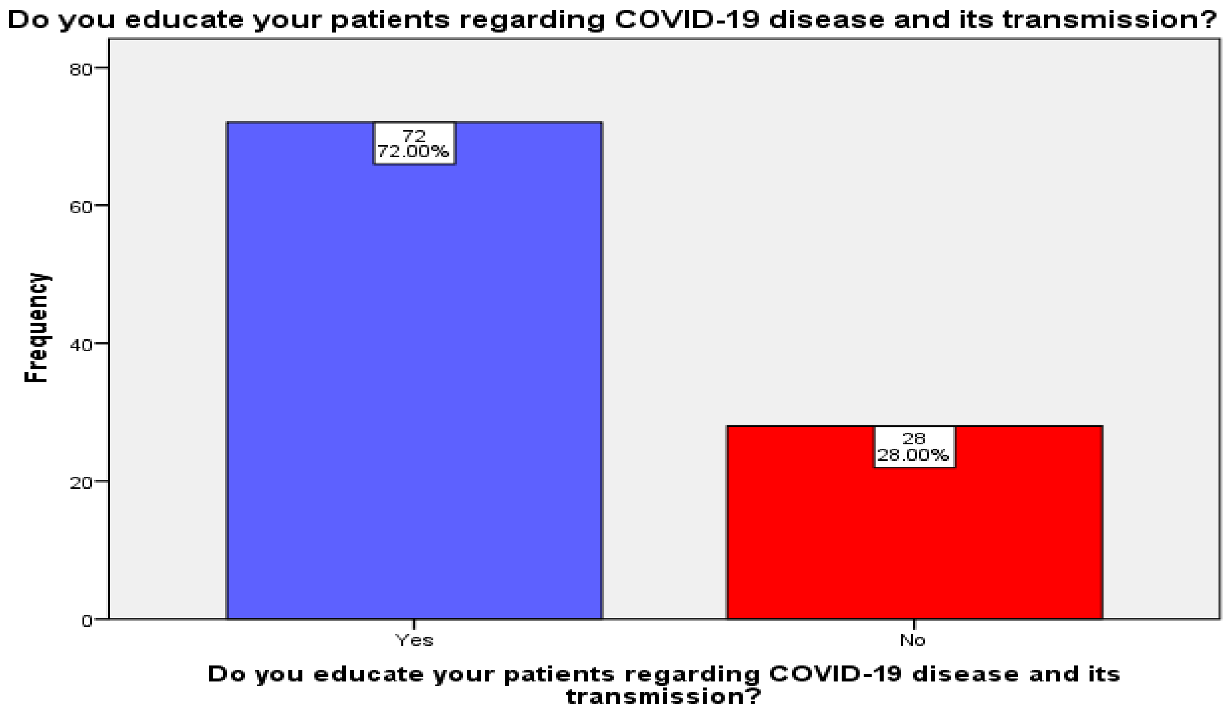

FIG 10 : The bar graph shows the distribution of practices of the participants regarding education of patients about COVID-19.

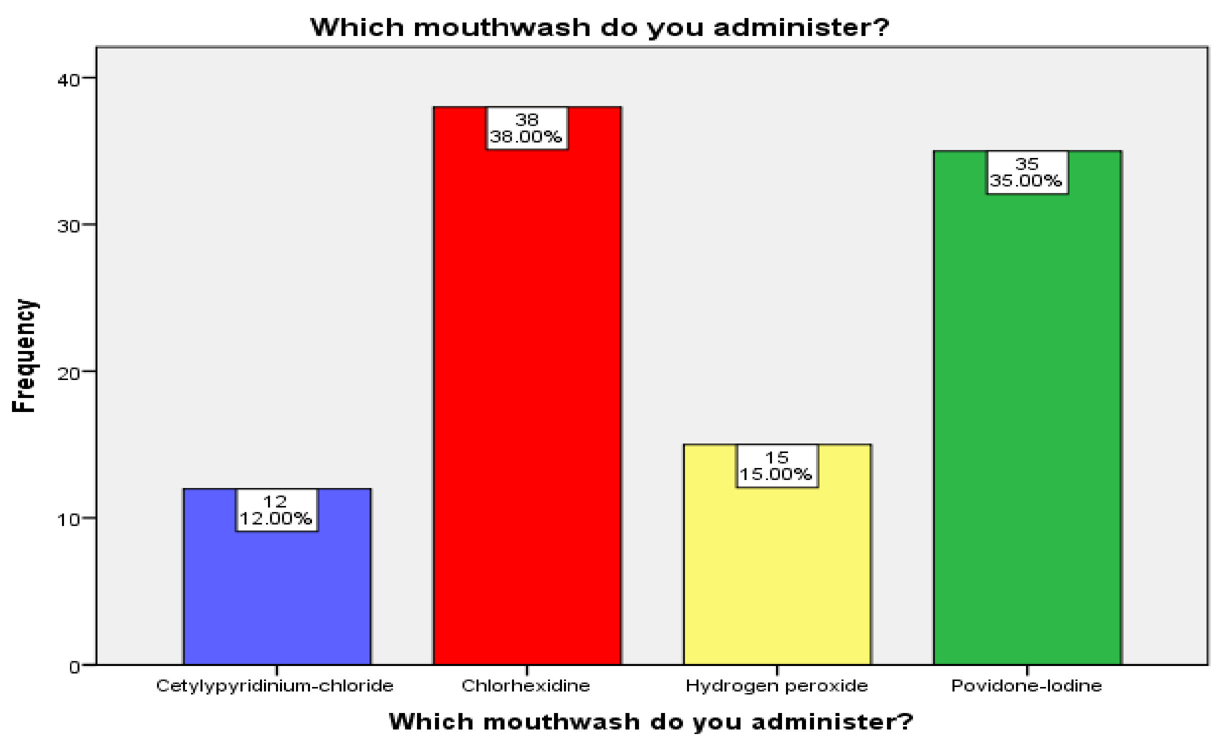

FIG 11 : The bar graph shows the distribution of practice of the participants on administration of pre-procedural mouthwash.

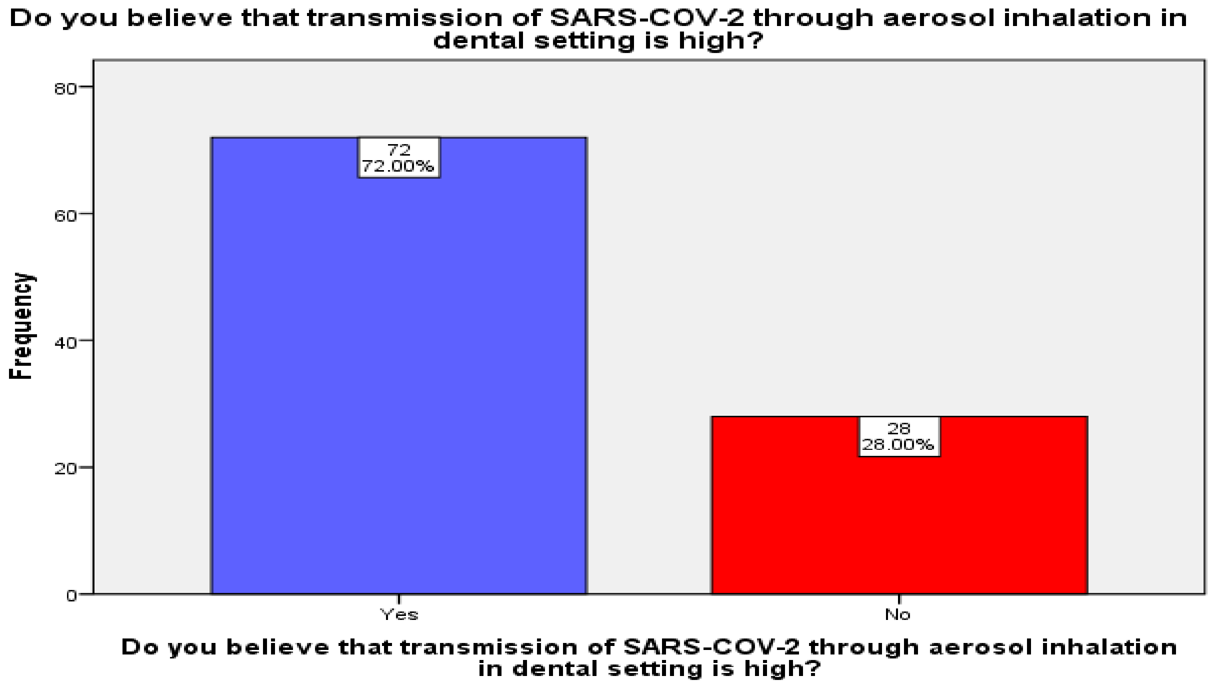

Fig 12: The bar graph shows the distribution of the attitude of the participants regarding transmission of COVID-19 through aerosol inhalation in the dental setting.

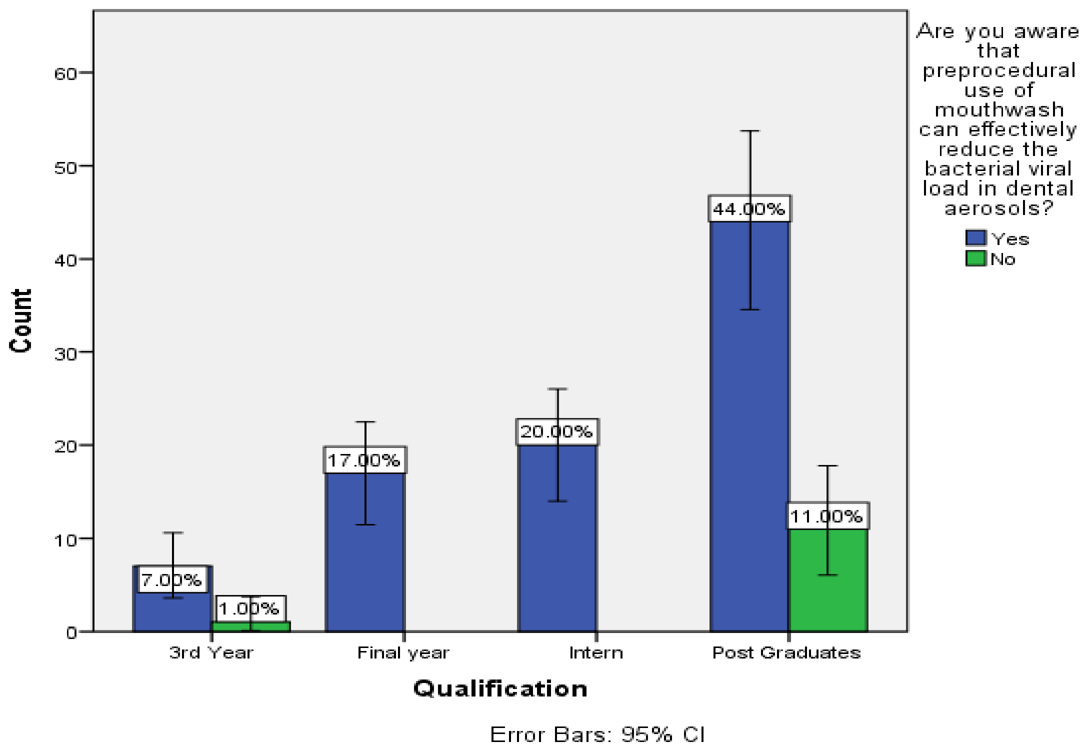

FIG 13: The graph represents the association of gender and awareness of preprocedural mouth wash. X axis denotes qualification of the participants and Y axis denotes count of awareness of preprocedural mouth wash. On comparing the awareness of the effect of

preprocedural mouth wash on the bacterial and viral load in dental aerosols, with qualification of participants, statistically significant difference was noted between the participants with a p-value = .03 (< 0.05).

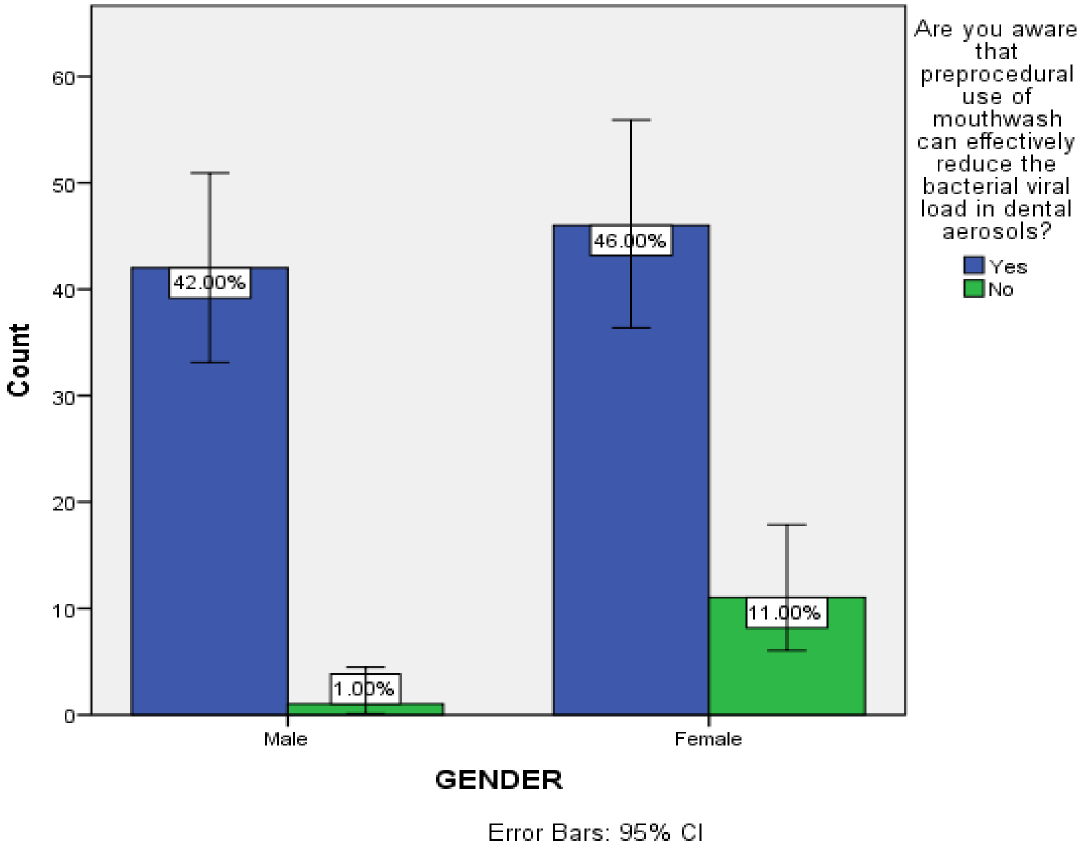

FIG 14: The association of gender on the awareness of preprocedural mouth wash revealed no statistically significant difference between males and females, with a p-value = .08 (> 0.05).

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AUTHORS CONTRIBUTION

Srijan Sunar: Literature search, data collection, data analysis, manuscript writing.
Dr.Parkavi : Study design, data verification, manuscript drafting.

CONFLICT OF INTEREST:

The authors declare that there are no conflicts of interest in the present study.

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