

Awareness Among Dental Students Regarding Use of Mouthwash as a Pre-Prophylactic Rinse for Patients: A Questionnaire-Based Survey

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Abstract:

Background: The COVID-19 pandemic has inarguably shattered the medical community into bits and pieces. With infecting more than 10% of the global population, it has established itself as the “Disease of the Century.” While attempts are being made to control the spread of virus, it can take up to several years to break the chain and put an end to this pandemic.

Objective: To evaluate the knowledge among dental students regarding use of mouthwash as a pre-prophylactic rinse to reduce oral viral load among the patients.

Methods: The study is based on the reports collected via a questionnaire survey conducted from June 2021 to September 2021 among 300+ dental students from over 5 different colleges in Bengaluru, India. The study protocol was designed with the help of Department of Public Health Dentistry, NSVK Sri Venkateshwara Dental College and Hospital.

The data was gathered in respect to the survey forms filled by the participants and a trained and expert statistician was involved in the study who was unaware of the circumstances and the associated personal information of the participants.

Results: Of the 300 students who voluntarily took part in the survey, only 48.33% of them were aware of the initial predicaments of dealing with the virus directly sourced from the colleges. Moreover, only 67.56% of them recognized oral cavity to be immediate risk against the virus during the initial screening procedures and fewer than 150 demonstrated an initial support for the virus.

Conclusion: What we have witnessed in the past 2 years have been nothing less of a public disaster that was on a precipitous of explosion. Within the next few decades, we may have multiple such instances of community health endangerment, that is the reason why it is imperative for us all to imbibe superior screening and preventive techniques. Although the universal acceptance of most of these pre-prophylactic practices are yet to be recognized, it is significant for us to imbibe in superior healthcare practices for the sake of lowering community transmission.

Key words— prophylaxis, mouthwash, SARS-CoV-2 virus, COVID-19, screening

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I. Introduction

With the aftermath of the pandemic still lingering on us, it would be naive to state that the last 2 years have been nothing but a dreaded eye opener for humanity. There has not been any sector of working profession that has remained untouched by the horrors of the same and it is time now to take to task the strengthening of preventive healthcare from its grassroots since the pandemic is here to stay^[1]. Although it has taken its toll on the healthcare system, there still exists ray of hope when it comes to the control of the pandemic. While we are all aware that our healthcare has been structured into various levels of preventive health, it is imperative to precipitate the learning of the same to the up-coming generations of doctors/dentists^[2]. However, when it comes to the students who are the most exposed to patients while treating or practicing on them, there still exists a far deep widened gap into practicing optimum screening techniques. One such criteria is the use of mouthwash as a pre-prophylactic rinse to reduce the viral load^[3-4]. Although in India dental house interns and final year students are responsible to work on patients, the redistribution of knowledge regarding prophylactic measures vitalised as part of post pandemic screening and treatment is yet to be accepted as universal guidelines among these students^[4]. In this study, we aim to evaluate the gap of paradigm surrounding the dearth of the above-mentioned knowledge among the dental students especially in the field of mouthwash use.

II. Materials and Methods

The study is based on the reports collected via a questionnaire survey conducted from June 2021 to September 2021 among 300+ dental students from over 5 different colleges in Bengaluru, India. The study protocol was designed with the help of Department of Public Health Dentistry, NSVK Sri Venkateshwara Dental College and Hospital. The dental students who took part in the study were all asked to participate via an invitation and the questionnaire for the survey were emailed to them.

The data was gathered in respect to the survey forms filled by the participants and a trained and expert statistician who was unaware of the circumstances and the associated personal information of the participants involved in the study.

Also, an educative session was conducted at the end of the survey where we segregated the groups of the individuals taking part in the survey on basis of their affinity and existing knowledge about prescribing mouthwashes. The participants who took part in this session were invited via Google meet and the session was conducted in presence of an expert.

III. Results

A total of 300 dental students from 5 colleges in Bengaluru, India had voluntarily taken part in the study.

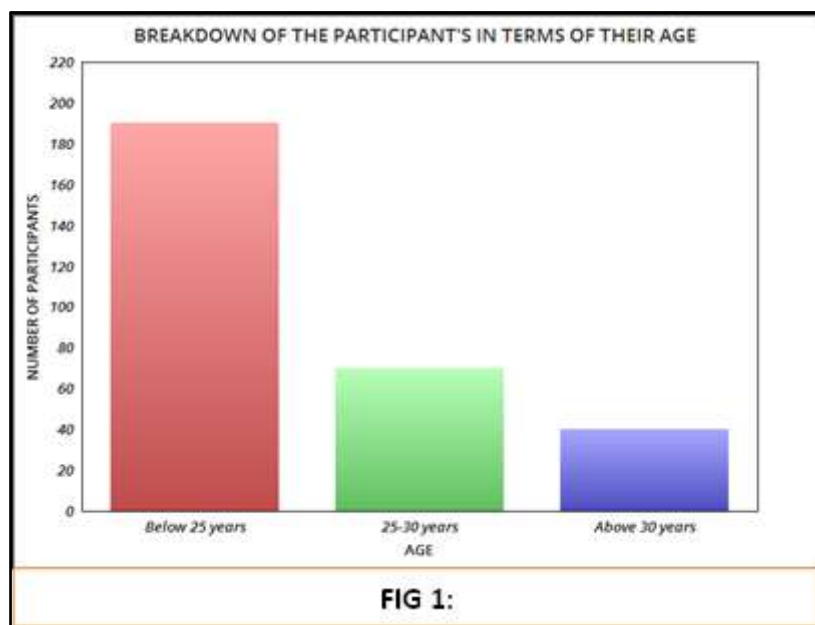
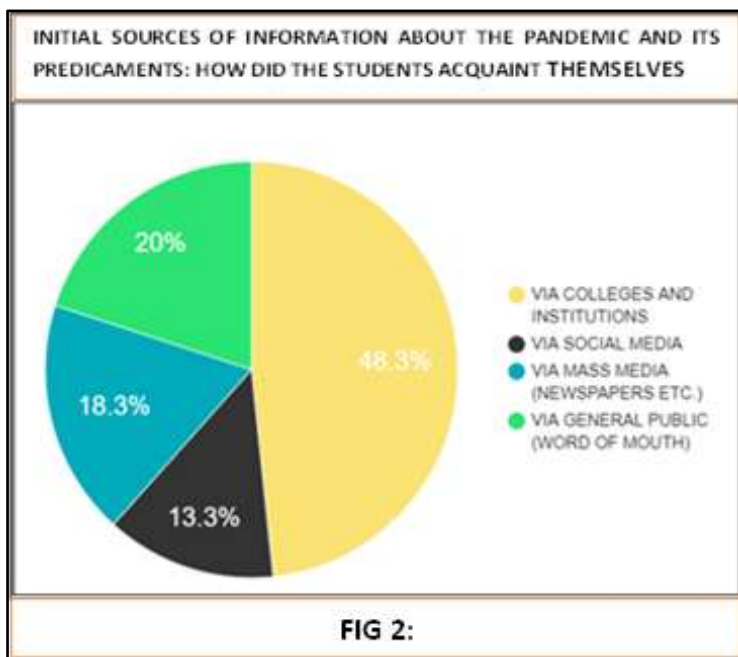
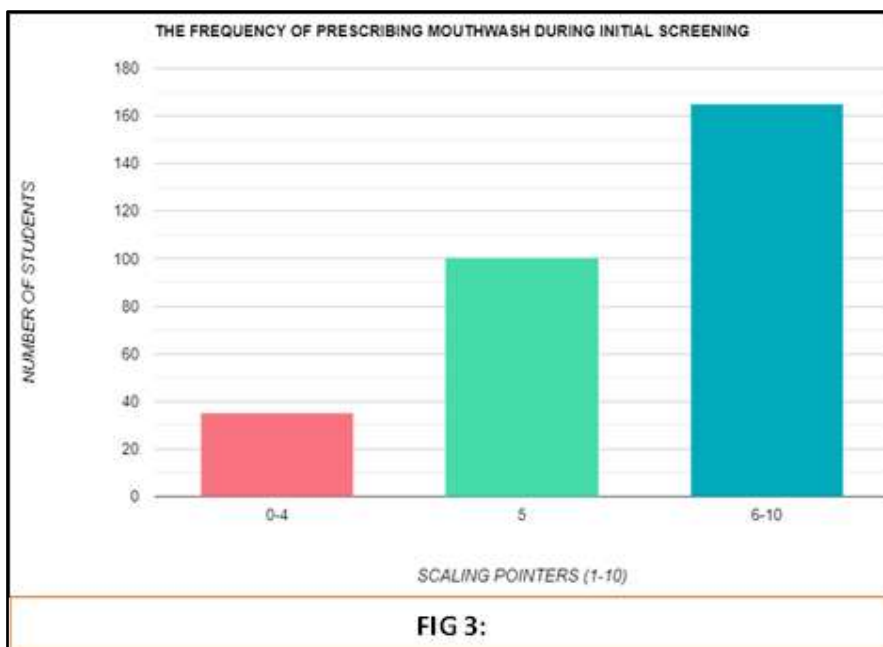


Fig 1 presents the breakdown of the participants based on their age. 230 were undergraduates, the rest 70 were perusing their post-graduation. To trace down as to how did the dental students retrieve information about the initial predicaments of the virus (**Fig 2**), we found out that around 48.33% of them had their initial sources coming in directly from their respective colleges, while the rest around 51.67% of them had to rely on other sources.



Even after the subsided impacts of the first wave of the pandemic, around 57.83% of the students complained that hardly any initiation was done to put in place safety protocols.

When we surveyed further on understanding how much of the basics did the students know about the virus and its expose in the oral cavity, we found out that only 67.56% of the students could identify the significant risk pertaining to the reservoirs of the virus in the oral cavity. More than 96 students had no idea about the vulnerabilities of oral contamination of the virus. When we asked the participants to scale their frequency of prescribing mouthwashes prior to the dental screening owing to the pandemic (within a range of [1-10]), we found that only about 55% of the participants supported the idea for the same, a whopping number of 140 students did not regularly press the idea of using mouthwash among their patients (**Fig 3**).



We then divided these students into two groups to understand as how they believed the mouthwash did or did not impact their practices. In the first group (**Group A**), there were 165 participants who had been actively prescribing mouthwashes during the initial screening procedures. To **Group A**, we further asked, post screening during subsequent appointments, what according to them was the ideal time to prescribe a

mouthwash. Around 65.5% agreed to the idea of using mouthwash prior to beginning their appointments and the rest believed that the ideal time to use the mouthwash was during or post the treatment (**Fig 4**).

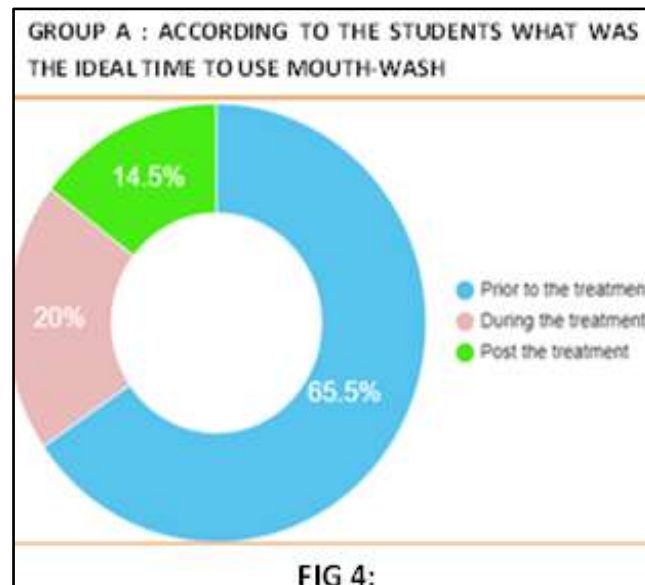


FIG 4:

The rest 140 students in **Group B**, who did not agree that using mouthwash could any how impact the viral load in the oral cavity, were asked to identify the reasons as to what they primarily believed was the use of mouthwash in their practices (**Fig 5**).

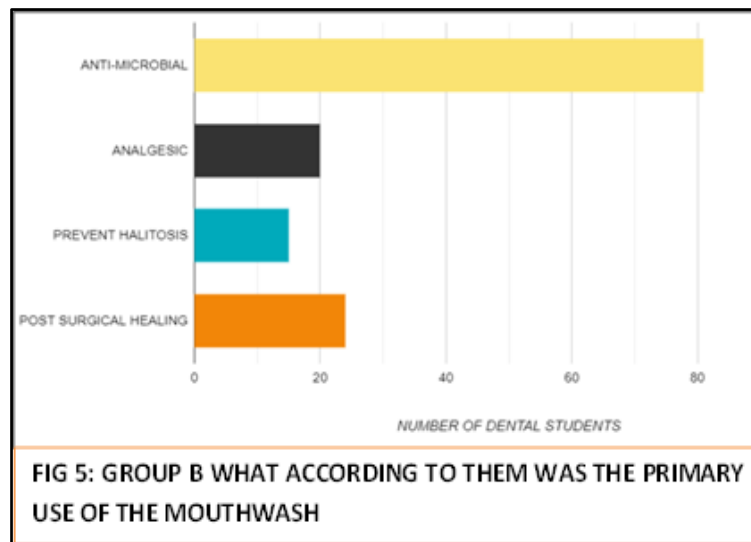
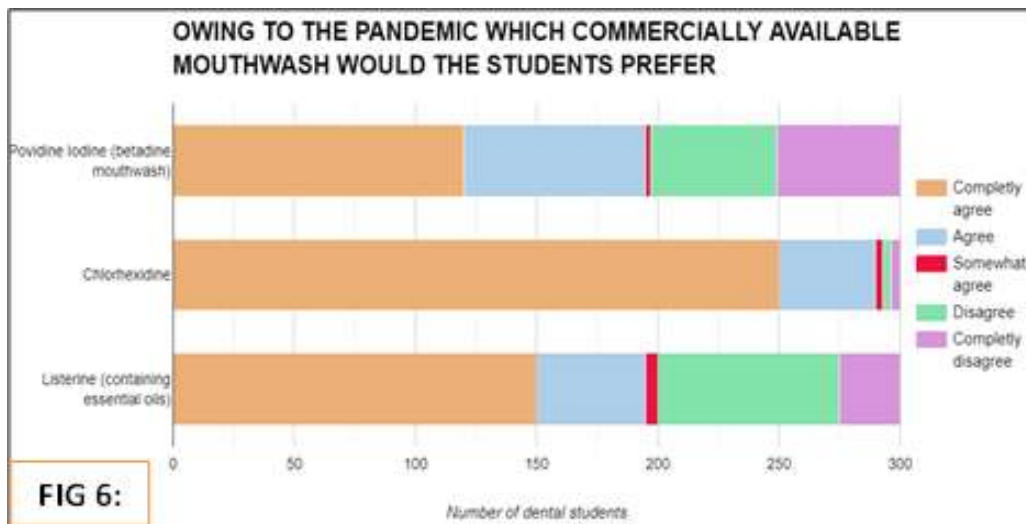


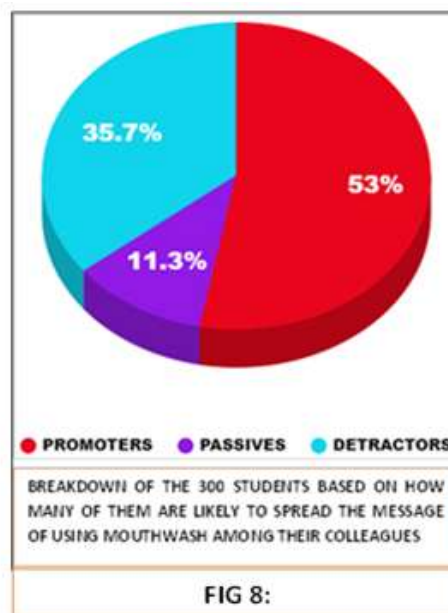
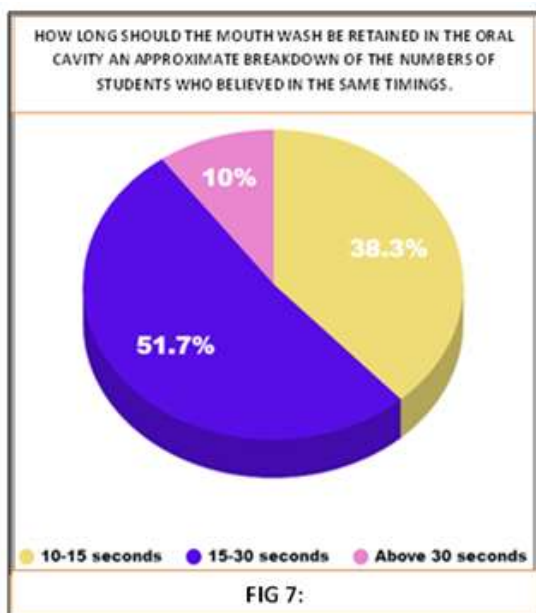
FIG 5: GROUP B WHAT ACCORDING TO THEM WAS THE PRIMARY USE OF THE MOUTHWASH

Around 81 of them considered mouthwash as an antimicrobial agent, 20 of them believed that they were primarily used as an analgesic, 15 of them cited halitosis and the rest recommended the patients to use mouthwashes post oral surgeries. This very discrepancy was jarring enough to describe how inadequate was the knowledge supporting the use of mouthwashes as prophylactic measures among the dental students. Out of the 300 students, there were only 65% of them who knew the difference between the techniques of gargle, swish or rinse and even among those 195, there were only 49.04% of them who practiced the technique of proper gargling.

With the vast availability of these commercially available mouthwashes, we asked the participants to choose which one according to them was their first choice of recommendation (**Fig 6**). Also, out of those, only 130 students strongly agreed that mouthwashes containing Cetyl-pyridinium-Chloride and Povidone-Iodine were highly capable of reducing SARS-CoV-2 viral load.

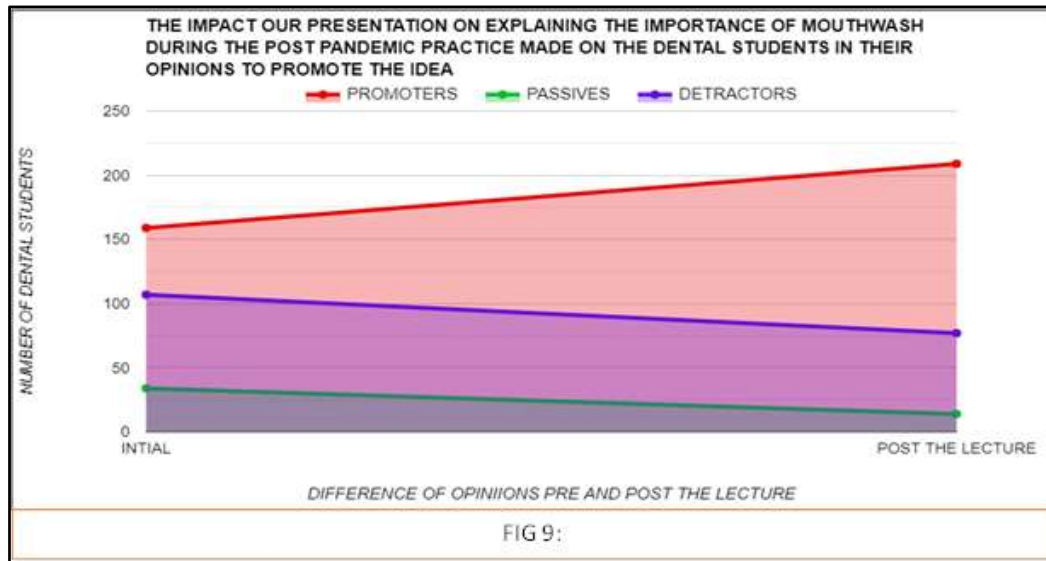


Delving into understanding the content knowledge of the mouthwashes, we asked the students, what according to them would be the optimum time to retain the mouthwash in the oral cavity (Fig 7).



115 students felt that mouthwashes must be retained for less than 15 seconds in the oral cavity, 155 of them believed that it must be retained for a minimum of 15-30 seconds and only 30 participants felt that more than 30 second retention is important to minimise the viral load from the oral cavity. While we were conducting the survey, we finally also tried to enquire as to how many students were willing to spread the message of the importance of using mouthwash as a pre-prophylactic medium to reduce the viral load in the oral cavity (Fig 8).

Over 159 students agreed to the same, citing the research benefits that they had been explained in their respective colleges. However, 141 students or 47% of them were either passives or detractors to the idea. We then divided the 141 students from the rest 159, and decided to give them a simple secondary research-based presentation on how efficient was the use of certain mouthwashes in reducing the primary viral load from the oral cavity. Post the presentation, we once again took a count to figure out how many students were impacted from the presentation and decided to tabulate it in form of a graph (Fig 9). As the graph clearly presents, more than 200 were promoters of the idea and the number of passives and detractors reduced post the presentation lecture.



IV. Discussion

May 19, 2020, a study was published by Jin-Gu-Yoon which stated that SARS-CoV-2 viral load was extremely consistent in the saliva, the rate was higher than the amount found in the oropharynx during the early period of its lifecycle [5]. This shows an extreme proclivity as to why the dentists must all be protected from being the first-hand victims to the same while finding techniques to reduce the viral load within the oral cavity [6]. The technique to disrupt the lipid envelope of the virus has long been the common portfolio of the most prescribed mouthwash [7-8], Chlorhexidine gluconate and a recent study showed that how in its gel or rinse form it can be efficient to reduce risk associated with pneumonia causation for patients under mechanical ventilation [9-11].

TABLE 1: THE EFFECT OF COMMERCIAL MOUTHWASHES ON HUMAN CORONA VIRUS
 SOURCE: -- Meyers, Craig et al. "Lowering the transmission and spread of human coronavirus." *Journal of medical virology* vol. 93,3 (2021): 1605-1612. doi:10.1002/jmv.26514

Mouth Wash/gargle	log10 Decrease contact time: 2 min (% inactivation)	log10 Decrease contact time: 1 min (% inactivation)	log10 Decrease contact time: 30 sec (% inactivation)
Peroxide Sore Mouth	between >1 and <2 log ₁₀ (>90% to <99%)	between >1 and <3 log ₁₀ (>90% to <99.9%)	between <1 and <2 log ₁₀ (<90% to 99%)
1.5% H ₂ O ₂	<1 log ₁₀ (<90%)	between <1 and <3 log ₁₀ (<90% to <99.9%)	between <1 and <2 log ₁₀ (<90% to <99%)
Crest Pro Health	between ≥3 and >4 log ₁₀ (≥99.9% to >99.99%)	>4 log ₁₀ (>99.99%)	between ≥3 and <4 log ₁₀ (≥99.9% to <99.99%)
Listerine Antiseptic	>4 log _{10a} (>99.99%)	>4 log _{10a} (>99.99%)	>4 log ₁₀ (>99.99%)
Betadine 5%	>4 log ₁₀ (>99.99%)	between >3 and >4 log ₁₀ (>99.9% to >99.99%)	between >3 and <4 log ₁₀ (>99.9% to <99.99%)

A comparative study published in the Medical Journal of Virology, comparing the efficacy of reduction of Human Corona-virus in the oral cavity produced some distinct results (Table 1). While most of the above mentioned commercially available mouthwashes produced an average reduction rate of 90% at a minimum contact time, the individual mouthwashes produced a variable range of 90-99% reduction. Certain formulations such as the Crest Pro-Health showed a reduction of 99.9% of the viral load, Listerine fared exceptionally well, even at a 30 sec contact rate, reduced 99.99% of the virus [12-13]. If the major site of viral-replication, prior to the symptoms is the throat, good practice of oral antiseptics could lower the rate of infectious viral particles, consecutively reducing the risk of transmission [14].

<u>CHEMICAL MOUTHWASH</u>	<u>MECHANISM OF ACTION</u>	<u>RECOMMENDED DOSE OF USE</u>
CHLORHEXIDINE GLUCONATE	DISRUPTION OF ENVELOPE, LEAKAGE OF COMPONENTS.	0.12%
POVIDINE IODINE	FREE IODINE DISSOCIATES FROM POLYVINYLPIRROLIDONE, IODINE RAPIDLY PENETRATES MICROBES TO DISRUPT PROTEINS AND OXIDISES NUCLEIC ACID STRUCTURES.	1%
HYDROGEN PEROXIDE	RELEASE OF NASCENT OXYGEN, MAKES VIRUS VULNERABLE TO OXIDATION	1.5%-3%
CETYL-PYRIDINIUM CHLORIDE	LYSOSOMOTROPIC MECHANISM OF ACTION AND ITS ABILITY TO DESTROY VIRAL CAPSIDS.	0.05%

TABLE 2: - MECHANISM OF ACTION OF THE DIFFERENT COMMERCIALY AVAILABLE MOUTHWASHES

Our study presented a huge vacuum in the field of prophylactic practices among dental students. It is true the pandemic is here to stay, the major question is that, is the younger generation prepared to be a part of it, especially the doctors/dentists. Although there are promising studies in the field as we discussed, still the students are hesitant to use mouthwashes as a pre-prophylactic measure [14-15]. While our study highlights the same, it also brings forth an interesting observation as to how the institutions themselves have failed to recognise the importance of these mouthwashes and therefore sacrificed its procurement. Even if these students wish to use the same in their practices, they must purchase it as part of their self-itinerary.

V. Conclusion

What we have witnessed in the past 2 years have been nothing less of a public health disaster that was on a precipitous of explosion. Within the next few decades, we may have multiple such instances of community health endangerment, that is the reason why it is imperative for us all to imbibe superior screening and preventive techniques. Although the universal acceptance of most of these pre-prophylactic practices are yet to be recognised, it is significant for us to imbibe in superior healthcare practices for the sake of lowering community transmission.

References

- [1]. Chetty, R. et al. (2020), The Economic Impacts of COVID-19: Evidence from a New Public Database Built from Private Sector Data, Harvard University and Opportunity Insight, <https://opportunityinsights.org/paper/tracker/>.
- [2]. Jum'ah AA, Elsalem L, Loch C, Schwass D, Brunton PA. Perception of health and educational risks amongst dental students and educators in the era of COVID-19. *Eur J Dent Educ.* 2021;25(3):506-515. doi:10.1111/eje.12626
- [3]. Burton MJ, Clarkson JE, Goulao B, et al. Antimicrobial mouthwashes (gargling) and nasal sprays to protect healthcare workers when undertaking aerosol-generating procedures (AGPs) on patients without suspected or confirmed COVID-19 infection. *Cochrane Database Syst Rev.* 2020;9(9):CD013628. Published 2020 Sep 16. doi:10.1002/14651858.CD013628.pub2
- [4]. Vergara-Buenaventura A, Castro-Ruiz C. Use of mouthwashes against COVID-19 in dentistry. *Br J Oral Maxillofac Surg.* 2020;58(8):924-927. doi:10.1016/j.bjoms.2020.08.016
- [5]. Yoon JG, Yoon J, Song JY, et al. Clinical Significance of a High SARS-CoV-2 Viral Load in the Saliva. *J Korean Med Sci.* 2020;35(20):e195. Published 2020 May 25. doi:10.3346/jkms.2020.35.e195
- [6]. Casillas Santana MA, Dipp Velázquez FA, Sámano Valencia C, et al. Saliva: What Dental Practitioners Should Know about the Role of This Biofluid in the Transmission and Diagnostic of SARS-CoV-2. *Medicina (Kaunas).* 2021;57(4):349. Published 2021 Apr 6. doi:10.3390/medicina57040349
- [7]. Seneviratne CJ, Balan P, Ko KKK, et al. Efficacy of commercial mouth-rinses on SARS-CoV-2 viral load in saliva: randomized control trial in Singapore. *Infection.* 2021;49(2):305-311. doi:10.1007/s15010-020-01563-9
- [8]. O'Donnell VB, Thomas D, Stanton R, et al. Potential Role of Oral Rinses Targeting the Viral Lipid Envelope in SARS-CoV-2 Infection. *Function (Oxf).* 2020;1(1):zqaa002. doi:10.1093/function/zqaa002
- [9]. Zhao T, Wu X, Zhang Q, Li C, Worthington HV, Hua F. Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia. *Cochrane Database Syst Rev.* 2020;12(12):CD008367. Published 2020 Dec 24. doi:10.1002/14651858.CD008367.pub4
- [10]. Machhi J, Herskovitz J, Senan AM, et al. The Natural History, Pathobiology, and Clinical Manifestations of SARS-CoV-2 Infections. *J Neuroimmune Pharmacol.* 2020;15(3):359-386. doi:10.1007/s11481-020-09944-5
- [11]. Machhi J, Herskovitz J, Senan AM, et al. The Natural History, Pathobiology, and Clinical Manifestations of SARS-CoV-2 Infections. *J Neuroimmune Pharmacol.* 2020;15(3):359-386. doi:10.1007/s11481-020-09944-5
- [12]. Toni Luise Meister, Yannick Brüggemann, et al., Virucidal Efficacy of Different Oral Rinses Against Severe Acute Respiratory Syndrome Coronavirus 2, *The Journal of Infectious Diseases*, Volume 222, Issue 8, 15 October 2020, Pages 1289–1292, <https://doi.org/10.1093/infdis/jiaa471>
- [13]. Meyers, Craig et al. "Lowering the transmission and spread of human coronavirus." *Journal of medical virology* vol. 93,3 (2021): 1605-1612. doi:10.1002/jmv.26514

- [14]. Steinhauer K, Meister TL, Todt D, et al. Comparison of the in-vitro efficacy of different mouthwash solutions targeting SARS-CoV-2 based on the European Standard EN 14476. *J Hosp Infect.* 2021;111:180-183. doi:10.1016/j.jhin.2021.01.031
- [15]. Burton MJ, Clarkson JE, Goulao B, et al. Use of antimicrobial mouthwashes (gargling) and nasal sprays by healthcare workers to protect them when treating patients with suspected or confirmed COVID-19 infection. *Cochrane Database Syst Rev.* 2020;9(9):CD013626. Published 2020 Sep 16. doi:10.1002/14651858.CD013626.pub2

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