

Covid-19, mouthwashes and dental indices - A fascinating periodontal triad

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Abstract

Aim: The aim of this study is to assess the impact of Covid -19 induced use of mouthwashes over dental indices of a cross section of population amidst the pandemic.

Material and Methods: A cross-sectional study was carried out in the Post Graduate dept. of Periodontics and Oral Implantology, Govt Dental College & Hospital Srinagar, J & K with a sample size of 150 participants. All the patients were allocated to two separate groups. Group 1 included patients who had started using mouthwashes (povidone Iodine, CHX). Group 2 included patients who had not used any mouthwash during the pandemic. The indices evaluated were Plaque Index (Sillness and loe) and gingival index (Loe & Sillness). Data were analysed using the SPSS.

Results: Group 1 had 69 patients (46%), who had used mouth wash & Group 2, those who had not used any mouthwash during last 3 months, constituted 81 patients (54%). Mean of Plaque Index for Group 1 and Group 2 was 1.18 and 1.72 respectively. Mean of Gingival Index for Group 1 & Group 2 was 1.30 and 1.85 respectively. ($p < 0.01$)

Conclusion: The results of the present study reveal that mouthwashes have a significant anti-plaque and anti-gingivitis role. Covid -19 induced mouthwash use may have just been a blessing in disguise for maintaining a better gingival health.

Keywords: Covid-19, Mouthwashes, Plaque Index, Gingival Index, Sars-CoV 2.

Introduction

The inflammatory state of gingiva i.e., gingivitis, is the most prevalent disease affecting the gingiva and

subsequently act as an initial trigger for breakdown of whole tooth supporting organ system. The well-known local etiologic culprit causing gingivitis is the oral biofilm of plaque. There is a strong correlation between dentogingival plaque and periodontal disease¹. Effective plaque control strategy goes a long way in preventing most of the diseases of periodontium. Plaque control protocol consists of three main arms: mechanical, chemical and chemotherapeutic controls. While mechanical plaque control forms the first line of defense against plaque accumulation², chemical plaque control can augment mechanical plaque control and reduce gingivitis³.

Mouthwashes form the most common and effective chemical plaque control adjunctive therapy. Chlorhexidine is one of most effective antiseptics for dental plaque inhibition and the prevention of gingivitis when used twice daily as a mouth rinse^{4,5}. The effect of mouthwashes over dental indices are well documented^{6,7}. Chlorhexidine (CHX) is by far the most thoroughly studied and the most effective anti-plaque and anti-gingivitis agent known today^{8,9,10}. In gingivitis patients, CHX mouth rinses provide significant reductions in plaque and gingivitis scores, but a significant increase in staining score¹¹. CHX mouthwashes while having a significant plaque reducing action, produce tooth discoloration¹².

Covid 19 pandemic posed tough challenges in different realms of day-to-day life. Adjustments in lifestyle helped people combat the pandemic well. Covid appropriate behaviors like wearing masks, hand washing and social distancing were the most stressed instructions throughout the period of pandemic. Likewise, Mouthwashes during Covid 19 times made it to several headlines. Upon the regular use of mouthwash, more symptoms improvement after two days of treatment, a

higher conversion rate to "COVID19-negative PCR" by five days of treatment, and less intubation and mortality.¹³ Daily use of phthalocyanine mouthwash rapidly reduced clinical symptoms such as sore throats, cough and mouth ulcers.¹⁴ Povidone-iodine mouth rinse has been titled as an adjunct to PPE in fight against Covid-19 pandemic. The intervention is inexpensive, low risk and potentially easy to deploy at scale globally.¹⁵

The prospect of this study is to assess the impact of Covid -19 induced use of mouthwashes over dental indices of a cross section of population amidst the pandemic.

Material and Methods

A cross-sectional analysis was carried out over a period of 4 months from December 2020 to March 2021 in Post Graduate dept. of Periodontics and Oral Implantology, Govt Dental College & Hospital Srinagar, J &K. The Ethical approval for this survey was obtained from the Institutional ethical Committee of GDC Srinagar.

Participant selection and distribution

150 patients (85 males & 65 females) ranging in 25-50-year age group visiting the department were included in the study after obtaining an informed consent. Inclusion criteria were at least 20 teeth, no periodontitis, no periodontal treatment 6 months prior to the study. Exclusion criteria were-Patients having co morbidities like Diabetes mellitus, CVS or respiratory diseases and pregnant ladies. Patients who had taken antibiotics or anti-inflammatory drugs 2 months prior to the study were excluded.

Study Design

All the patients were allocated to two separate groups. Group 1 included patients who had started using mouthwashes (povidone Iodine, CHX) amidst the Covid-19 pandemic as a possible preventive measure for

Sars Cov-2. Group 2 included patients who had not used any mouthwash during the pandemic.

Clinical parameters

The amount of Plaque accumulation was assessed by the using the criteria of the plaque-index (PII).¹⁶ The gingival status was obtained using the criteria of the gingival-index (GI).¹⁷ Both parameters were recorded at four sites (mesio-vestibular, mid-vestibular, disto-vestibular and lingual) of each tooth by using a mouth mirror, dental explorer and a triple syringe for drying. Total score per person is obtained by adding the unit scores per tooth and then dividing this by the number of teeth examined. Total score for a group is obtained by adding the individual scores of each patient and dividing by total number of patients.

Statistical analysis

Data were analysed using the SPSS 20 and presented in simple measures of frequencies and percentages for the groups, and the values expressed as: mean, mean difference and standard deviation. The significance of difference in means was tested using paired sample t-

Table 2 shows the mean difference in the gingival and plaque indices of Group 1 and Group 2 respectively. ($p < 0.01$)

Table 2

Index		Mean	Mean difference	SD	P Value
Plaque index	Group 1	1.18	0.54	0.11	0.01
	Group 2	1.72		0.25	0.01
Gingival index	Group 1	1.30	0.55	0.14	0.01
	Group 2	1.85		0.27	0.01

Discussion

Mouthwashes have seen a new dawn amid the Covid-19 Pandemic. Various studies were conducted to establish role of various mouthwashes against SARS CoV-2. The default role of mouthwashes in periodontics is augmentation of plaque control and keeping the plaque and gingival indices well under control. This study explores the fascinating triad formed by the viral

test, the student t-test for two independent means, and ANOVA test. $P \leq 0.05$ was considered to be significant.

Results

Out of a total 150 patients included in the study, Group 1 had a staggering number of 69 patients (46%), who had used mouth wash as a preventive measure against Sars CoV-2. Group 2, those who had not used any mouthwash during last 3 months, constituted 81 patients (54%). (Table 1)

Table 1

Group	Number of Patients	Percentage
1	69	46%
2	81	54%

Mean of Plaque Index for Group 1 and Group 2 was 1.18 and 1.72 respectively. Mean of Gingival Index for Group 1 & Group 2 was 1.30 and 1.85 respectively.

Covid-19 induced precautionary use of mouthwashes led to a significant reduction in the plaque index, and gingival index. There was statistically significant lower mean score ($p < 0.01$) in the aforementioned parameters.

pandemic induced mouthwash use and its subsequent effect on oral indices as established by Sillness and Loe Plaque Index (1964) and Loe and Sillness Gingival Index (1963).

The use of mouthwashes by participants of Group 1 resulted in a better plaque control as depicted by the mean plaque index of 1.18 as compared to mean plaque index of 1.72 in Group 2 participants who had not used

any mouthwash in the recent past. Group 1 also showed a better gingival health status (mean GI: 1.30) as compared to Group 2 (mean GI: 1.85). This is consistent with the study of Van Strydonck et al (2012) that establishes strong evidence for the antiplaque and antigingivitic effects of CHX mouth rinses used as adjuncts to regular oral hygiene in gingivitis patients. The use of CHX is associated with a 33% plaque and 26% gingivitis reduction, as compared to controls.¹¹

As an antimicrobial agent, chlorhexidine is effective in vitro against both gram positive and gram-negative bacteria including aerobes and anaerobes and yeasts and fungi (Davies G et al., 1954, Emisilon C 1977).^{18,19}

Chlorhexidine can reduce the adherence of Porphyromonas gingivalis to epithelial cells. This effect is probably due to the binding of chlorhexidine to the bacterial outer membrane and therefore it could have similar results on the adherence of other plaque bacteria (Grenier D 1996).²⁰ One study by Jenkins S, Addy et al (1994) compared the plaque-inhibitory potential of 0.05% and 0.1% CPC, 0.05% chlorhexidine and control mouth rinses used twice daily during a 4-day period of non-brushing. The 0.1% CPC rinse had the lowest plaque score, being around 26% lower than the control rinse, and lower than the 0.05% chlorhexidine rinse.²¹

The applications for PVP-I range from routine oral care and gingivitis through to the management of oral mucositis and surgical site disinfection following dental surgeries. Evidence also suggests that PVP-I confers additional benefits that complement its antiseptic properties. These include anti-inflammatory, anti-edematous, and hemostyptic effects, which can improve clinical outcomes.²² In the present study, participants in Group 1 showed similar antiplaque and anti-gingivitis outcomes.

The current study showed a staggering increase in use of mouthwashes by people as a precautionary and preventive measure against Sars CoV 2 with about 46% of participants (Group 1) reporting new use of anti-bacterial mouthwashes during the raging pandemic. This followed a streak of studies suggesting and reporting benefits of using various mouthwashes against Sars CoV 2. PVP-I oral antiseptic rinses may offer promising results as a decontaminating agent in present COVID-19 era because of their supercilious efficacy against SARS-CoV-2 virus as indicated. Their preprocedural use is highly recommended.²³ K Bayley, Justin et al (2020) proposed a protocolised intra-nasal and oral application of PVP-I for both patients and their attendant healthcare workers (HCWs) during the current COVID-19 pandemic to help limit the spread of SARS-CoV-2 from patients to healthcare workers and vice versa. The phthalocyanine derivate mouthwash protocol appears as a potential alternative for clinical improvement of COVID-19 infected patients. Daily use of this mouthwash rapidly reduced clinical symptoms such as sore throats, cough and mouth ulcers.¹⁴

Khalid K, Qassim et al (2020) in their study showed that upon the regular use of mouthwash, more symptoms improvement after two days of treatment, a higher conversion rate to "COVID19-negative PCR" by five days of treatment, and less intubation and mortality, with all P-value < 0.05. These findings can be justified by the complicit hypothesis, predicting a rather preventive than a therapeutic advantage for the regular use of potent mouthwash as an additional control measure at the community level.¹³

Conclusion

The current study evaluated the pandemic induced increased incidence of mouthwash use by the participants. It leads to a fair and long-established

conclusion that mouthwashes have a significant anti-plaque and anti-gingivitis role as established by Plaque and Gingival Indices. Covid -19 induced mouthwash use may have just been a blessing in disguise for maintaining a better gingival health.

Author Contributions:

Author 1: carried out the study implementing, drafting the manuscript and participated in data analysis and interpretation.

Author 2: contributed in conception, design, acquisition, data analysis and interpretation of data revised critically.

Author 3: contributed in conception, design, acquisition, data analysis and interpretation of data revised critically.

All authors gave their final approval and agree to be accountable for all aspects of the work.

Conflict of Interest: The authors declare no conflict of interest.

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