Effect of Mouthwash in Reducing the Oral Load of SARS-CoV-2

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Abstract:
The use of mouthwash as an oral antimicrobial agent against SARS-CoV-2 infection. It is important to investigate the efficacy of mouthwash solutions against salivary SARS-CoV-2 in order to reduce the exposure of the dental team during dental procedures. This review aims to evaluate current knowledge on the effect of mouthwash in reducing the oral load of SARS-CoV-2. The article was conducted of two databases and were limited to period January 2018 to May 2023 with combination of the following keywords: “effect” and “mouthwash” and “oral” and “SARS CoV-2”. The results obtained were 21 articles found at the beginning of the search in both databases, and the 11 full text articles were selected for further review and discussion. Chlorhexidine gluconate (0.12%) was effective in reducing salivary SARS-CoV-2 load for at least 60 min. Povidone-iodine 1% oral solutions are effective preprocedural mouthwashes against SARS CoV-2 in dental treatments. Cetylpyridinium Chloride 0.05% could reduce viral load in SARS-CoV-2–positive patients. H2O2 concentrations (1.5% and 3%), verifying a minimal reduction in viral titer after 30s. Benzalkoniumchloride as antiseptic mouthrinse only mildly reduces viral infectivity in vivo, despite its high efficacy in vitro. The use of mouthwash chlorhexidine, povidone-iodine, cetylpyridinium chloride, hydrogen peroxide, benzalkoniumchloride can reduce the number of viruses, one of which is the SARS virus in the oral cavity. Antiseptics are effective in the first stage of contamination, before they enter the cell in the early period.

Keywords: antimicrobial, effect, mouthwash, SARS CoV-2.

Introduction
Prevention of viral infections can be done by a combination of vaccine immunization, use of prophylactic antimicrobial agents, and isolation from the causal microorganism, and improving the immune system and nutrition (Balafif et al, 2023). There is emerging evidence that topical antimicrobial agents may also be useful in preventing COVID-19 disease spread. The use of mouthwash as an oral antimicrobial agent...
against SARS-CoV-2 infection (Güner et al., 2020). In addition to mouthwash, herbs such as an anthill can also provide antimicrobial effects against bacteria, viruses, or fungi in the oral cavity (Balafif et al., 2019; Balafif et al., 2017; Balafif et al., 2022).

The oral cavity is potentially high-risk transmitter of COVID-19. Antimicrobial mouthrinses are used in many clinical preprocedural situations for decreasing the risk of cross-contamination in the dental setting. Besides other COVID-19 prevention measures such as facemasks, hand disinfection and social distancing, the use of throat sprays or mouthrinses containing antiseptic agents has been discussed for temporarily reducing viral titers in the oral cavity and oropharynx (Seneviratne et al., 2021). It is important to investigate the efficacy of mouthwash solutions against salivary SARS-CoV-2 in order to reduce the exposure of the dental team during dental procedures.

Methods

This study is a descriptive and qualitative literature review. The literature review text was structured according to the PRISMA items. The article was conducted of two databases and were limited to period January 2018 to Mei 2023, which had their full texts published in English with combination of the following keywords: “effect”, “mouthwash”, “oral”, “SARS CoV-2” associated by the Boolean operator AND. Duplicate articles, which were in different databases, were excluded from the review. Articles that appeared to meet the inclusion criteria, as well as articles that lacked information in their abstracts, were selected for full reading in phase 2, in order to determine the work eligibility. A supplementary article was included after checking the reference lists.

Results

The article selection (21 articles) were selected from Pubmed and Google Scholar. After reviewing titles and abstracts, 10 articles were excluded as they were not related to the review topic. 11 Articles were selected as they were related with the topic.

Effect of Mouthwash

Chlorhexidine is an antimicrobial agent that is commonly used in the preoperative preparation of skin to prevent postoperative infections, dental plaque prevention, and the prevention of ventilator- associated pneumonia. For prevention of viral spread from SARS-CoV-2-infected individuals to others, recommended use chlorhexidine gluconate 0.12% mouthwash is twice a day as follows: (1) spray 1 ml to the nares, (2) rinse the throat thoroughly with 15 ml for at least 30 s, and (3) use a spray applicator to spray the posterior throat three times (1.5 ml). This process may be continued until the virus is naturally cleared from the body, which takes approximately 2–3 weeks (Huang & Huang, 2021).

Povidone-iodine is a broad-spectrum antimicrobial that has been used in infection control for over 60 years. It is available in various preparations for use as a disinfectant for the skin, hands, mucosal surfaces well as for wound treatment and eye applications. Povidone-iodine 1% oral solutions are effective preprocedural mouthwashes against SARS CoV-2 in dental treatments (Ferrer et al., 2021).

Cetylpyridinium Chloride (CPC)-containing mouthwashes reduces viral spread. One-minute washes with inexpensive and accessible CPC solutions and persistence of effect up to 3 hours could become an important item of multilayer strategies for preventing SARS-CoV-2 spread (Alemany et al., 2022).

The virucidal effect of H2O2 at two concentrations (1.5% and 3%), verifying a minimal reduction in viral titer after 30s of interaction of H2O2 with the virus (Bidra et al., 2020).

The oral application of Benzalkoniumchloride (BAC) as antiseptic mouthrinse only mildly reduces viral infectivity in vivo, despite its high efficacy in vitro (Meister et al., 2022).
Discussion

Chlorhexidine has been shown to be effective in killing enveloped viruses due to its cationic nature. As SARS-CoV-2 is an enveloped virus, chlorhexidine has been shown to be effective against SARS-CoV-2. Costa et al examined that Chlorhexidine gluconate (0.12%) was effective in reducing salivary SARS-CoV-2 load for at least 60 min (Costa et al., 2022). In vivo study carried out with two patients affected by COVID-19, who were given mouthwash for 30s with 15 mL of 0.12% Chlorhexidine gluconate, showed that the viral load of SARS-CoV-2 in saliva significantly decreased and maintained is stable for 2 hours after application (Yoon et al., 2020).

Chaudhary et al. (2021) reported that there was no statistically significant decrease in viral load at both 15 and 45 min in the povidone-iodine group as compared to the isotonic saline group. Antiseptics are effective in the first stage of contamination, before they enter the cell in the early period (Gül et al., 2022).

CPC disrupts of the viral envelope by releasing cations that act by breaking the lipid envelope, which prevents fusion with the target cell. CPC 0.05% could slightly but significantly reduce viral load in SARS-CoV-2–positive patients (Bonn et al., 2023).

Efficacy of antiseptic mouth rinses (povidone-iodine, chlorhexidine, and H2O2) was obtained that povidone-iodine 1 % was the most effective rinse against SARS-CoV-2 especially in patients with low viral copy numbers at baseline. Low viral load is usually encountered in either asymptomatic patients or in patients in the recovering stage of the condition, which, despite their mild/moderate clinical symptoms, may continue to present a certain period of viral shedding, suggesting the possibility of transmission during their asymptomatic period (Fantozzi et al., 2022).

Conflict of interests

No conflict of interest.

References


