

Jurnal Info Kesehatan

Vol. 23, No. 4, Desember 2025, pp. 905-911

P-ISSN 0216-504X, E-ISSN 2620-536X

DOI: [10.31965/infokes.Vol23.Iss4.1978](https://doi.org/10.31965/infokes.Vol23.Iss4.1978)

Journal homepage: <https://jurnal.poltekkeskupang.ac.id/index.php/infokes>



RESEARCH

Open Access

An Experimental Study: *Aloe vera* Extract Mouthwash against Dental Plaque

Amakhul Husna^{1a*}, Rita Herlina^{1b}, Dian Femala^{1c}, Hima Mahda Nadia^{2d}, Hilda Azkiya^{3e}

¹ Department of Dental Health, Poltekkes Kemenkes Pontianak, Pontianak City, West Kalimantan, Indonesia

² Jakarta State Polytechnic, Jakarta, Indonesia

³ Universitas Indonesia, Jakarta, Indonesia

^a Email address: asmaul436@gmail.com

^b Email address: ritaherlinaaaa@gmail.com

^c Email address: j65073841@gmail.com

^d Email address: himamahdanadia@gmail.com

^e Email address: hilda.azkiyavan@gmail.com

Received: 19 August 2025

Revised: 9 November 2025

Accepted: 28 December 2025

Abstract

Recent studies have demonstrated the potential of *Aloe vera* as a natural agent in dental care based on in vivo and in vitro evidence; however, research evaluating its effectiveness as a mouthwash remains limited. This study aimed to assess the efficacy of *Aloe vera* mouthwash in reducing dental plaque among school-aged children in Indonesia. A structured experimental study with a pretest–posttest design was conducted involving 45 children aged 10–12 years in West Kalimantan. Dental plaque levels were measured using the Personal Hygiene Performance (PHP) Index before and after the intervention. The results showed that the mean dental plaque score decreased from 2.76 at baseline to 1.75 after the use of *Aloe vera* mouthwash. Statistical analysis using a paired t-test indicated a significant reduction in dental plaque scores following the intervention. In conclusion, *Aloe vera* mouthwash is effective in reducing dental plaque among children and may serve as a potential alternative preventive agent for periodontal disease.

Keywords: *Aloe vera*, Dental, Mouthwash, Plaque.

Corresponding Author:

Amakhul Husna

Department of Dental Health, Poltekkes Kemenkes Pontianak, Pontianak City, West Kalimantan, Indonesia

Email: asmaul436@gmail.com



©The Author(s) 2025. This article is distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

1. INTRODUCTION

Oral health is a global concern because 75% of the population in low- and middle-income countries (LMICs) experience dental problems (WHO, 2022). In Indonesia, dental caries and periodontal disease affect over 3/4 of the child population (Badan Penelitian dan Pengembangan Kesehatan, 2019). One of the mechanisms underlying periodontal diseases is plaque accumulation. Dental plaque occurs because several bacteria form biofilms on the surface of the teeth (Swastini, 2017). It needs to be controlled instead of being cleaned by physiological processes. As we know, most Indonesian children have not made brushing their teeth a daily routine (Maftuchan & Hadi, 2020). Therefore, one way to do this is by using mouthwash regularly (Brookes et al., 2023; Veseli & Breznica, 2024). It was simpler to use than brushing teeth (Pattnaik et al., 2022). Mouthwashes prevent plaque development by restricting the expansion and migration of oral bacteria (Al-Maweri et al., 2020). Mouthwash is also essential for preventing COVID-19 infections, which are still common in Indonesia, while it is no longer considered a public health emergency (Sinto, 2022; United Nations, 2023). It can lower the SARS-CoV-2 viral load, even though it does not directly eradicate the virus (Tsai & Wu, 2020).

The increasing use of antimicrobial drugs has raised concerns about microorganisms developing resistance against them (Bhaiyana et al., 2019). Chlorhexidine is a mouthwash ingredient that is the gold standard in dentistry (Kamath et al., 2020). Despite being an over-the-counter product, this agent has multiple negative effects, such as tooth discoloration, dysgeusia, and the development of calculus (Armianti, 2018; Sakaue et al., 2018). Thus, research using herbal substances has long been driven to look for agents that are less expensive and less harmful (Moghadam et al., 2020).

Some studies investigate the relationship between herbal medicine and dental plaque, and herbal oral care products, particularly in the form of mouth rinses, have a positive effect on plaque and gingivitis reduction (Anwar et al., 2025; Mehta et al., 2024; Tatikonda et al., 2014). *Aloe vera*, for instance, has the potential to be developed in Indonesia due to its ability to thrive in tropical climates (Sánchez et al., 2020). *Aloe vera* has many beneficial effects, such as anti-carcinogenic, antiviral, astringent, anti-inflammatory, anti-oxidant, bone regeneration, and an enhanced immune system, and contains micronutrients (Kamath et al., 2020; Moghadam et al., 2020; Sánchez et al., 2020; Vangipuram et al., 2016). Concerning dental issues, *Aloe vera* has been applied for treating oral ulcers, fungal infections, oral submucous fibrosis, and reducing dental plaque (Putri et al., 2013; Sánchez et al., 2020). Previous research has demonstrated that *Aloe vera* mouthwash is effective in reducing plaque and preventing gingivitis, but this finding was only observed in a sample of 17 children aged 8 to 12 years (Alnouri et al., 2020).

Although previous studies have demonstrated the antibacterial effect of *Aloe vera* mouthwash, no study in Indonesia has investigated the use of 100% *Aloe vera* extract among children aged 10–12 years. This study aims to fill this research gap by evaluating the effect of *Aloe vera* mouthwash on dental plaque reduction among Indonesian children.

2. RESEARCH METHOD

This study employed a quasi-experimental design with a single group, utilizing a pretest-posttest approach, and was followed for all methods and reports (Vlahov, 2004; Haynes et al., 2021). In this type, the outcome was assessed twice: before and after the intervention of a non-random group of participants in a particular treatment. The study was conducted over a one-month period (July–August 2021). The eligible population was children 10 – 12 years of age in Sungai Duri Village, Sungai Raya Subdistrict, Bengkayang Regency, West Kalimantan, who were recruited as participants. A total sampling method was used due to the limited number of eligible children aged 10–12 years (n=45) in Sungai Duri Village. This sample size is sufficient for paired analysis based on Cohen's recommendation for a medium effect size (power 0.80,

$\alpha = 0.05$). To control confounders, participants were instructed not to brush their teeth or eat for one hour before data collection and to maintain their usual brushing habits during the study period. The PHP Index instrument used to assess plaque has been validated in previous studies (Gupta et al., 2014), with good inter-rater reliability (Cronbach's $\alpha > 0.8$). Participants' rights were upheld, and they were fully informed about the study's benefits and the procedures' details. They gave assent, and their mother or guardian, who accompanied them from the start of the procedure, signed written informed consent. The study protocol was carried out by trained operators carefully and thoroughly.

The *Aloe vera* extract solution was made by hand from fresh leaves of *Aloe vera* using the infusion method. Before use, the leaves were cleaned under running water and cut finely. The extraction method was obtained by boiling the substance in water in a ratio of 1:1 (100 grams of *Aloe vera* with 100 ml of water) at a temperature of 90°C for 15 minutes. The aim was to filter the water-soluble active substance from vegetable materials using a flannel cloth and then put it in a packaging bottle when it was no longer hot. The solution was freshly prepared before starting data collection to maintain material stability and avoid microbiological contamination. Before administering the intervention, the dental plaque was collected between 9 – 10 am by dripping a disclosing agent under the participant's tongue. Since biofilm was hard to distinguish, a disclosing agent was used to color dental plaque that might not be visible. Following that, participants were instructed to rinse their mouth with a 100% concentration of *Aloe vera* extract for 30 seconds, ensuring the solution wetted the entire surface of the teeth. Dental plaque was collected for the second time after rinsing. The criteria of dental plaque were calculated using a scoring based on the Personal Hygiene Performance (PHP) Index. Examination was carried out systematically on (1) the labial surface of the upper right first incisor; (2) the labial surface of the lower left first incisor; (3) the buccal surface of the upper right first molar; (4) buccal surface of the upper left first molar; (5) the lingual surface of the lower right first molar. If the upper right first incisor was missing, it could be replaced by the upper left first incisor, and if the lower left first incisor was missing, it could be replaced by the lower right first incisor. This segment would not be assessed if the first incisor on the right or the left was missing. Index teeth were considered absent in several situations, such as missing due to extraction, containing remaining roots; jacket crowns made of either acrylic or metal, and more than half of the surface of the index tooth was missing or damaged by caries or fractures, and if the tooth eruption had not yet reached half the height of the clinical crown. Assessment could be carried out if at least two index teeth were examined and marked 1 with plaque and 0 with no plaque. The PHP index was formulated by dividing the total plaque score in all surface teeth by the total number of teeth assessed. Score criteria were classified as best if index PHP = 0, good (0.1 – 1.7), moderate (1.8 – 3.4), and poor (3.5 – 5). The researchers followed COVID-19 guidelines for protocol during data collection, ensuring that participants and data collectors always wore face masks and maintained social distancing. Hand sanitizer was utilized to ensure frequent hand washing during data collection.

The SPSS program version 18.0 (SPSS Inc., Chicago, Ill) was used for statistical analysis. Univariate analysis was carried out to present the percentage of variables. The Paired T-Test was utilized to assess the association between *Aloe vera* mouthwash and the reduction of dental plaque. The significance level was established at 0.05. The ethical clearance granted by the Ethics Commission in Health Research at Health Polytechnic, Ministry of Health, Pontianak, has been officially approved, indicated by the issuance of approval letter number 359/KEPK-PK.PKP/VII/2021.

3. RESULTS AND DISCUSSION

A total of 45 children took part in the study, with two measurements of dental plaque score. Regarding Table 1, the majority of participants initially had poor dental plaque scores

before rinsing with *Aloe vera* (42%). However, only 11% of participants fell into the poor category after the treatment.

Table 1. The distribution of frequency based on plaque score before and after the intervention

Dental Plaque Score	Before Intervention		After Intervention	
	n	%	n	%
Poor (3.5 – 5)	19	42.2	5	11.1
Moderate (1.8 – 3.4)	9	20.0	18	40.0
Good (0 – 1.7)	17	37.8	22	48.9
Total	45	100	45	100

Table 2 presents the result of the analysis using a T-Test. Following the intervention, a clear improvement in oral hygiene status was observed. Specifically, 14 of the 19 children (73.7%) who were initially classified in the “poor” category improved to either “moderate” or “good” plaque scores, while the proportion of participants in the “good” category increased from 37.8% before to 48.9% after rinsing. This shift indicates that more than half of the children experienced a clinically meaningful improvement in plaque control after using the *Aloe vera* mouthwash.

Table 2. Comparison of dental plaque score before and after intervention

Variable	Mean ± SD (Pre)	Mean ± SD (Post)	Mean Difference	T-Test	p-value
Dental plaque score	2.76 ± 0.84	1.75 ± 0.69	1.01	8.86	0.001*

The findings demonstrate a significant reduction in plaque scores after using 100% *Aloe vera* mouthwash, confirming its antibacterial efficacy. The novelty of this study lies in its focus on Indonesian children aged 10–12 years using 100% natural *Aloe vera* extract, which has not been previously documented in national or regional studies. Our study indicated that *Aloe vera* can reduce plaque dental score after rinsing with *Aloe vera* for half a minute. This significant result is comparable to other studies in India (Kamath et al., 2020; Vangipuram et al., 2016). These two studies also stated that *Aloe vera* was as effective as chlorhexidine in children. Compared with those previous research, the present findings suggest that *Aloe vera* could serve as a locally sourced, safer alternative to chlorhexidine in community oral health programs.

The mechanism of action occurs due to several compounds contained in *Aloe vera*. Aloin and Aloe-emodin in *Aloe vera* may hinder protein synthesis, while Acemannan indirectly combats bacteria through phagocytosis (Pattnaik et al., 2022). Saponin and flavonoids can destroy the structure of bacterial cells (Shamsudin et al., 2022). Tannin also works as an antibacterial (Farha et al., 2020). Prior studies show that *Aloe vera* has powerful antiseptic properties that effectively clean hard-to-clean areas like gum pockets (Pattnaik et al., 2022). Hence, gargling with *Aloe vera* mouthwash helps control plaque in the supragingival area, where dental plaque typically accumulates (Hamonari et al., 2021).

Several studies evidence *Aloe vera*’s numerous beneficial properties, including anti-inflammatory effects attributed to the presence of sterols and anthraquinones, as well as antiseptic activity due to the presence of lupeol, salicylic acid, phenols, and sulfur (Gupta et al., 2024). Moreover, it has demonstrated the ability to promote wound healing (Chelu et al., 2023; Hashemi et al., 2015). *Aloe vera* works by inhibiting the cyclooxygenase pathway, which reduces inflammation by decreasing prostaglandin synthesis from arachidonic acid. In vitro studies have also shown its antimicrobial effects, inhibiting various oral microorganisms like *Streptococcus mutans*, *Streptococcus sanguis*, *Actinomyces viscosus*, and *Candida albicans* (Arbab et al., 2021; Athiban et al., 2012). The observed low plaque scores in the study may be

attributed to the antibacterial properties of *Aloe vera*. However, there are a number of limitations to this study that should be taken into account when interpreting the findings. First, the design only assessed the immediate, short-term impact of a single *Aloe vera* rinse; as a result, it is unknown how long the observed plaque reduction will last over days or weeks. Second, the lack of a contemporaneous control group (placebo or active comparator like chlorhexidine) makes it more difficult for us to attribute the full observed benefit to *Aloe vera* instead of temporary mechanical rinsing, the elimination of revealing dye, or other time-related effects. Third, children may have improved their oral hygiene just because they were observed or because finishing the study increased their awareness, which could skew the results toward an overestimation of the intervention's effect (the Hawthorne effect).

We selected 100% *Aloe vera* as the maximum concentration because it had a stronger antibacterial. Previous studies demonstrated that the diameter of the zone of inhibition of 100% *Aloe vera* was bigger than the lower concentrations (Haynes et al., 2021; Kamath et al., 2020; Swastini, 2017). In some clinical settings, *Aloe vera* has been proven to eliminate various bacteria, such as *Candida albicans*, *Actinomyces*, strains of *Streptococcus*, and *Lactobacillus*, causing dental plaque. *Aloe vera* not only consists of potent antibacterial properties but also can alter the pH in the mouth, thereby disrupting the growth of bacteria (Prueksrisakul et al., 2015).

4. CONCLUSION

This study demonstrated that the use of *Aloe vera* mouthwash effectively reduced dental plaque and improved oral hygiene status among children. The intervention was well tolerated, with no adverse effects observed, indicating that *Aloe vera* is safe for short-term use. These findings suggest that *Aloe vera* has strong potential as a natural, affordable, and child-friendly alternative to chemical mouthwashes for plaque control. Nevertheless, as this study focused only on short-term outcomes and did not include a control group, further research using randomized controlled designs and longer follow-up periods is recommended to confirm its long-term effectiveness and comparative benefits.

REFERENCES

- Al-Maweri, S. A., Nassani, M. Z., Alaizari, N., Kalakonda, B., Al-Shamiri, H. M., Alhajj, M. N., ... & Alahmary, A. W. (2020). Efficacy of *Aloe vera* mouthwash versus chlorhexidine on plaque and gingivitis: A systematic review. *International journal of dental hygiene*, 18(1), 44-51. <https://doi.org/10.1111/idh.12393>
- Alnouri, D. M. A., Kouchaji, C., Nattouf, A. H., & AlSayed Hasan, M. M. A. (2020). Effect of *Aloe vera* mouthwash on dental plaque and gingivitis indices in children: A randomized controlled clinical trial. *Pediatric Dental Journal*, 30(1), 1–8. <https://doi.org/10.1016/j.pdj.2020.01.001>
- Anwar, M. A., Sayed, G. A., Hal, D. M., Hafeez, M. S. A. E., Shatat, A. A. S., Salman, A., ... & Aly, S. H. (2025). Herbal remedies for oral and dental health: a comprehensive review of their multifaceted mechanisms including antimicrobial, anti-inflammatory, and antioxidant pathways. *Inflammopharmacology*, 33(3), 1085-1160. <https://doi.org/10.1007/s10787-024-01631-8>
- Arbab, S., Ullah, H., Weiwei, W., Wei, X., Ahmad, S. U., Wu, L., & Zhang, J. (2021). Comparative study of antimicrobial action of *Aloe vera* and antibiotics against different bacterial isolates from skin infection. *Veterinary Medicine and Science*, 7(5), 2061–2067. <https://doi.org/10.1002/vms3.488>
- Armiaati, I. G. K. (2018). Penurunan jumlah koloni *Streptococcus mutans* dalam rongga mulut oleh ekstrak etanol kulit daun lidah buaya. *Interdental Jurnal Kedokteran Gigi (IJKG)*, 14(1), 1-4. <https://doi.org/10.46862/interdental.v14i1.364>

- Athiban, P., Borthakur, B., Ganesan, S., & Swathika, B. (2012). Evaluation of antimicrobial efficacy of *Aloe vera* and its effectiveness in decontaminating gutta-percha cones. *Journal of Conservative Dentistry*, 15(3), 246–248. <https://doi.org/10.4103/0972-0707.97949>
- Bhaiyana, S., Puri, A., Nangia, R., & Bhat, N. (2019). Antibacterial effect of *Aloe vera* gel against plaque and caries bacteria: an in-vitro study. *International Journal of Health and Clinical Research*, 2(3), 21–25.
- Brookes, Z. L. S., McCullough, M., Kumar, P., & McGrath, C. (2023). Mouthwashes: Implications for Practice. *International Dental Journal*, 73, S98–S101. <https://doi.org/10.1016/j.identj.2023.08.013>
- Chelu, M., Musuc, A. M., Popa, M., & Calderon Moreno, J. (2023). *Aloe vera*-based hydrogels for wound healing: properties and therapeutic effects. *Gels*, 9(7), 539. <https://doi.org/10.3390/gels9070539>
- Farha, A. K., Yang, Q. Q., Kim, G., Li, H. B., Zhu, F., Liu, H. Y., ... & Corke, H. (2020). Tannins as an alternative to antibiotics. *Food Bioscience*, 38, 100751. <https://doi.org/10.1016/j.fbio.2020.100751>
- Gupta, R. K., Gupta, D., Bhaskar, D. J. ohn, Yadav, A., Obaid, K., & Mishra, S. (2014). Preliminary antiplaque efficacy of *Aloe vera* mouthwash on 4 day plaque re-growth model: randomized control trial. *Ethiopian Journal of Health Sciences*, 24(2), 139–144. <https://doi.org/10.4314/ejhs.v24i2.6>
- Hamonari, N., AL-Dabbagh, S. A., & Mudhir, A. M. (2021). The effect of aloe vera mouthwash in reducing periodontal disease among secondary school students in Duhok, Kurdistan Region, Iraq: a quasi-experimental study. *Indian Journal of Forensic Medicine & Toxicology*, 15(3), 3707-3714. <https://doi.org/10.37506/ijfmt.v15i3.15873>
- Hashemi, S. A., Madani, S. A., & Abediankenari, S. (2015). The review on properties of *Aloe vera* in healing of cutaneous wounds. *BioMed research international*, 2015(1), 714216. <https://doi.org/10.1155/2015/714216>
- Haynes, A. B., Haukoos, J. S., & Dimick, J. B. (2021). TREND reporting guidelines for nonrandomized/quasi-experimental study designs. *JAMA surgery*, 156(9), 879-880. <https://doi.org/10.1001/jamasurg.2021.0552>
- Kamath, N. P., Tandon, S., Nayak, R., Naidu, S., Anand, P. S., & Kamath, Y. S. (2020). The effect of *Aloe vera* and tea tree oil mouthwashes on the oral health of school children. *European Archives of Paediatric Dentistry*, 21(1), 61-66. <https://doi.org/10.1007/s40368-019-00445-5>
- Badan Penelitian dan Pengembangan Kesehatan. (2018). *Laporan Nasional Riskesdas 2018*. Jakarta: Badan Penelitian dan Pengembangan Kesehatan.
- Maftuchan, M., & Hadi, E. (2020). Kiddie doctors education strategy in improving the knowledge, attitude, and oral hygiene status of elementary school children. *Journal of International Society of Preventive and Community Dentistry*, 10(5), 549–554. https://doi.org/10.4103/jispcd.JISPCD_116_20
- Mehta, V., Mathur, A., Tripathy, S., Sa, R., & Sharma, T. (2024). Effectiveness of herbal oral care products in reducing dental plaque and gingivitis: an overview of systematic reviews. *Canadian Journal of Dental Hygiene*, 58(2), 120. Retrieved from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC11223638/>
- Moghadam, E. T., Yazdanian, M., Tahmasebi, E., Tebyanian, H., Ranjbar, R., Yazdanian, A., ... & Tafazoli, A. (2020). Current herbal medicine as an alternative treatment in dentistry: In vitro, in vivo and clinical studies. *European journal of pharmacology*, 889, 173665. <https://doi.org/10.1016/j.ejphar.2020.173665>
- Pattnaik, N., Mohanty, R., Satpathy, A., Nayak, R., Shamim, R., & Praharaj, A. K. (2022). *Aloe vera* mouthwashes can be a natural alternative to chemically formulated ones – A

- randomized-controlled trial. *Journal of Taibah University Medical Sciences*, 17(3), 424-432. <https://doi.org/10.1016/j.jtumed.2021.10.006>
- Prueksrisakul, T., Chantarangsu, S., & Thunyakitpisal, P. (2015). Effect of daily drinking of *Aloe vera* gel extract on plasma total antioxidant capacity and oral pathogenic bacteria in healthy volunteer: A short-term study. *Journal of Complementary and Integrative Medicine*, 12(2), 159–164. <https://doi.org/10.1515/jcim-2014-0060>
- Putri, M., Herijulianti, E., & Nurjannah, N. (2013). *Ilmu Pencegahan Penyakit Jaringan Keras dan Jaringan Pendukung Gigi*. Jakarta: EGC.
- Sakaue, Y., Takenaka, S., Ohsumi, T., Domon, H., Terao, Y., & Noiri, Y. (2018). The effect of chlorhexidine on dental calculus formation: An in vitro study. *BMC Oral Health*, 18(1), 52. <https://doi.org/10.1186/s12903-018-0517-3>
- Sánchez, M., González-Burgos, E., Iglesias, I., & Gómez-Serranillos, M. P. (2020). Pharmacological update properties of *Aloe vera* and its major active constituents. *Molecules*, 25(6), 1324. <https://doi.org/10.3390/molecules25061324>
- Shamsudin, N. F., Ahmed, Q. U., Mahmood, S., Ali Shah, S. A., Khatib, A., Mukhtar, S., ... & Zakaria, Z. A. (2022). Antibacterial effects of flavonoids and their structure-activity relationship study: A comparative interpretation. *Molecules*, 27(4), 1149. <https://doi.org/10.3390/molecules27041149>
- Sinto, R. (2022). COVID-19 Pandemic-to-endemic transition in Indonesia: What does the future hold?. *Acta Medica Indonesiana*, 54(2), 159-159. Retrieved from: <https://www.actamedindones.org/index.php/ijim/article/view/2158>
- Swastini, I. G. A. A. P. (2017). Daya Hambat Ekstrak Daun Lidah Buaya (*Aloe vera* L) Terhadap Bakteri *Streptococcus mutans* Penyebab Dental Plak: The Inhibition of *Aloe vera* Rind Extract to The Growth of Bacteria *Streptococcus Mutans* Caused of Dental Plaque. *Jurnal Sangkareang Mataram*, 3(2), 6-10. Retrieved from: <https://sangkareang.org/index.php/SANGKAREANG/article/view/227>
- Tatikonda, A., Debnath, S., Chauhan, V., Chaurasia, V., Taranath, M., & Sharma, A. (2014). Effects of herbal and non-herbal toothpastes on plaque and gingivitis: A clinical comparative study. *Journal of International Society of Preventive and Community Dentistry*, 4(5), S126–S129. <https://doi.org/10.4103/2231-0762.146220>
- Tsai, C. L., & Wu, P. C. (2020). Possible beneficial role of throat gargling in the coronavirus disease pandemic. *Public health*, 185, 45–46. <https://doi.org/10.1016/j.puhe.2020.05.055>
- United Nations. (2023). *WHO chief declares end to COVID-19 as a global health emergency*. UN News. <https://news.un.org/en/story/2023/05/1136367>
- Vangipuram, S., Jha, A., & Bhashyam, M. (2016). Comparative efficacy of *Aloe vera* mouthwash and chlorhexidine on periodontal health: A randomized controlled trial. *Journal of Clinical and Experimental Dentistry*, 18(4), 442–447. <https://doi.org/10.4317/jced.53033>
- Veseli, E., & Breznica, E. (2025). Mouthwash use in children and adolescents: should parents be worried?. *European Archives of Paediatric Dentistry*, 26(4), 813-814. <https://doi.org/10.1007/s40368-024-00991-7>
- Vlahov, D. (2004). Transparent reporting of evaluations with nonrandomized designs (TREND). *Journal of Urban Health*, 81(2), 163-164. <https://doi.org/10.1093/jurban/jth099>
- WHO. (2022). *Global Status Report on Oral Health 2022*. Geneva: WHO. Retrieved from: <https://www.who.int/team/noncommunicable-diseases/global-status-report-on-oral-health-2022>