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Original Research

Effect of aroma gargle and mouthwash on halitosis and xerostomia- A systematic review

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ABSTRACT:
Background: Halitosis and Xerostomia causes unpleasant situations, and it causes social and psychological disadvantages for an individual. The Indian population, around 25% per cent, is affected by xerostomia, which is interlinked with Halitosis. **Aim:** The objective of this study is to study the effect of a cosmetic type of mouthwash, aroma mouth gargle, and its effect on conditions such as Halitosis and xerostomia. **Materials and Methods:** Published article based on the effects of aroma mouthwash and mouth gargling on the oral health conditions of Halitosis and xerostomia. It includes articles from PubMed, Google Scholar, Science Direct and Research Gate. **Results:** This research resulted in 300 articles, of which 20 were full-length articles having accessibility and are eligible for review. Finally, four articles were selected for this systematic review. **Conclusion:** Aroma mouthwashes are concluded that they are safe to use in different systematic conditions and other conditions through various randomised control trials. It is advised to be used in conditions such as dysphagia, periodontitis and oral infection, as it produces the same effects of as chlorohexidine. It is highly effective for Halitosis and xerostomia.

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INTRODUCTION

Halitosis, which is a term for foetor oris, bad breath,odour, smelly breath,is a condition that can be caused by extra-oral or intra-oral changes. Halitosis refers to different types of unpleasant smells felt from an individual's breath during exhalation, inhalation, and speech.[1]Halitosis {origin: from Latin halitus 'breath air'+ English osis 'pathological alteration'}.Prevention of bad breath is not something from the present; it was described by Greek and Roman people in ancient times. The importance of bad breath prevention was given by Islamic and Jewish religions, and the use of Siwak is considered a religious practice by Muslims [2].This condition is were a disagreeable or unpleasant odour is emitted by the mouth during the breathing process, which causes unpleasant situations [3], and it causes social and psychological disadvantages for an individual.

Bad breath is taboo, which questions an individual's oral health hygiene, but not all the time halitosis is caused by poor oral health; it is also an indication of many health problems. It is a common condition; in the Indian population, about 5% had Halitosis, and 75% had halitophobia. Nearly 50 million Indian population is affected by Halitosis. Halitosis is an indication of many pathological conditions, such as a condition called xerostomia. Xerostomia {origin: Greek xeros 'dry' + stoma 'mouth'}[4]. Xerostomia is a sensation that occurs due to dryness and is subjected to hyposecretion and the function of salivary glands [5]. It is a condition of oral dryness, a burning sensation, and causes swallowing difficulty and alters and decreases the taste sensation. A pathological condition such as sialoliths causes the decreased secretion of saliva, causing the oral cavity to dry, which causes Halitosis. A dry mouth due to less saliva

secretion causes insufficient flushing of the oral cavity, and stagnant food debris may lead to other oral health problems such as dental caries and radiotherapy and chemotherapy given during cancer treatment. The Indian population, around 25% per cent, is affected by xerostomia, which is interlinked with Halitosis. Though xerostomia is seen commonly in the adult group, Halitosis affects the toddler and growing stage group due to poor adult attention. [6]

Mouth gargle is a medicinal solution that is used for oral hygiene to rinse out bacterial infections and reduce pain due to infections such as influenza, ulcers, or allergies to provide relief in the mouth. Recent discoveries and research on airborne viral infections, such as Sars-Co v and Mers V[7], most commonly target the respiratory and oral route, which in question a person's oral health hygiene.The most common type of mouth gargle is betadine solution, which is used to relieve pain and consists of a 2% povidone-iodine solution. Ingredients consist of alcohol with the active ingredient menthol and thymol, which controls plaque. The percentage contributed is around 27%.[8].The active ingredient for analgesic-producing effects is benzydamine. To neutralize it, benzoic acid is added for a buffer effect. The antiseptic effect of chlorhexidine digluconate is 0.05% -0.2% for plaque inhibition.[9]

Gargle is mostly used to eliminate bacteria, spores, fungi, viruses, and simple organisms. It works by inhibiting the growth of infectious-causing microbes. Used in gingivitis (inflammation of gums), prevention for sore throat, and infection of oral mucosal lining.

Mouthwash is a rinsing liquid(aq) that is used to rinse teeth, gums, and mouth. It contains antiseptic to kill bacteria that reside in the active surface of the tooth, tongue, and interdental spaces.Mouthwash is classified into two groups: one is therapeutic, and the other is cosmetic uses. Therapeutic mouthwash shows an anti-plaque effect, and it has active ingredients such as chlorhexidine, essential oils, peroxide, etc.Cosmetic mouthwash has a temporary effect, which temporarily controls bad breath {Halitosis} and contains extra added ingredients which leave a pleasant taste after use; the function is limited, which gives it a rapid rise in demand, but due to the temporary effect, it does not benefit other ways. Aroma gargle is a cosmetic mouthwash that consists of eucalyptol and menthol. [10, 11]

Mouth wash and mouth gargling have common uses to maintain oral hygiene, but they vary in active ingredients. Mouthwash dominantly contains chlorhexidine as the active ingredient, and mouth gargles have betadine as the active ingredient. A common function of both is an antimicrobial and anti-inflammatory effect, working against spores and gum inflammation and tongue flushing out food debris on the surface to avoid plaque formation, which might lead to Halitosis.The objective of this study is to study the effect of a cosmetic type of mouthwash, aroma mouth gargle, and its effect on conditions such as Halitosis and xerostomia.

MATERIAL AND METHODS

ELIGIBILITY CRITERIA

Inclusion criteria

- This study includes a randomized control trial that was done between 2000-2023
- It consists of full-length text articles from web engines such as PubMed, Google Scholar, Science Direct and Research Gate.
- It elaborates on the articles on the effect of aroma gargling and mouthwash.

Exclusion criteria

- The study consists of full-length articles curated in a single language (English)
- It includes materials in which the aroma mouthwash and gargling are not effective for oral health hygiene and do not affect the condition of xerostomia and Halitosis.

SEARCH STRATEGY

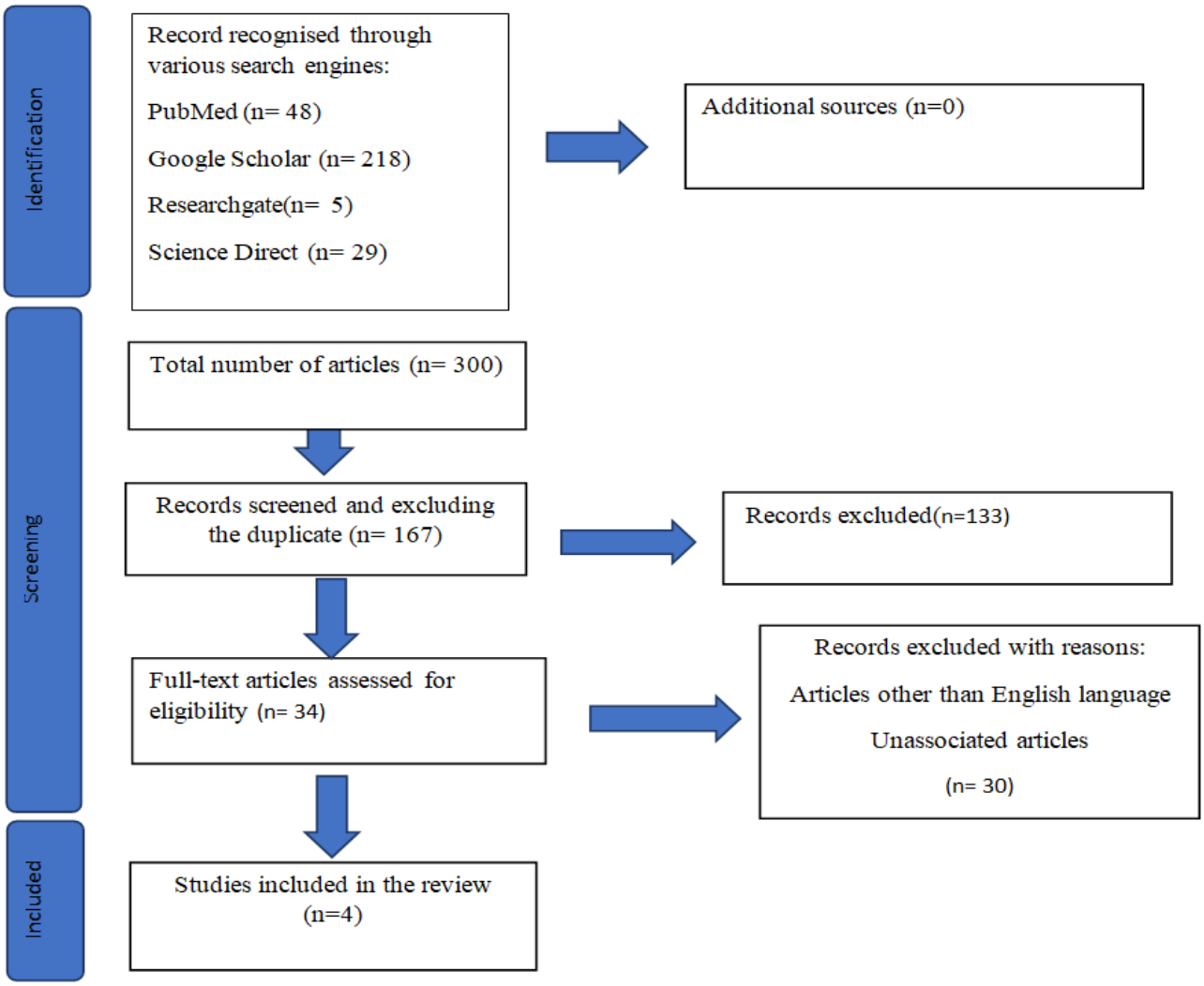
Published article based on the effects of aroma mouthwash and mouth gargling on the oral health conditions of Halitosis and xerostomia. It includes articles from PubMed, Google Scholar, Science Direct and Research Gate.

RESULTS

This research resulted in 300 articles, of which 20 were full-length articles having accessibility and are eligible for review. Finally, four articles were selected for this systematic review.

Figure 1: Flow chart showing the number of studies identified, screened, assessed for eligibility, excluded and included in the systematic review.

PRISMA FLOWCHART



[Figure 1] The search resulted in 300 articles, out of which 34 were full-text articles assessed for eligibility. Four articles were used in this systematic review.

Table 1: Characteristics of interventions in the study

S.no	Author name	Year	Sample size	Patient characteristics	Duration	Patient Allocation
1.	Roza Haghgoo etal. [12]	2013	84	Students of age 14- 18 years who suffered from Halitosis.	One week	Group 1- Peppermint mouth rinse group (n= 43). Group 2- Placebo group (n= 41).
2.	Min Young Oh etal.[13]	2013	56	Haemodialysis patients of Eulji General Hospital, Seoul, undergoing the treatment three times a week for more than three weeks with ages between 20- 75 years	1.5 months	Group 1- Aroma solution gargling group (n= 28) Group 2- Control Group (n= 28)
3.	P. Satthanakul et al.[14]	2014	20	Healthy Volunteers without any visible oral diseases.	Eight days	Group 1- Lemongrass mouth rinse group (n= 10) Group 2- Placebo group (n= 10)
4.	Mohamed Saaed M Ali et al.[15]	2020	54	Dental students of age 19- 23 years who are without any systemic diseases.	One month	Group 1- Oregano Essential oil mouthwash group. Group 2- Chlorhexidine

						Mouthwash group. Group 3- Placebo group.

Table 1 shows the characteristics of the studies included in the systematic review. In all 4four studies, different types of aromatic mouthwash were used for the treatment of Halitosis; all the studies differ in the age of the patients, sample numbers and duration of the outcome.

Table 2- Characteristics of the primary outcome and results of the studies included in the systematic review.

S.no	Authors name	Year	Effect measure	Result
1.	Roza Haghgoo etal. [12]	2013	15- 20 ml of given mouthwash were swished for 30 seconds, three times a day and without any food intake for the next 30 minutes. Halitosis level was evaluated after seven days.	Peppermint mouth rinse was more effective than placebo mouthwash in eliminating Halitosis significantly in 23 out of 43 participants. ($p<0.02$).
2.	Min Young Oh et al. [13]	2013	Gargling with 20 ml Aroma solution at baseline, 5, 30, 60, and 120 minutes. Objective halitosis was measured using a portable halitosis detector. Xerostomia and subjective halitosis were analysed using Visual analogue scale (VAS)	Gargling with aroma solution reduces Xerostomia and Halitosis significantly, with the mean difference of 1.89±1.50 (Xerostomia), 1.00±1.49 (Subjective Halitosis), 1.75±0.89 (Objective halitosis) with p-value <0.001.
3.	P. Satthanakuletal. [14]	2014	15 ml of the given sample was used as a mouth rinse for 1 minute twice a day. Halitosis is measured using haltimeter for volatile sulphur compounds (VSC) at the end of the eighth day.	Lemongrass mouth rinse reduces VSC by 50.6% at baseline and 52.1% for seven days.
4.	Mohamed Saaed M Ali et al.[15]	2020	15 ml of given mouthwash was used for 30 seconds after 30 minutes of toothbrushing. Halitosis was measured using an organoleptic test and BANA test at baseline and after seven days.	The oregano essential oil group and chlorhexidine (CHX) group showed a significant reduction in Halitosis after seven days with the mean difference of 1.77±0.54, 0.94±0.72 (organoleptic tongue scores for oregano essential oil and CHX mouthwash group, respectively.), 1.94±0.3 (organoleptic floss scores for oregano essential oil and CHX mouthwash group, respectively.), 1.0±0.48 (BANA test scores for oregano essential oil and CHX mouthwash group, respectively.) with p- value 0.001.

Table 2 shows the characteristics of the primary outcome and result of the studies, including a progressive decrease in Halitosis and xerostomia with the use of different aroma mouthwash with a notable p-value.

Table 3- Bias analysis as included in the studies.

S.no	Authorname and year	Random sequence generation	Allocation concealment	Blinding of outcome	Incomplete outcome data	Blinding participants and personal	Selective reporting
1.	Roza Haghgoo et al. (2013) [12]	?	?	-	+	-	+
2.	Min Young Oh et al.(2013) [13]	+	+	+	+	?	+
3.	P. Satthanakul et al. (2014) [14]	+	?	+	?	+	+
4.	Mohamed Saaed M Ali etal. (2020) [15]	+	+	-	+	-	+

+ = low risk of bias, - = high risk of bias, ? = unclear risk of bias

Table 3 shows the bias analysis of the included studies.

DISCUSSION

Halitosis is a highly problematic condition for health, which leads to many systematic diseases and unpleasant aesthetics, which further affects the individual person. One such systematic condition is xerostomia. Xerostomia is one such disease, which is a sequel condition of Halitosis, which addresses other systematic diseases; such systematic conditions expressed are dysphagia, oral pain, dental caries, oral infection, and periodontal diseases.

Roza Haghgoo et al. (2013) from Tehran reported that a clinical trial was conducted on 84 high school having complaints of malodor; the group of students were divided into mouthwash and placebo control, the 43 subjects for mouthwash and 41 subjects for the placebo group, around 24.4%of all the subject had a prevalence of Halitosis, after a week later of the clinical trial, the report was out stating that, out of 43 subjects of mouth wash group 23 subjects were not seen having Halitosis and out of 41 subjects around 30 students exhibited Halitosis, result shows that use of peppermint mouth wash have significant effect on halitosis control and elimination.Further, this trial did not report the trial duration and

the method used for blinding information has not been provided.Min Young Oh et al. (2013) reported a controlled trial conducted on 56 subjects who were under hemodialysis. The group was divided into two, one experimental and the other a controlled group. Number of experimental group n=28 and control group n=28. The experimental group were treated with an aroma gargle of 20ml the duration of the gargle was 15 seconds, and a control group of n=28 subjects was not provided with an aroma gargle. The data of the clinical trial was collected from duration October 1 to November. The result of the trial concluded that the experimental group had a lower level of xerostomia than the control group and prominently differed in the interaction between the group and time point. The levels of salivary pH and halitosis level differ between the two groups. Hence the study concludes that an aroma solution is used fully to maintain oral health and hygiene.P. Satthanakul et al. reported a randomized control trial on 20 healthy subjects. The experiment was a double-blinded control trial. The control trial was based on the antimicrobial properties and activity of lemon grass, which is most commonly used as a mouth-rinsing solution; it was examined against common odour-causing microorganisms. Those bacteria were aggregatibacter andactinomycetemcomitans. The study is done using broth microdilution assay and through the disc diffusion method. In this trial, the volatile sulphur compound level is tracked using a halimeter. The duration was of the week; halimeter is used from day 0 to day eight on each subject. Concluded that lemongrass mouth rinse solution reduces the oral malodour, but it leaves a burning sensation, which is commonly caused by spices.Mohamed Saeed Ali et al. reported a double-blinded randomized control trial was conducted on 54 dental students with oral Halitosis. They were divided into three groups and had trials with three different solutions. Solutions were oregano, chlorhexidine and placebo, and they were given instruction to rinse each with 15 ml of assigned mouthwash solution and were instructed to use it twice a day. The duration of the trial was 7 days, and the level of Halitosis was measured. Measurement is done by two methods, organoleptic and BANA (N-benzoyl-Dl-arginine-naphthylamide), for seven days of use of mouth solution. Both uses of oregano and chlorohexidine were recorded with the reduction in organoleptic tongue and floss scores, and BANA scores were recorded for seven days of the trial. There was not much of a drastic difference between both oral solutions recorded in 7 days of trial. Thus aroma mouthwashes and gargle significantly reduce halitosis and xerostomia.

CONCLUSION

Aroma mouthwashes are concluded that they are safe to use in different systematic conditions and other conditions through various randomised control trials. It is advised to be used in conditions such as dysphagia, periodontitis and oral infection, as it produces the same effects of as chlorohexidine. It is highly effective for Halitosis and xerostomia.

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