

Effectiveness of Chewing Gum to Alleviate Xerostomia: A Systematic Review

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Abstract:- Xerostomia is also known as dry mouth. Dry mouth is one of the major discomforts seen in the oral cavity and can be compromised by dietary intake and quality of life. Chewing gum plays a role in saliva substitutes and is soft and sticky while chewing. The aim is to evaluate the impact of chewing gum on xerostomia by conducting a systematic review. A systematic review was selected based on a literature search using the search engine database by appropriate MeSH terms and further followed by Cochrane database bias assessment were done by PRISMA guidelines. Four randomised controlled studies were included. Among those four studies, the p-value is significant on the effectiveness of chewing gum in relieving pain and has increased saliva secretion in the mouth. Chewing gum has an advantage in saliva substitutes, relieving pain and discomfort in the oral cavity. While chewing the chewing gum, it has an adequate secretion of saliva to wet the oral cavity or mouth. Hence, there is a significant pain reduction in the use of chewing gum to relieve or alleviate in xerostomia patients.

Keywords:- Chewing gum, xerostomia, saliva, dry mouth, pain.

I. INTRODUCTION

Xerostomia means the oral cavity becomes dry [1]. Dry mouth is a common symptom, complex and under-recognised condition, and it is typically associated with the reduced salivary flow [2]. Saliva is fluid present in the oral cavity and has protective functions, including cleansing in the mouth, facilitating speech and swallowing, protecting oral tissues (including teeth) against physical and microbial offend, and maintaining a neutral pH between 6-7.4 [3]. The reduced rate of salivary flow can cause difficulty in taste, mastication, deglutition; it can also occur with the chance of dental caries, periodontal diseases, hypersensitivity, and mucosal lesions [4]. There are various potential causes of xerostomia, which includes dehydration, under any medication, chemotherapy or radiotherapy, chronic diseases, and any other nerve damage [5].

Xerostomia can cause the complications like a sticky, dry mouth or burning sensation in the oral cavity, difficulties in mastication, swallowing, change in the taste of spicy, salty or sour food intolerance, cracked, peeling of lips, a dry or rough tongue, mouth sores, oral candidiasis, bad breath and inability to retain dentures or poorly fitting removable prostheses [6,7]. The other cause of diseases like Sjogren's syndrome [8,9], diabetes [10,11,12], depression [13,14], anaemia [15], bulimia[16] and genetic disorders (i.e., Down syndrome [17], Prader-Willi syndrome [18,19].) Problems with dry mouth were also observed in alcoholics [20], cigarette smokers [21] and drug addicts [22,23,24,25].

Living with reduced saliva secretion is difficult and leads to serious health problems such as xerostomia. In that particular situations, therapeutic procedures for stimulation of saliva secretion are used. However, in some cases, salivary gland damage requires continuous use of saliva substitutes [26,27].

Xerostomia can potentially be improved by curative therapy, such as saliva substitutes[28]. Reduced saliva is diagnosed when the amount of salivary flow is less than the amount of absorption of fluid in the oral mucosa [29]. The frequent cause of decrease flow in the saliva is the use of certain medications like anticoagulants, antidepressants, antihypertensives, antiviral drugs, hypoglycaemics, levothyroxine, multivitamins and supplements, non-steroidal anti-inflammatory drugs, and steroid inhalers, followed by chemotherapy or radiotherapy to the head and neck, and Sjogren's syndrome [30]. The other factors also include depression, stress, or other nutritional deficiencies [31]. Dry mouth is one of the major problems, and it causes dental caries in the oral cavity. Dental caries is a major public problem, and it should be prevented because, for this reason, the dry mouth should be managed as soon as possible if the symptoms persist. Therefore, the aim is to evaluate the impact of chewing gum to relieve the pain in the dry mouth.

II. MATERIALS AND METHOD

A total of 197 articles were searched using among those four articles are included in this study is used under the PRISMA guidelines, and this systematic review was done using chewing gum to relieve xerostomia.

A. Eligibility Criteria:

➤ Inclusion criteria:

1. Studies published in English
2. Articles on chewing gum and xerostomia
3. Full- text articles

➤ Exclusion criteria:

1. Only abstracts available
2. Unrelated articles
3. Articles published in other languages.

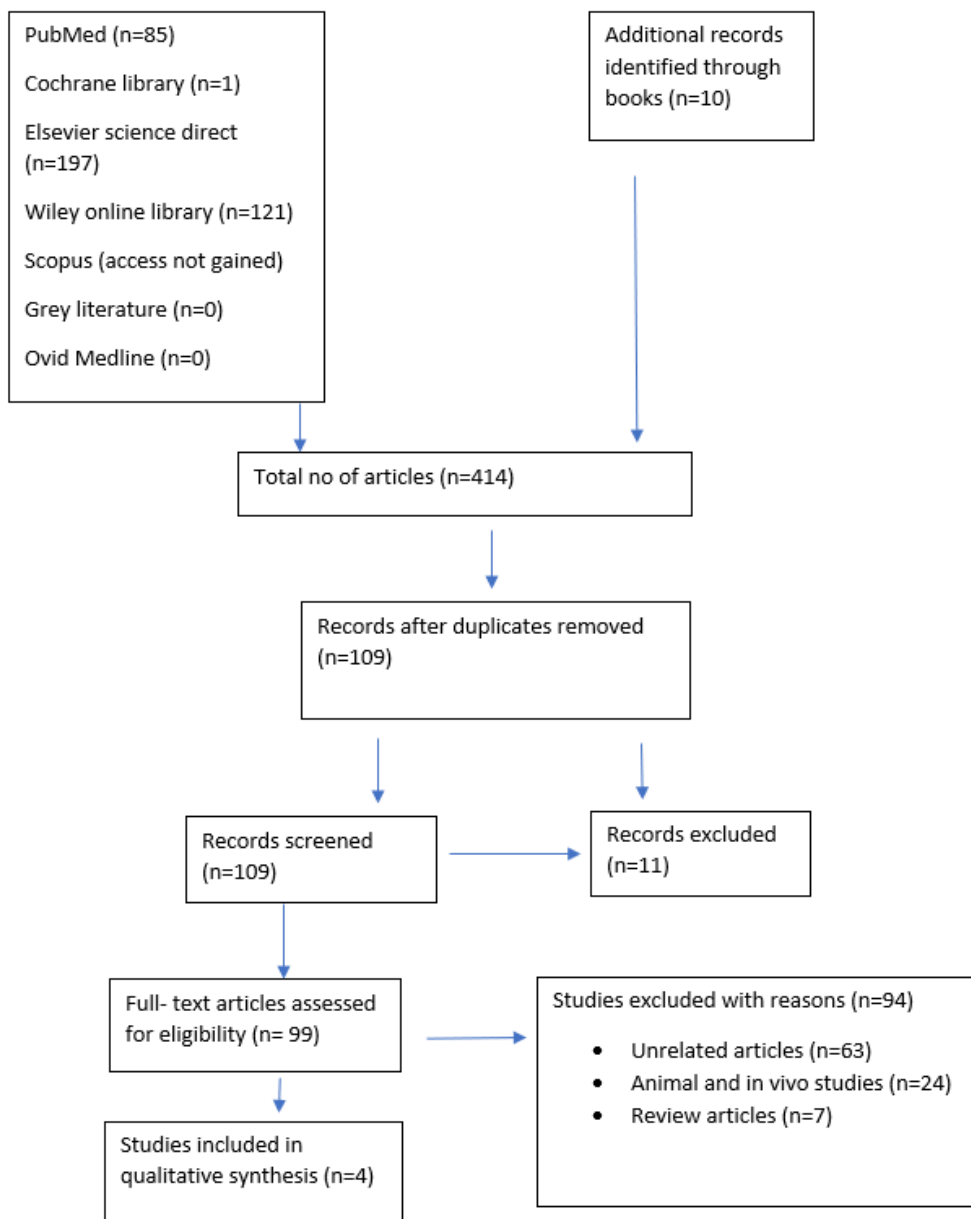


Fig 1:- shows the identified, screened, assessed for eligibility, excluded and included studies in the systematic review.

B. Search Engines:

- PubMed
- Wiley online library
- Cochrane library
- Elsevier science direct
- Prospero
- Cinahl
- OSF
- Ovid Medicine
- Grey literature

After the search using the appropriate MeSH terms, a total of 197 articles were found from the Cochrane databases bias assessment. After duplicates removal of 111 articles were screened, and 74 full-text articles were available. Next Inclusion-exclusion criteria were applied, and finally, four related articles were selected for further assessment.

III. RESULTS

S.NO	AUTHOR	YEAR	PLACE OF THE STUDY	NO OF SAMPLES	INTERVENTION	DURATION
1	BOTS et al[31]	2005	Holland	65	Xerostomia was assessed at baseline and after each period of treatment Chewing gum was used for two weeks and then the other regimen if for wash out period	Xerostomia Chewing gum
2	SAID & MOHAMMED et al[32]	2013	Egypt	60	They elevated Xerostomia and salivary flow before and after each session One or two pieces of chewing gum is used for ten minutes and six times a day	Xerostomia Chewing gum
3	FAN et al[33]	2013	China	11	Rinsing is done for two weeks using thin straw to suck water They got chewing gum six to ten times a day when they felt dry	Xerostomia Chewing gum
4	DAVIES et al[34]	2000	England	43	Artificial mucin-based saliva to relieve Xerostomia in patient with an advanced stage of cancer They received chewing gum or artificial saliva to be used before meals for ten minutes	Xerostomia Chewing gum

Table 1:- Characteristics of the intervention in the included studies

Table 1: shows the characteristics of the intervention in the included studies. In all above, the effectiveness of chewing gum was reviewed.

S.NO	AUTHOR NAME & YEAR	STUDY DESIGN	OUTCOME	P- VALUE
1	BOTS et al 2005[31]	Cross over randomized clinical trial	Use of chewing gum decreases xerostomia. Chewing gum and the salivary substitute show effects in thirst	P<0.05
2	SAID & MOHAMMED et al 2013[32]	Quasi experimental study	Use of chewing gum relieves xerostomia. Chewing gum will significantly increase the salivary flow rate	P- value is not mentioned
3	FAN et al 2013[33]	Cross over randomized clinical trial	Use of thin straw will significantly reduce thirst and increase the salivary flow	P= 0.001
4	DAVIES et al 2000[34]	Cross over randomized clinical trial	There is an effectiveness in the relief of xerostomia in patients with cancer, if chewing gum is used	P=0.33

Table 2:- Outcome data as reported in included studies

Table 2: shows an outcome and result of the effectiveness of chewing gum in the studies as mentioned above.

S.NO	AUTHOR NAME & YEAR	RANDOM SEQUENCE GENERATION	ALLOCATION CONCEALMENT	SELECTIVE REPORTING	INCOMPLETE OUTCOME DATA	BLINDING OF OUTCOME ASSESSMENT	BLINDING PARTICIPANTS AND PERSONALS
1	BOTS et al 2005[31]	++	++	++	++	++	-
2	SAID & MOHAMMED et al 2013[32]	++	++	-	++	++	++
3	FAN et al 2013[33]	++	++	++	++	++	?
4	DAVIES et al 2000[34]	++	++	++	++	++	?

Table 3:- Bias analysis of included studies

Table 3: shows the bias analysis of all the included studies based on PRISMA guidelines. It is categorised as high-risk bias "-", low-risk bias "+" and unclear "?".

IV. DISCUSSION

The effect of chewing gum in the oral cavity is to increase the salivary flow rate, which leads a patient to get relief from being thirsty. There is an increased discomfort caused by thirst are generalised dehydration is present in the oral cavity. It is caused due to reduced salivary flow, atrophy and fibrosis of the salivary glands, use of drugs and restriction of fluid intake.

BOTS et al, reported that the use of Chewing gum as mechanical stimulation might increase saliva secretion and relieves dry mouth. It is a cross over randomised controlled trial, and the p-value is less than 0.05, which is statistically significant, and the study reveals that the effect of chewing gum alleviates xerostomia [31].

SAID & MOHAMMED, reported a significant decrease in weight gain and increased salivary flow with chewing gum. It is a quasi-experimental study, and the p-value is statistically significant and also the study reveals that the effect of chewing gum alleviates xerostomia [32].

FAN et al, reported that with chewing gum, there was a relief of xerostomia and decreased thirst and weight gain. It is a cross over randomised controlled trial, and the p-value is 0.001, which is statistically significant, and the study reveals that the effect of chewing gum alleviates xerostomia[33].

DAVIES, reported that chewing gum and artificial saliva showed effectiveness in the relief of xerostomia in patients with advanced-stage cancer. It is a cross over randomised controlled trial, and the p-value is 0.33, which is statistically significant, and the study reveals that the effect of chewing gum alleviates xerostomia [34].

In all the above-mentioned studies, chewing gum is used as a mechanical stimulation and increases salivary production to relieve dry mouth and also from thirst. The chewing gum and artificial saliva show the effectiveness in the relief of xerostomia in advanced oral stage cancer patients.

V. CONCLUSION

Chewing gum has an advantage in saliva substitute, relieving pain and discomfort in the mouth or oral cavity. While chewing the chewing gum, it has an adequate amount of saliva secretion to avoid dryness in the oral cavity or mouth. In addition, there is a sign of pain reduction using chewing gum to relieve or alleviate in xerostomia patients.

VI. LIMITATION OF THE STUDY

Many articles were excluded due to limited accessibility. The other sources should also be considered to get a more relevant outcome. Hence, an only a limited number of studies available and need further studies for research.

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