

## Xerostomia: Analysis among dental patients

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### ABSTRACT

The present study was conducted to estimate the incidence of xerostomia (dry mouth) among 200 dental patients had different systemic diseases, including hypertension, diabetes, cardiovascular (CV) problems, anemia, arthritis and cancer.

Distribution of xerostomia according to the type of systemic disease, age and sex was analyzed.

In this study, 64% of total patient represent xerostomia, 24.5% of xerostomic cases were males, while 39.5% were females. Incidence of xerostomia was correlated directly with age where 16% of xerostomic patients were limited in age group between 21-40 years, while 48% of xerostomic patients were limited in the age group between 41-60 years.

The results concluded that systemic disease played role in development of xerostomia which could be due to underlying medical condition, or due to their medication intake. Patients complained from xerostomia were instructed for good oral hygiene and increase their water intake. In certain cases, pilocarpine was indicated to relieve their symptoms.

**Key Words:** Xerostomia, dry mouth.

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### INTRODUCTION

Xerostomia, or "dry mouth", is the condition of not having enough saliva, or spit, to keep your mouth wet. The daily secretion of saliva normally ranges between 1-1.5 L in human.<sup>(1)</sup>

Xerostomia does not represent a disease entity. It results from decreased salivary secretion.<sup>(2, 3)</sup>

The salivary glands are part of the control system for maintaining an appropriate level of hydration. Thirst and the need for fluid intake are usually signaled by a "dry mouth". It is often difficult to differentiate between "dry mouth" resulting from thirst and that associated with gland dysfunction.<sup>(4, 5)</sup>

Dry mouth can cause difficulties in tasting, chewing, swallowing and speaking. It can even increase the chance of de-

veloping decay and other infections whether bacterial or fungal disease.<sup>(6)</sup>

Xerostomia develops when the salivary glands are not working properly. There are many reasons why salivary glands not working properly: Diseases affecting salivary glands "Sjögren's Syndrome, HIV/AIDS, diabetes mellitus, parkinsonism".<sup>(5)</sup> The salivary glands can be damaged if exposed to radiation or cytotoxic drugs which make saliva thicker, and as a side effect of more than 400 medications such as antihypertensive, anticholinergic, antidepressants, antihistamines, decongestants and diuretics.<sup>(6, 7)</sup>

The aim of the present study was to estimate the percentage of xerostomia among dental patients and correlate each case to its participating factors.

**SUBJECTS AND METHODS**

**Patients' Selection**

Two hundred patients were participated in this study. All patients were not medically fit; they had one of the following systemic conditions: Diabetes mellitus, hypertension, arthritis, cardiovascular (CV) problem, anemia and cancer. The chief complaint was dental or oral disease. Ordinary oral and dental examinations were performed and patients were asked whether if they had dry mouth that could play a major role in the underlying dental and oral disease complications. One hundred and twenty eight out of two hundred patients had the signs and symptoms of dry mouth yet it was not their chief complaint to which they attend the dental clinics. These signs and symptoms include some of the following symptoms: Dry sensation in mouth, throat, dry cracked tongue, mouth soreness and ulceration, difficulties in swallowing, tasting and chewing, cracked lip, frequency in mouth infection and bad odor.

A particular case sheet was designed for each patient containing the following data: Patient's age, medical history, medication and response for instruction. The study was conducted in the College of Dentistry, Mosul University and private dental clinic for the period from 2003 to 2004.

Analysis in this study included descriptive statistics; that's, calculation of frequencies and percentages. Chi square test was used and significance was recorded when  $p < 0.05$ .

**RESULTS**

Patients were divided into two groups: Xerostomic and non-xerostomic. The distribution of xerostomic among studied patients was represented in Table (1) and

Figure (1), where 64% of patients had xerostomia, while 36% were non xerostomic ( $p < 0.01$ ).

Table (1): Distribution of patients according to xerostomia

	No.	%
<b>Xerostomia</b>	128	64%
<b>Non-xerostomia</b>	72	36%
<b>Total</b>	200	100%

$p < 0.01$ .

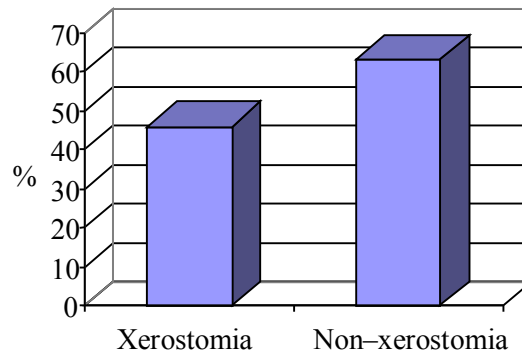


Figure (1): Percentage distribution of xerostomia in the studied group

The percentage distribution of systemic diseases was shown in Tables (2) and (3) and Figure (2), where all patients were not madically fit, 29% had hypertension, 20.5% had diabetes, 22% had CV diseases, 16% had anemia, 9% had arthritis and 3.5% had cancer. Not all patients having systemic disease in this study complaint from xerostomia, but only 64% of them. The percentage distribution of xerostomia in patients with systemic disease according to their medical disease was illustrated in Figure (3), where 22% of them were hypertensive, 15.5% were diabetic, 15% with CV disease, 5% anemic, 4% with arthritis and 2.5% with cancer (Table 3).

Table (2): Distribution of xerostomia in different systemic diseases

Systemic Disease	Non-xerostomia	Xerostomia	Total	Percentage
<b>Hypertension</b>	14	44	58	29
<b>Diabetes</b>	10	31	41	20.5
<b>Cardiovascular Problems</b>	14	30	44	22
<b>Anemia</b>	22	10	32	16
<b>Arthritis</b>	10	8	18	9
<b>Cancer</b>	2	5	7	3.5
<b>Total</b>	72 (36%)	128 (64%)	200	100

Table (3): Number and percentage of xerostomia in systemic disease

Systemic Disease	Xerostomia	Percentage (Total)
Hypertension	44	22
Diabetes	31	15.5
Cardiovascular Problems	30	15
Anemia	10	5
Arthritis	8	4
Cancer	5	2.5
<b>Total</b>	<b>128</b>	<b>64</b>

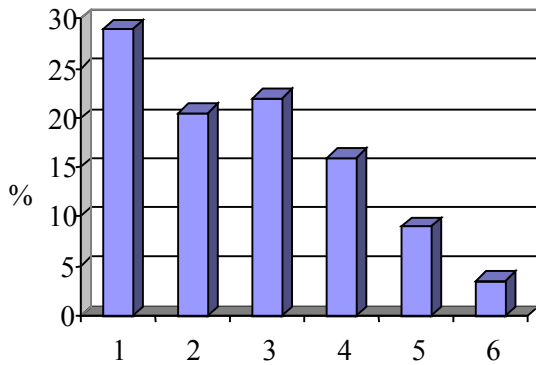


Figure (2): Percentage distribution of systemic disease in the studied group

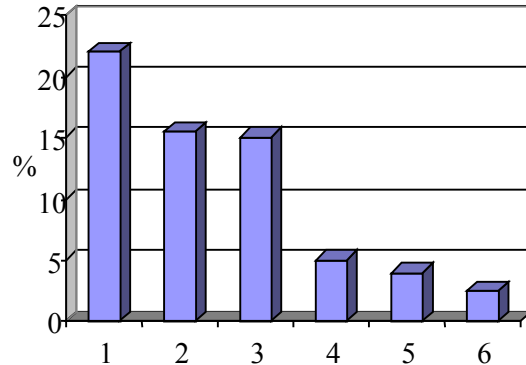


Figure (3): Percentage distribution of xerostomia in systemic disease

1: Hypertension; 2: Diabetes; 3: Cardiovascular Disease; 4: Anemia; 5: Arthritis; 6: Cancer

The percentage distribution of xerostomia according to sex was illustrated in Table (4) and Figures (4), (5) and (6), where 58% of all patients were females, while 42% were males. In xerostomic group 39.5% were females compared to 24.5% males ( $p < 0.05$ ). The percentage distribution of xerostomia according to age represent 16% of young age (21–40 years), 48%

in older age (41–60 years) (Table 5 and Figure 7) ( $p < 0.001$ ). In the xerostomic group, the percentage distribution of patients according to age (Figures 7 and 8) revealed that 35% of patients were within the age of 21–40 years, while 65% of patients were within the age of 41–60 years ( $p < 0.05$ ).

Table (4): Sex distribution in the studied groups

		Male	Female
		No. (%)	No. (%)
Xerostomia	128	49 (24.5%)	79 (39.5%)
Non-xerostomia	72	35 (17.5%)	37 (18.5%)
<b>Total</b>	<b>200</b>	<b>84 (42%)</b>	<b>116 (58%)</b>

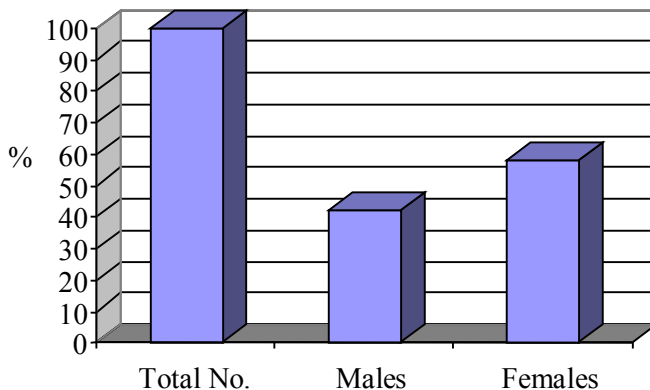


Figure (4): Percentage distribution of male and female in the study group

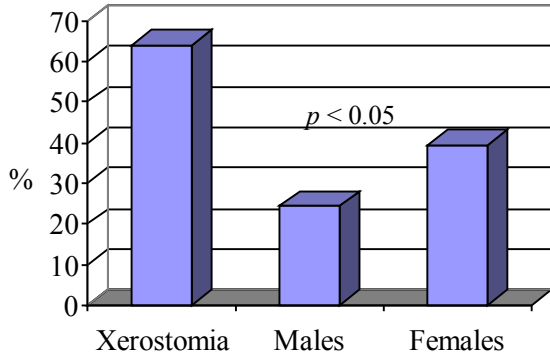


Figure (5): Percentage distribution of male and female in xerostomic group

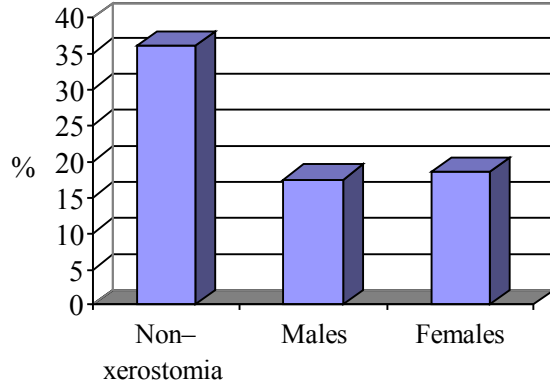


Figure (6): Percentage distribution of male and female in non-xerostomic group

Table (5): Distribution of xerostomia according to age (number and percentage)

Age (Year)	% of Total Number of Patients		% of Total Number of Xerostomia	
	No.	%	No.	%
21-40	87	35	32	16
41-60	113	65	96	48
<b>Total</b>	<b>200</b>	<b>100</b>	<b>128</b>	<b>64</b>

$p < 0.001$ .

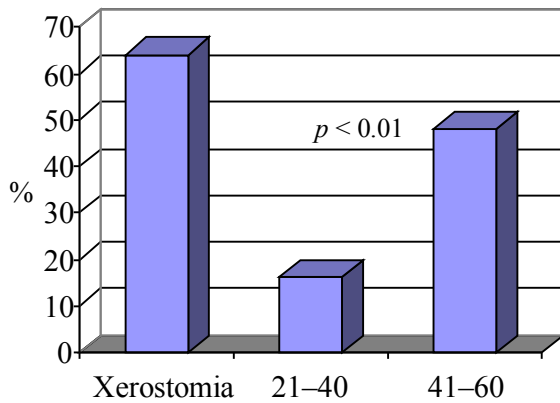


Figure (7): Percentage distribution of age in xerostomic group

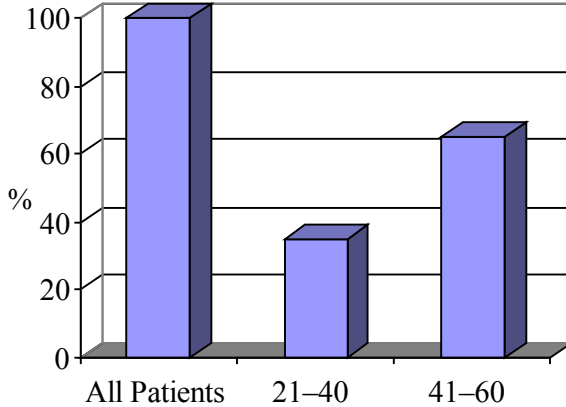


Figure (8): Percentage distribution of patients according to age

### DISCUSSION

Xerostomia is a common problem in our locality. Patients attending College of Dentistry and to private clinic were the source of the sample in this study regarding their systemic diseases, subjective complaint according to Klestov *et al.*<sup>(8)</sup>

Xerostomia in this study showed to have incremental increase with age: Forty eight percent in age group 41-60 years, whereas 16% in age group 21-40 years

(significant  $p < 0.001$ ). This result may be explained by the fact that composition of saliva appears to have fewer protective properties, changes in the structure of the salivary gland. These results were in agreement with Pedersen *et al.*<sup>(9)</sup> and Baum.<sup>(10)</sup>

Females in this study experienced more xerostomia than males. This may be explained by the fact that females undergo various physiological changes starting from growth to puberty to childbearing to

lactation to menopause; i.e., hormonal changes. This result was in agreement with Atwood *et al.*;<sup>(11)</sup> or it may be explained by the fact that smaller size of salivary gland in females than in males.<sup>(1,2)</sup>

Relationship between systemic disease and xerostomia was directly proportional. Hypertension and diabetes, rheumatoid arthritis and osteoarthritis with the exception of diabetes were explained as due to their medication intake.<sup>(12)</sup> Side effect of more than 400 medicines can cause less saliva. Of them, drug groups are “antihypertensive, antidepressant, antihistamines (H<sub>1</sub> and even H<sub>2</sub> antagonist), some antiarrhythmic, diuretic, antiparkinsonian drugs, benzodiazepine, antipsychotic”.<sup>(12-15)</sup>

Whereas in diabetic, uncontrolled diabetes result in polyphagia, polydipsia, and xerostomia due to increase osmolarity of blood due to high blood glucose level.<sup>(13)</sup> As a result of this hyperosmolarity the salivary glands will enlarge to provide the individual with excessive amount of saliva to reduce sensation of thirst. This effect is obvious in 10–20% of patients.

Anaemic patients manifest symptoms of dry mouth. This may be explained by the fact that there will be change in epithelial tissue and in particular mucous membrane of oral cavity in this condition.<sup>(14,15)</sup>

Patients undergoing chemotherapy or radiation experience xerostomia. This certainly is explained by the fact that both radiation and cytotoxic agent affect flow rate and cause destruction of salivary gland cells in accordance with the observation of other studies.<sup>(16,17)</sup>

Another cause of dry mouth is obstruction of salivary duct by stone or calculus, yet this condition was not recorded in this study among 200 patients but it was observed rarely among patients.

Myalgia of facial muscles is found to have relationship with burning mouth,<sup>(18)</sup> yet it was not observed in this study. Treatment of facial myalgia relieves the symptoms of burning mouth.

Patients complaining of dry mouth in this study were instructed to chew sugarless gum, frequent sip water, avoid tobacco, alcohol and food high in sugar, establish a good plaque control program, use fluoride toothpaste, mouthrinses or fluoride gel. This was followed due to the fact that sali-

va acts as protective layer minimize dental caries and even minimize bacterial and fungal infections.<sup>(6)</sup> In certain conditions change the type of medication was coordinated with patients' physician was found to be effective.

Diabetic patients were instructed to control their blood glucose level to normal to avoid further dental complications.

Five milligrams pilocarpine was prescribed to patient having xerostomia due to radiation. Improvement of their complaint was significant compared to the mild side effect of pilocarpine in causing mild blurred vision as patient receiving radiotherapy in this study were small in number, yet their complaint was extensive and troublesome.<sup>(19)</sup>

## CONCLUSIONS

Xerostomia is a distressful symptom associated with discomfort, anxiety, infection, difficult swallowing and pain. The major cause of xerostomia in this study was medication. Patient must be instructed for good oral hygiene, mouthwashes without alcohol content as it accelerate dehydration of mouth, eating food such as fruits and vegetables to provide good nourishment and excess fluid intake to minimize such complain.

Systemic condition was the major cause of xerostomia and its related medication. Pilocarpine was recommended in the treatment of severe cases of xerostomia.

## REFERENCES

1. Regez JA, Sciubb JJ. Salivary gland diseases. *Oral Pathol.* 1989; 18(2): 225-236.
2. Schubert MM, Izutsu KT. Iatrogenic causes of salivary gland dysfunction. *J Dent Res.* 1987; 66: 680-688.
3. Talal N. Overview of Sjögren's Syndrome. *J Dent Res.* 1987; 66: 672-674.
4. Mandel ID. The function of saliva. *J Dent Res.* 1988; 66: 623-627.
5. McDonald TJ. Dry mouth in patient without other complaints appears to be non-organic. *Postgrad Med.* 1988; 84: 22-25.
6. National Oral Health Information Clearing Houseway (NOHICH). National Institution of Dental and Craniofacial Resea-

- rch. December. 1999; Pp: 84–92.
7. John G, John WW, Robin TA, Seymour G. Dry mouth. In: Textbook of Dental Pharmacology and Therapeutics. 2<sup>nd</sup> ed. Philadelphia University Press. 1994; Pp: 62-89.
  8. Klestov AC, Webb J, Latt D, Schiller C, McNamara K, Young DY, Hobber J, Featherstone J. Treatment of xerostomia: A double-blind trial in 108 patients with Sjögren's Syndrome. *Oral Surg*. 1988; 51: 594-599.
  9. Pedersen W, Schubert M, Izutsu K, Merisai T, Truelove E. Age-dependent decrease in human submandibular gland flow rates as measured under resting and post-stimulation conditions. *J Dent Res*. 1988; 67: 822-825.
  10. Baum BJ. Salivary gland fluid secretion during aging. *J Am Geriatr Soc*. 1989; 37: 453-458.
  11. Atwood CS, James IR, Keil V, Roberts NK, Hartmann PE. Circadian changes in salivary constituents and conductivity in women and men. *Br Dent J*. 1991; 171(4): 125-140. (Abstract)
  12. Grad H, Grushka M, Yanover L. Drug-induced xerostomia: The effect and treatment. *J Can Dent Assoc*. 1985; 51: 296-300.
  13. Martin EW, Lucas J. Diabetes Patients. In: Review of Oral Medicine. 6<sup>th</sup> ed. Philadelphia University Press. 2001; Pp: 87–99.
  14. Scopp IW, Heyman RA, Goldberg MA, Groy DJ. Dryness of mouth with use of tranquilizers, chlorpromazine. *J Am Dent Assoc*. 1995; 91: 46-53.
  15. Wright JM. Oral manifestation of drug reactions. *Dent Clin North Am*. 1994; 38: 511-516.
  16. Shannon IL, McGrary BR, Starcke EN. A saliva substitute for use by xerostomic patients undergoing radiotherapy to the head and neck. *Oral Surg Oral Med Oral Pathol*. 1978; 44: 565-661.
  17. Edgar WM. Saliva: Its secretion, composition and functions. *Br Dent J*. 1992; 172(5): 305-312.
  18. Herman WW, Konzelman JL, Guinn J, Braselton JA. *Oral Surg Oral Med Oral Pathol*. 2004; 97(4): 450-461.
  19. Johnson JT, Ferretti GA, Nethery WJ, Valdez IA, Fox PC, Ng D, Muscoplat CC, Gallagher SC. Oral pilocarpine for post-irradiation xerostomia in patient with head and neck cancer. *New Eng J Med*. 1993; 329(6): 390-395.