

Survey of prevalence of xerostomia in a population of Kerman, Iran, attending medical and dental clinics

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Original Article

Abstract

BACKGROUND AND AIM: The effects of xerostomia on oral health have been studied for decades; however, the prevalence of this disorder in the general population remains controversial. The purpose of this study was to determine the prevalence of xerostomia in the population of Kerman, Iran.

METHODS: A total of 1010 subjects participated in this cross-sectional study. Study volunteers completed a standardized questionnaire regarding demographic data, history of systemic disease, use of medication, cigarette smoking, and etcetera. The Fox questionnaire was also completed to diagnose xerostomia.

RESULTS: The prevalence of xerostomia in this study was 55% (59.9% among men and 49.9% among women). The mean age of the study population was 34.7 ± 12.1 . 21.5% of cases had a systemic disease and 19% reported taking medication. Moreover, 25.9% of the participants (30% men and 4.6% women) smoked cigarettes or other tobacco products. Systemic disease, medication, and the use of tobacco products and opiates were found to be significant risk factors for xerostomia.

CONCLUSIONS: The prevalence of xerostomia in our study was higher than that reported in other populations. Smoking and medication were significant risk factors for xerostomia.

KEYWORDS: Epidemiology, Prevalence, Xerostomia, Dry Mouth

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Saliva is a complex and important body fluid that plays a significant role in the lubrication and protection of oral mucosa, remineralization of teeth, digestion, phonation, taste sensation, buffering action and clearance, and antibacterial activity. Therefore, this fluid is necessary for the integrity of the oral tissues and is critical for protection and maintaining of oral and dental health.¹ Xerostomia (the subjective complaint of dry mouth) and salivary gland hypofunction (objective evidence of low saliva secretion) can have a

deleterious effect on many aspects of oral function and general health; thus, they can cause a significant decline in the quality of life.² The main causes of salivary gland hypofunction are medication, systemic diseases, and radiotherapy.

Many studies have shown that there is great variability in the prevalence of dry mouth. In North of England, the prevalence of xerostomia in 1103 adult patients attending for routine dental care was 12.7% (14.4% females, 10.3% males), which was lower than reported in previous North American and

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Swedish studies.³ In a systematic review in Scandinavia, the prevalence of xerostomia in the 13 articles ranged from 0.9% to 64.8%.⁴ In most studies, the self-reported diagnoses were obtained through a questionnaire administered to the patient.^{3,4}

In Iran some studies have examined the prevalence of xerostomia in specific individuals (with a serious disease, institutionalized elderly, and etcetera). For example, in Mashhad (northeast of Iran), the prevalence of xerostomia in 237 institutionalized elderly people was 38%. This study showed that old age is a major factor in the decrease of salivary secretion and xerostomia.⁵

As mentioned earlier, xerostomia affects important aspects of life such as speaking, the enjoyment and ingestion of food, and the wearing of dental prostheses.¹⁻³ These impacts on the daily lives of patients lends support to the assertion that dry mouth is an important condition that merits concerted research attention for the further understanding of how best to treat and prevent it. Therefore, the knowledge of the prevalence of xerostomia among a population is very important. The aim of this study was to describe the prevalence of xerostomia in a population of Kerman, Iran, that was not clinic-based or limited to the elderly.

Methods

This study was approved by the Ethics Committee of Kerman University of Medical Sciences (code 86/66). In this study, 1010

persons aged 18 years or over, who accompanied patients of the private and public dental clinics, were evaluated. We selected subjects that were relatives of the patients. They only accompanied the patient and at the time of the research had no dental and oral complaints. These individuals were selected for increased external validity. First, subjects were asked to participate and give written informed consents. Then they completed a form including age, gender, any details about the existence of systemic disease, menopause, current systemic medications, tobacco use, and the questionnaire of Fox et al (Table 1).

In this study we determined the xerostomia level by asking subjects the questionnaire of Fox et al. about dry mouth. Translation and back-translation were used to develop a Farsi version of the questionnaire. First, two Iranian oral medicine specialists, fluent in English, performed a forward translation. Then, the translated text was translated back into English by a native English speaker and literature graduate. Thereafter, in one session, these three people discussed and approved unanimously that the translation was the same as the original English version.

The reliability was assessed by measuring internal consistency reliability, for this we measured Cronbach's alpha coefficient and item-scale correlation. The minimum acceptable level of Cronbach's alpha and item-scale correlation was assumed 0.6 and 0.4, respectively.

Table 1. Fox and colleagues's specific questions about dry mouth⁶

Questions	Yes	No	
Does your mouth feel dry at night or on awakening?			
Does your mouth feel dry at other times of the day?			
Do you keep a glass of water by your bed?			
Do you sip liquids to aid in swallowing dry foods?*			
Does your mouth feel dry when eating a meal?*			
Do you have difficulties swallowing any foods?*			
Do you chew gum daily to relieve oral dryness?			
Do you use hard candies or mints daily to relieve oral dryness?			
Question about personal evaluation of the amount of saliva	Too little	Too much	Do not notice it
Does the amount of saliva in your mouth seem to be too little, too much, or you do not notice it?			

* These questions were correlated to objective measures of dry mouth in Fox and Colleagues' 1978 study

For validity a sample of 20 subjects were interviewed, and the acceptability and meaning of the items were investigated. Then, the stimulated and unstimulated saliva of these subjects were measured. Validity was tested by using the sensitivity, specificity, receiver operating characteristics (ROC), and the Pearson correlation. Finally, the reliability and validity of this Persian version of the questionnaire were examined, and were recorded as an optimal level. Then, we identified subjects with dry mouth as those who answered yes to at least one of the three questions that were marked with a star (Table 1).⁶ Fox et al. showed these three questions, which focused on oral dryness associated with eating, were highly indicative of salivary performance.^{6,7}

We calculated sample size using the following formula $n = z^2 p(1-P)/d^2$ ($z = 1.96$, $p = 0.3$, $d = 0.03$).

We conducted data analysis using SPSS for Windows (version 15; SPSS Inc., Chicago, IL., USA). We assessed intergroup comparisons by using the chi-squared test significant at levels of $P < 0.05$.

Results

The subjects' mean age \pm standard deviation

(SD) was 34.2 ± 12.1 years (age range = 18-78 years) and approximately 49.1 % (503) of the 1010 subjects were women. Fifty five percent of the subjects (59.9% of all men and 49.9% of all women) reported experiencing at least one xerostomia symptom (need to sip liquids to aid in swallowing dry food, mouth feels dry when eating a meal, or have difficulties in swallowing any food). Men had experienced more symptoms of dry mouth compared with women ($P < 0.001$), but the difference between age groups was not significant.

Overall, 27% of 1010 subjects reported experiencing one symptom, 16.9% reported experiencing two symptoms, and 10.4% reported experiencing all three symptoms (Figure 1).

Approximately 21.5% of the subjects reported a history of systemic diseases. The most common diseases were cardiovascular diseases, hypertension, diabetes, and psychological diseases, respectively. Nineteen percent of the subjects reported taking medications. The most common medications used, respectively, were antihypertensives, hypoglycemics, and antidepressants.

Symptoms of dry mouth were experienced significantly more among subjects who had a

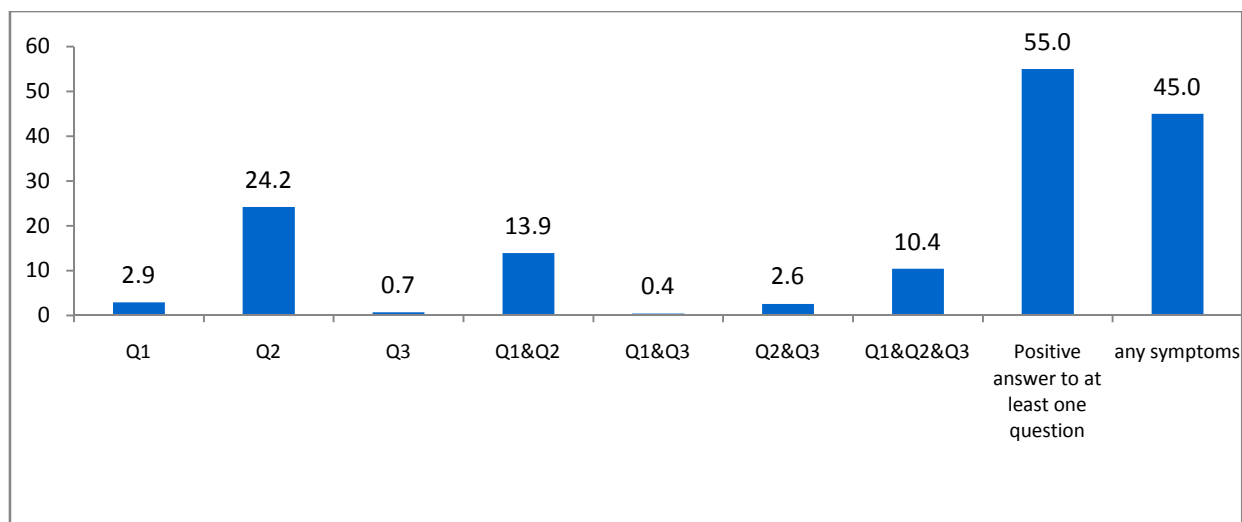


Figure 1: The frequency of positive answers to main questions of the questionnaire of Fox et al.

Q1 = Does your mouth feel dry when eating a meal?

Q2 = Do you sip liquids to aid in swallowing dry foods?

Q3 = Do you have difficulties swallowing any foods?

systemic disease (65%) or used certain medications (64.1%), compared with non-patients (52.2%) and those who did not use medications (52.8%) (Table 2).

Most of the subjects did not use any form of tobacco, while approximately 7.8% of subjects were cigarette smokers, and 7.1% used a pipe. A total of 94% of the subjects reported taking no form of illegal drugs and the common drug used was opium (3.8%). Overall, 70% of men, and 95.4% of women did not use any form of tobacco and drugs. Approximately 74.5% of smokers and 73.8% of drug addicts reported experiencing xerostomia symptoms. There was a significant relationship between smoking and drug use, and experienced symptoms of dry mouth ($P < 0.001$ and $P < 0.002$ respectively).

The quantity of saliva by 67.7% of the subjects was reported as normal and 19.3% as little or too little (Figure 2). A significant number of subjects who were older (compared with younger subjects), had a history of systemic diseases (compared with non-patients), used certain medications (compared with non-users of medications),

were smokers (compared with non-smokers), and used drugs (compared with non-users of drugs), assessed the quantity of their saliva as little or too little.

Discussion

In this study, we found that 55% of the subjects reported the sensation of oral dryness. The results of a systematic review showed that the prevalence of xerostomia in 13 selected articles ranged from 0.9 to 64.8%. In all articles, similar to our study, the xerostomia level was determined by asking subject specific questions about dry mouth.⁴ In some studies only one question was asked about dry mouth.^{3,8} Therefore, it seems that a wide range of the prevalence of xerostomia in the literature is related to the variation in number and content of the questions, and guidelines for the diagnosis of xerostomia. Since the study-population in this study was selected of persons that accompanied patients to the private and public dental clinic, we can say that the findings of this study can be generalized to other individuals.

Table 2. Relationship of xerostomia with systemic disease, and medications

Xerostomia		P	No Number (%)	Yes Number (%)
Systemic diseases	Yes	P = 0.001	76 (35.0)	141 (65.0)
	No		397 (47.8)	414 (52.2)
Medication	Yes	P = 0.005	69 (35.9)	123 (64.1)
	No		386 (47.2)	432 (52.8)

Frequency (%) positive answers to main questions

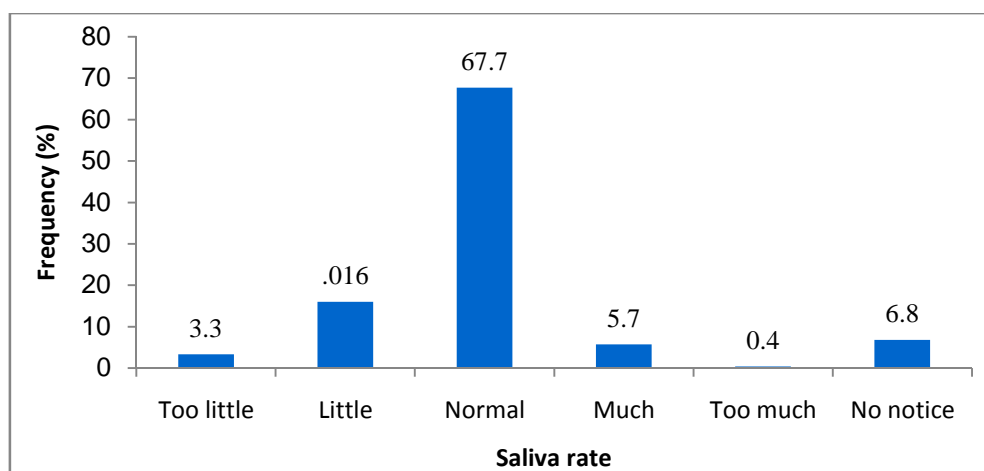


Figure 2. The personal evaluation of the amount of saliva

We found that in the population of Kerman 59.9% of 507 men reported having symptoms of dry mouth, which was higher than American men (18%), English men (10.3%), and Swedish men (21.3%).^{6,8,9}

Moreover, we found that 49.9% of 503 women reported having symptoms of dry mouth, and that was lower than men. This result was similar to studies in Japan, and Saudi Arabia.^{10,11} In these studies, the prevalence of xerostomia in men was higher than women. However, in the majority of the studies women had experienced more symptoms of dry mouth than men.^{3,4,8,12} In some studies the prevalence of xerostomia was similar in men and women.^{13,14}

In our study similar to the majority of studies, we selected subjects that were 18 years or older.^{3,8,9} Some studies have shown that the incidence of xerostomia increased with age.^{3,8,15} Whereas other researchers have demonstrated that there is no association between age and symptoms of dry mouth, and this finding was in accordance with our study.^{13,16}

In the present study, there was a significant relationship between the sensation of oral dryness, and medication and systemic diseases. The most common diseases were cardiovascular diseases, hypertension, diabetes, and psychological diseases. Therefore, the most common medications used were antihypertensives, hypoglycemics, and antidepressants, respectively.

Many studies have shown that drugs, especially those with anticholinergic activity are the most common cause of reduced salivation. Therefore, the complaint of dry mouth is common, particularly in patients treated for hypertensive and psychiatric problems. However, the relationship between medications and dry mouth is a complex one and differs according to which aspect of dry mouth is being examined.¹⁷

As mentioned earlier in our study, there was a significant relationship between the sensation of oral dryness, and medication and common systemic diseases. A study in the

United States showed that complaints of dry mouth in patients taking cardiovascular drugs had increased.¹⁸ In other studies, persons with chronic mental illness or diabetes had significantly higher incidences of self-reported dry mouth and reduced salivary flow compared with a control group.^{19,20}

The effect of smoking on reduction of salivary flow, and dry mouth is controversial. Thomson et al. showed that unstimulated flow rate was higher among smokers.¹⁷ Some studies have shown that xerostomia was more commonly observed among cigarette smokers.^{9,11,21} A longitudinal study in Sweden showed that smoking had been significantly associated with daytime xerostomia but not with night-time xerostomia.²² Other studies reported that cannabis smoking and Methamphetamine abuse has been significantly associated with xerostomia.^{23,24}

The present study also showed that the prevalence of xerostomia was higher in smokers and drug users. Considering that drug use is not acceptable in society, it is likely that the statistics obtained in this study is lower than the reality. However, in this study there was a significant relationship between the use of drugs and dry mouth.

It seems that the higher prevalence of drug use and smoking among men than women (30% in men compared with 6.4% in women) as well as the higher percentage of systemic diseases in men than women in the study population (1.24% in men and 8.18% in women) can cause men to experience more xerostomia symptoms compared with women.

The personal evaluation of the amount of saliva showed that those who reported that the amount of saliva in their mouth seemed to be little or too little (19.3%) were significantly more than those that reported their saliva seemed to be too much or they did not notice any xerostomia symptoms. This finding emphasizes the importance of the use of different diagnostic methods for xerostomia in various studies. As mentioned earlier, the results of a systematic review

showed that the prevalence of xerostomia in the 13 selected articles ranged from 0.9% to 64.8%.⁹ Some of these studies determined the prevalence of xerostomia by only personal evaluation of saliva amount.

Conclusion

The prevalence of xerostomia in our study was higher than that reported in other

populations. Smoking and medication were significant risk factors for xerostomia.

Conflict of Interest

The Authors have no conflict of interest.

Acknowledgments

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