Assessment of Xerostomia and Oral Health Related Quality of Life in Geriatric Subjects on Polymedications - A Prospective Study in Regional Dharwad Population

Pooja Purohit[1], Kruthika S Guttal[2]*, Shantala ArunKumar[3], Krishna N Burde[2] and Kirty Nandimath[4]

[1]*Former Postgraduate, Department of Oral Medicine and Radiology, SDM College of Dental Sciences and Hospital, Shri Dharmasthala Manjunatheshwara University, Karnataka, India*

[2]*Professor, Department of Oral Medicine and Radiology, SDM College of Dental Sciences and Hospital, Shri Dharmasthala Manjunatheshwara University, Karnataka, India*

[3]*Associate Professor, Department of Oral Medicine and Radiology, SDM College of Dental Sciences and Hospital, Shri Dharmasthala Manjunatheshwara University, Karnataka, India*

[4]*Professor and Head, Department of Oral Medicine and Radiology, SDM College of Dental Sciences and Hospital, Shri Dharmasthala Manjunatheshwara University, Karnataka, India*

*Corresponding Author: Kruthika S Guttal, Professor, Department of Oral Medicine and Radiology, SDM College of Dental Sciences and Hospital, Shri Dharmasthala Manjunatheshwara University, Karnataka, India.

Abstract

Background: To evaluate the quality of life in elderly patients in relation to the number of remaining teeth, the number of ingested drugs for underlying systemic disorders and presence of xerostomia and to determine the correlation between an increased intake of drugs and severity of xerostomia.

Materials and Methods: All patients aged above 60 years were screened for signs and symptoms of xerostomia and a detailed case history regarding the underlying systemic conditions and the details of medications taken (duration, dosage, frequency of medications). Oral status was assessed, with regards to the number of remaining teeth presence of any fillings/prosthesis or presence of any decayed teeth. A complete examination to assess xerostomia, which included subjective symptoms if any experienced by the patients, followed by assessment of clinical features suggestive of Xerostomia. In addition to the above-mentioned assessment, Modified Schirmer test was performed to confirm the features of xerostomia.

Results: Out of 100 subjects, 48 males (86.7%) with a mean age of 62.4 years and 52 females (13.3%) with a mean age of 61.3 years were observed. The maximum number of xerostomic subjects (70) belonging to 53 to 65 years of age (65.6%), followed by 20 cases (22.28%) in 66 to 72 years of age, 6 cases (8.3%) in 66 to 72 years of age, and the least of 4 cases (3.64%) in ≥ 73 to 78 years of age. A Pearson correlation measure was estimated and the hypothesis in the analysis of the relation between the degree of xerostomia and quality of life of the patients was tested.

The statistical significance adopted in the study is 5% ($p < 0.05$).

Conclusion: The clinical oral dryness scoring system (OHIP 14) has proven to be a useful tool to assess the effects of salivary hypofunction and lack of mucosal wetness. It indicates the need for intervention or referral from primary care. Another feature is that it takes very little chair-side time during the decision-making process, hence the system can be used very conveniently in general practice as well as in a hospital setting. However, a higher level of xerostomia is significantly associated with a poorer quality of life. The study emphasizes that good oral health is essential in elderly, for a better general health.

***Keywords:** Xerostomia; Oral Health Related Quality of Life; Polymedications*

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Introduction

Older adults in India are diverse and heterogenous in their health and health related behaviors. There are oral diseases in all population groups, which are strongly related to age, and as people get older there is increase in prevalence and severity [1]. As time passes by, the elderly are affected by progressive, debilitating chronic systemic diseases such as cancer, heart diseases, arthritis, hypertension, diabetes mellitus, mental health, osteoporosis, Parkinson's disease, stroke and metabolic dysfunctions. Many of these diseases influence the oral health directly or indirectly [2]. Poor oral conditions lead to nutritional deficiency, tooth loss, gingivitis, psychosocial damages, resulting in poor quality of life [3]. Aging is a complex biological phenomenon that results from an interaction between genetic and environmental factors. This process may directly or indirectly increase the risk of developing diseases [4]. Also prolonged life expectancy has increased the usage of poly medicines for combating many systemic diseases. 80% of the commonly prescribed medications cause persistent xerostomia, and more than 400 medications are known to be associated with salivary gland dysfunction as an adverse effect [5]. Saliva is essential for preservation of oropharyngeal health, and many functions in the oral and gastrointestinal environment. Saliva aids in swallowing, oral cleansing, speech, digestion and taste perception. It also serves as a source of immunoglobulins playing a protective role. Xerostomia (also termed dry mouth or dry mouth syndrome) is the medical term for the subjective symptom of dryness in the mouth, which may be associated with a change in the composition of saliva or reduced salivary flow (xerostomia) or have no identifiable cause. This symptom is very common and is often seen as a side effect of many types of medications. Xerostomia is common among geriatric patients with a prevalence ranging between 12 - 28%, and the range increases to 40-60% among institutionalized people [1]. Dry mouth leads to plethora of symptoms which include significant oropharyngeal disorders, alterations in oral environment leading to caries, difficulty in swallowing, opportunistic fungal infections, pain and impaired quality of life [6]. Several factors have the potential to influence the quality of life of a person, with oral health playing a major role [7]. Good oral health include the absence of facial pain, ability to chew properly, ease of ingestion and digestion of food. All these factors invariably contribute to communication, especially when speaking and smiling, and have the potential to increase the self- esteem of people [8].

When salivary hypofunction and xerostomia occurs, it may lead to transient or sometimes permanent oral and extraoral symptoms or even disorders.

Among the various causes for xerostomia, usage of atleast more than one medication is an important contributor leading to xerostomia, as possible side effect of systemic ingestion of multiple medications. Geriatric population is more prone for salivary gland related disorders, as the prevalence of systemic diseases are higher and the treatment of which with the use of polymedications may be leading to xerostomia [9]. Other than the use of polymedications, various conditions such as Sjogren's syndrome (SS), diabetes mellitus, Alzheimer's disease, dehydration, head and neck radiation and chemotherapy can also contribute to salivary gland diseases presenting mainly as xerostomia. Xerostomia in turn will lead to problems such as secondary dental caries, dysgeusia, dysphagia, oral candidiasis, bacterial infections, poorly fitted prostheses etc [10].

Nutrition is one of the important components of health, functional independence and quality of life in elderly population [11]. In this age group, malnutrition is common and the risk increases with advancing age. Oral Health Related Quality of Life (OHRQoL) is defined as an individual's assessment of how functional factors, psychological factors, social factors and experience of pain/discomfort in relation to orofacial concerns affect their well-being [12]. The use of OHRQoL instrument helps to assess the oral problems that may be leading to malnutrition. A better understanding of disease indicators is necessary for establishing a solid strategy through an organized oral health care system to prevent and treat this morbid chronic condition efficiently [13].

Aim of the Study

Thus, in view of these geriatric related problems, the present study aims to evaluate the quality of life in elderly patients with respect to the number of remaining teeth, xerostomia related to the number of ingested drugs.

Materials and Methods

The study was initiated following approval from Institutional Ethical committee. The present study was a cross sectional study involving Geriatric patients aged above 60 years reporting to Outpatient section of Department of Oral Medicine and Radiology. Subjects

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complaining of symptoms of Oral dryness were selected for the study. All the subjects were explained about the procedure and informed consent was obtained prior to the study. The study comprised of 100 patients.

Inclusion criteria

1. Patients over 60 years with/without history systemic diseases like diabetes mellitus, hypertension and under treatment for more than 6 months and willing to participate in the study.
2. Ambulatory patients willing to participate in the study.
3. Patients with healthy mental state and able to answer the questionnaires on their own.

Exclusion criteria:

1. Patients unwilling to participate in the study/refusing to give consent to participate in the study.
2. Patients with diagnosed salivary gland diseases like Sjogren's syndrome, post radiotherapy for head and neck region, autoimmune diseases, such as systemic lupus erythematosus and rheumatoid arthritis, or undergoing treatment for psychiatric illness.
3. Patients with history of Use of antihistamines and anticholinergic drugs or antipsychotics.

All patients aged above 60 years reporting to the dental hospital for various dental complaints were screened for signs and symptoms of xerostomia. Subjects fulfilling the above mentioned criteria were enrolled and a detailed case history regarding the underlying systemic conditions and the details of medications taken (duration, dosage, frequency of medications) was recorded. Oral status was assessed in relation to the number of remaining teeth presence of any fillings/prosthesis or presence of any decayed teeth. Also a routine complete blood investigation was established to rule out any nutritional deficiencies in the presence of clinical signs of anemia.

This was followed by complete examination to assess xerostomia, which included subjective symptoms if any experienced by the patients, and assessment of clinical features suggestive of Xerostomia as proposed by Osailan., *et al.* in addition Modified Schirmer test was also performed.

Clinical features suggestive of xerostomia:

1. Sticking of an intraoral mirror to the buccal mucosa or tongue
2. Frothy saliva
3. No saliva pooling in floor of mouth
4. Loss of papillae of the tongue dorsum
5. Altered/smooth gingival architecture
6. Glassy appearance to the oral mucosa (especially the palate)
7. Lobulated/deeply fissured tongue
8. Cervical caries (more than two teeth); and/or
9. Mucosal debris on palate (except under dentures).

Modified Schirmer test (MST) procedure

The salivary Schirmer test also referred to as oral Schirmer tests of salivary Schirmer test is believed to be a rapid, convenient, and reliable objective screening tool for assessing salivary gland hypofunction [14]. MST for screening tool for xerostomia.

All the patients were explained about the procedure. The test was carried out in the morning hours between 09.00 a.m. to 11.00 a.m. considering the circadian variation. The subjects were instructed not to eat or drink 2 hours prior to MST. After a period of 3 to 5 minutes rest, the patient was asked to swallow all the saliva in the mouth prior to the test, and not to swallow anymore during the test. In addition, the patient was asked to rest the tongue on the hard palate so that the test strip would not be in contact with the tongue during the test.

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The salivary duct orifices bilaterally including the vestibule were isolated with cotton rolls. Schirmer paper Tear touch was used (Mundelein, IL, USA) The MST strip was held vertically, in the lingual vestibule, with the round end of the strip being allowed to be in contact with mucosa to be moistened, the reading were recorded at 1, 2, and 3 minutes. In addition ph estimation was done for subjects (Figure 1):

***Figure 1:** Modified Schirmer test and ph testing of saliva.*

Range:

- Normal SFR: 25 - 30 mm

- Dry mouth: 10 - 15 mm

- Mild dryness: 6 - 10 mm

- Moderate dryness: 2 - 5 mm

- Severe dryness: 0 - 1 mm.

Following this all subjects were assessed for Oral health related quality of life, using a questionnaire OHIP-14 [15] (Annexure 1).

Statistical analysis

The data obtained was described with frequency distributions for the categorical variables and with medians and respective standard deviation when the quantitative variable presented normal distribution, otherwise the mean and SD was presented.

To analyze the variables Chi-Square test was applied for the comparison of categorical variables. Non-parametric test, Kruskal-Wallis test was applied for the comparison of medians i.e. collection of salivary flow rate (SFR) at various intervals. PH estimation was established by using non parametric test.

A Pearson correlation measure was estimated and the hypothesis in the analysis of the relation between the severity of xerostomia and quality of life of the patients was tested.

The statistical significance adopted in the study is 5% ($p < 0.05$) and the software used in the analysis was SPSS Version 18.

Results

Amongst the 100 subjects included in the study, 70 patients had xerostomia, and the average age of the subjects was 65 years. The gender distribution included 48 males (86.7%) and 52 females (13.3%). The mean age of male subjects was 62.4 years and that of females was 61.3 years.

OHIP questionnaire score among the subjects: It was observed that 61% sensed that taste perception had worsened, 56% affirmed for being self-conscious, 51% agreed for unsatisfactory diet, 78% agreed for difficulty while relaxing, 60% and 77% were embarrassed

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and irritated due to the presenting condition and were the ones with a higher frequency of answers. However, the questions 1, 3, 4, 6, 8, 12 had a lower frequency of answers. This reflects the analysis by domains where the highest scores, and consequently a worse quality of life, are in the domains related to functional limitation, physical pain. There was no significant association between quality of life and varying degrees of xerostomia (Table 1).

OHIP-14	No	Yes
1. Difficulty in pronunciation	71	29
2. Sense of taste	39	61
3. Pain while swallowing	74	26
4. Uncomfortable to eat	51	49
5. Self conscious	44	56
6. Tense	64	36
7. Unsatisfactory diet	49	51
8. Interrupted meals	58	42
9. Difficulty to relax	22	78
10. Embarrassed	40	60
11. Irritable	23	77
12. Difficulty in performing usual jobs	68	32
13. Life was less satisfying	100	0
14. Totally unable to function	100	0

Table 1: OHIP questionnaire score among the subjects.

The results of modified Schirmer test revealed that Out of 100 patients, 35 subjects had moderate dryness and 24 subjects had dry mouth and mild dryness. There was no significant difference in gender with respect to degree of dryness (Table 2).

Groups	Mean	N	Std. Deviation
Dry mouth	4.08	24	2.205
Moderate dryness	6.83	35	3.053
Mild dryness	5.83	24	1.857
Severe dryness	7.73	15	2.492
Normal SFR	1.00	1	.
Mild xerostomic	3.00	1	.
Total	5.97	100	2.819

Table 2: Varying degrees of xerostomia according to modified Schirmer test.

Amongst the various indicators of xerostomia 35 subjects with moderate dryness showed sticking of mouth mirror intra orally during examination had a significant correlation. And it was more prevalent in males. A statistically significant correlation was found between absence of pooling of saliva in the floor of the mouth and degree of dryness. There was no association between oral status and loss of papillae on the dorsum of tongue. A statistical significant correlation was observed in subjects with moderate dryness for glassy appearance of mucosa and presence of and Lobulated/deeply fissured tongue. Also there was association between mucosal debris and oral status (Table 3 and figure 2).

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	Groups	Dry mouth	Moderate dryness	Mild dryness	Severe dryness	Normal SFR	Mild Xerostomia	Total	P-value
Sticking of mirror									
No		24	0	23	0	1	1	49	0.000*
Yes		0	35	01	15	0	0	51	
Frothy saliva									
No		21	33	22	15	1	1	93	0.769
Yes		3	2	2	0	0	0	7	
Absence of pooling of saliva in floor of mouth									
No		2	32	5	15	0	0	54	0.000*
Yes		22	3	19	0	1	1	46	
Depapilation									
No		15	31	17	13	1	0	77	0.063
Yes		9	4	7	2	0	1	23	
Glassy appearance									
No		15	9	11	1	1	0	37	0.003*
Yes		9	26	13	14	0	1	63	
Lobulated/deeply fissured tongue									
No		21	16	16	4	1	1	59	0.002*
Yes		3	19	8	11	0	0	41	
Mucosal debris on palate									
No		24	25	20	7	0	0	76	0.001*
Yes		0	10	4	8	1	1	24	

Table 3: Comparison of various indicators of xerostomia among subjects.

Figure 2: a- Loss of papillae; b- Sticking of mouth mirror to buccal mucosa; c- Lack saliva pooling in the floor of mouth.

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Salivary pH estimation

There was association between pH and oral status within three groups using chi square test which is highly significant with p = 0.00.

Salivary flow rate comparison at 1st, 2nd and 3rd minute indicated that there was highly significant correlation among dry mouth group and there was a significant correlation in moderate and mild degree of dryness and mild xerostomic subjects (Table 4).

SFR	Groups	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Collection of SFR after 1 minute	Dry mouth	.360	24	.000	.794	24	.000
	Moderate dryness	.270	35	.000	.797	35	.000
	Mild dryness	.234	24	.002	.809	24	.000
Collection of SFR after 2 minute	Dry mouth	.242	24	.001	.906	24	.029
	Moderate dryness	.254	35	.000	.794	35	.000
	Mild dryness	.260	24	.000	.872	24	.006
	Severe dryness	.514	15	.000	.413	15	.000
Collection of SFR after 3 minute	Dry mouth	.218	24	.004	.850	24	.002
	Moderate dryness	.502	35	.000	.458	35	.000
	Mild dryness	.273	24	.000	.826	24	.001
	Severe dryness	.485	15	.000	.499	15	.000

***Table 4:** Comparison of salivary flow rate estimation among subjects.*

There was also a strong correlation between the comparison of number of drugs ingested and xerostomia (Table 5 and 6).

Groups	Acidic						Normal						Alkaline		
	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	Total	Chi-sq/ P value
Dry mouth	0	0	1	2	2	1	10	2	2	2	1	1	24	0.000*
Moderate dryness	0	2	6	13	4	6	3	1	0	0	0	0	35	
Mild dryness	0	0	0	3	3	5	10	0	0	3	0	0	24	
Severe dryness	1	3	2	8	0	1	0	0	0	0	0	0	15	
Normal SFR	0	0	0	0	0	0	0	0	1	0	0	0	1	
Mild xerostomic	0	0	0	0	0	1	0	0	0	0	0	0	1	
Total	1	5	9	26	9	14	23	3	3	5	1	1	100	

***Table 5:** Comparison of ph. assessment in various groups.*

Systemic disease	Number of drugs						Total
	1.00	2.00	3.00	4.00	5.00	6.00	
DM	21	0	0	0	0	0	21
DM, TH	0	4	0	0	0	0	4
HTN	17	0	0	0	0	0	17
HTN, DM	0	29	0	0	0	0	29
HTN, TH	0	17	0	0	0	0	17
HTN, DM, TH	0	0	7	0	0	0	7
HTN, TH	0	2	0	0	0	0	2
TH	3	0	0	0	0	0	3
Total	38	49	6	4	2	1	100

***Table 6:** Various medications ingested for systemic diseases.*

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Discussion

The most common causes of xerostomia include specific diseases of the salivary glands like primary Sjogren's syndrome, secondary Sjogren's syndrome, intake of medications with antimuscarinic properties, radiotherapy for head and neck cancer, uncontrolled diabetes [16].

The present study was a prospective cross-sectional study evaluating the effect of polymedications on xerostomia (evaluated by presenting signs and symptoms and salivary flow rates), impact on oral health related quality of life (assessed by OHIP questionnaire). The present study aimed to assess the quality of life in elderly patients in relation to the number of remaining teeth, the number of ingested drugs for any underlying systemic disorders and presence of xerostomia and also to determine the correlation between an increased intake of drugs and severity of xerostomia. The above-mentioned parameters were assessed in 100 patients having xerostomia.

The oral status was assessed with regards to the number of remaining teeth presence of any fillings/ prosthesis or presence of any decayed teeth. This was followed by complete examination to assess xerostomia, which included subjective symptoms if any experienced by the patients, followed by assessment of clinical features suggestive of Xerostomia as proposed by Osailan., *et al.* [17]. A detailed case history regarding the underlying systemic conditions and medications was obtained. The history included evaluation of subjective complaints like dryness of mouth and difficulty in swallowing, positive response to at least one of the following five questions in history recording has proven to be associated with a decrease in saliva production. These include leading questions like 1) Does your mouth feel dry? 2) Does your mouth feel dry while eating? 3) Do you have difficulty swallowing dry foods? 4) Do you sip liquids to aid swallowing? 5) Is the amount of saliva in your mouth too little most of the time? [17].

In addition, a detailed examination of oral cavity was done to elicit findings such as cracked lips, dry tongue, mouth sores and periodontal disease, dry and sticky mucosa, and the thin and pale appearing mucosa will present in place of moist appearance resulting from lack of salivary production, absence of pool of saliva in the floor of mouth [18]. Subjects may also complain of burning mouth as the associated complaint of xerostomia [19].

The mean age of the participants was 61 years (range 45 - 76 years) with equal gender distribution. In the present study the OHIP-14 questionnaire [15] was chosen to measure quality of life as it is a specific oral test to measure the impact of oral disorders. No significant differences were found wrt to age and gender in the assessment of the quality of life. This result was similar to previous reports [20-24].

The diagnosis of xerostomia includes combination of subjective symptoms and objective assessment like assessment of salivary flow rates. Normal salivary flow is highly variable and is usually considered to be 0.25 ml/min. A salivary flow of less than 0.12 - 0.16 ml/min is considered to be abnormal [23]. Also based on individual presentation additional investigations to confirm the diagnosis should be directed towards the aetiology.

Analyzing the distribution of the questions related to the quality of life of the oral health impact profile (OHIP-14) of the patients investigated, it was observed that questions 2, 5, 7, 9, 10, 11 were those with a higher frequency of answers "always" or "repeatedly" among the patients. This reflects in the analysis by domains where the highest scores, and consequently a worse quality of life, are in the domains related to functional limitation, physical pain and physical disability. In a study done by Niklander., *et al.* [25] it was found that the patients with xerostomia obtained higher scores in all OHIP-14 domains with greater impact related to psychological discomfort, psychological incapacity and physical pain. A study conducted by Stenman U., *et al.* [26] also signifies that three highly predictive variables in Indian group of subjects with high OHIP-14 scores i.e. Loss of taste, difficulty to relax and irritability was in correlation for individuals indicating strong influence on OHRQoL was in accordance with present study.

The data in the present study reveals that the oral dryness can be a sensitive tool, because each of the diagnostic xerostomia groups examined showed increased values of functional limitation, physical pain and discomfort. 6 out of 9 clinical parameters included in the study were statistically significant. It was also evident that there was influence between xerostomia and patients' quality of life. It is observed that the higher the degree of severity of the xerostomia, the worse the quality of life, similar with findings in the literature [27,28].

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In the present study, 35 patients were classified as moderate xerostomic in which excessive stickiness of mouth mirror to the buccal mucosa was present. Similarly, 15 severe xerostomia patients had excessive stickiness of intra oral mirror to buccal mucosa or tongue and this correlation was statistically significant and similar to other studies [17,29] which confirmed decreased mucosal wetness in xerostomic patients.

A statistically significant correlation was found between absence of pooling of saliva in the floor of the mouth and degree of dryness. It was found that sticking of mouth mirror to the buccal mucosa was scored most frequently in the moderate dryness group, and least frequently in the normal salivatory group, probably explained by the composition in the normal salivation group.

The normal salivatory group presented with cervical decay or medication-related xerostomia. Mucins are known to play an important role in preventing demineralization. Thus, the cervical decay patients in the normal salivation group could possible have had lower salivary mucin concentrations. Moreover, lower salivary protein concentration result in less lubrication and result in sticking of the mirror to the buccal mucosa of the cheek in patients with normal salivary flow levels.

Dry mouth due to xerostomia, is considered to be one of the causes of the atrophy of tongue papilla. The initial atrophic change of papilla seems to be decreased keratinization and the rounded shape of papilla. As atrophy progresses, the papilla looses their keratinization and become flattened and finally diminishes completely. In the present study, there was no statistical correlation between degree of dryness and loss of papillae on the dorsum of the tongue. This was consistent with results of previous studies [30].

There was no statistical correlation between frothy saliva and degree of dryness. But there was an association noted between glassy appearance of oral mucosa and degree of dryness. 63 subjects had glassy appearance of mucosa with moderate dryness followed by severe dryness. This was similar to reports by Tuner and Rathee., *et al*. [30,31].

Out of 15 patients in severe dryness group, 11 (73%) patients had lobulated and deeply fissured tongue which shows statistically significant correlation between the two. Fissured tongue is usually asymptomatic or present with mild pain. The situation can be worsened by entrapment of food particles within the fissures as a consequence of poor salivary flow, poor oral hygiene and nutrition [32].

A positive correlation and a high statistical significance of 76% was seen in subjects with mild, moderate and severe group which had an association with mucosal debris on palate.

The present study showed an overall mean of the SFR among various stages of xerostomic patients at the 1st, 2nd, and 3rd minutes as 5.70 mm, 9.91 mm, and 13.8 mm among dry mouth subjects; as 4.12 mm, 6.79 mm, and 9.04 mm among mild dryness group; as 1.2 mm, 3.17 mm, and 4.82 mm among moderate dryness respectively. There was a statistically significant correlation in salivary flow rate among moderate dryness group, which could be due to use of multiple drugs.

The advancing age increases the risk of diseases, which inturn increases the number of drugs intake. This can affect the salivary glands function, changing the saliva composition as well as salivary flow rate. In the present study the average drug intake was 5.47 ± 1.55 (1 being the minimum and 6 the maximum). This range is similar to that in other studies, as [33,34] previous reports have emphasized that that the daily intake of more than four drugs reduced salivary flow.

Certain classes of drugs can induce hyposalivation or xerostomia by targeting neurotransmitters and receptors leading to change in salivary composition. Patients with medication-related xerostomia often have a normal salivary flow rate, but with reduced protein concentration [35]. (And certain class of drugs inhibit binding of neurotransmitter to acinar membrane receptors or which interfere with ion transport pathways affecting the quantity as well as the quality of the saliva.

The most common medications causing xerostomia are those with anticholinergic activity, sympathomimetics, and benzodiazepines. Medications that can cause xerostomia include: (a) those that directly damage salivary glands, such as cytotoxic drugs; (b) anticholinergic agents (i.e. atropine, atropinics, hyoscine) and antireflux agents (i.e. proton pump inhibitors e.g. omeprazole); (c) central-acting psychoactive agents, such as antidepressants (i.e. tricyclic compounds), phenothiazines, benzodiazepines, antihistamines, bupropion, and opioids;

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(d) those acting on sympathetic system, such as those with sympathomimetic activity (e.g. ephedrine) and antihypertensives, including a-1 antagonists (e.g. terazosin and prazosin), a-2 agonists (e.g. clonidine), which can reduce salivary flow, and b-blockers (e.g. atenolol and propranolol), which also alter salivary protein levels; and (e) those that deplete fluids, such as diuretics. The risk of xerostomia increases with the synergistic effects of xerostomic medications, multiple medications, higher doses of medication, and the duration of the medication [35].

A statistical significant correlation was seen between degree of dryness and various drugs used. Majority of patients were either on antihypertensive drugs or antidiabteic medication (P = 0.000 < 0.05). This was consistent to previous reports [36-38].

Lastly, out of total, 64 subjects had a pH of 5.5, suggestive of acidic saliva in moderate dryness category. 23 subjects with normal pH of 7 were reported. 13 subjects had a pH of 8.5, suggestive of mild dryness. Previous studies [39,40] also found that saliva flow rate and pH were both directly related to mucosal wetness. Hence, the findings of present are in accordance with the previous studies.

Conclusion

The clinical oral dryness scoring system (OHIP 14) has proven to be a useful tool to assess the effects of salivary hypofunction and lack of mucosal wetness. It indicate the need for intervention or referral from primary care. Another feature is that it takes very little chair-side time during the decision-making process, hence the system can be used very conveniently in general practice as well as in a hospital setting. we can say that quality of life is not related to pale mucosa, number of remaining teeth nor the number of ingested drugs. However, a higher level of xerostomia is significantly associated with a poorer quality of life. Sugarless candies and drinking water are the more frequently used measures to alleviate dry mouth. Due to these results, a good oral health is essential in elderly, so that they can enjoy the best possible quality of life.

Acknowledgements

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