PREVALENCE OF XEROSTOMIA AMONG PATIENTS VISITING PRIVATE DENTAL HOSPITAL IN CHENNAI - A RETROSPECTIVE STUDY.

Running Title: A retrospective analysis of the prevalence of xerostomia in patients attending a private dental hospital in Chennai.

ABSTRACT:

Introduction:

Xerostomia is a dry mouth condition caused by insufficient or absent saliva flow. Xerostomia is not a disorder, but it may be a symptom of a variety of diseases, a side effect of head and neck radiation, or a side effect of a number of drug medications. It may be linked to reduced salivary gland activity or not.

Aim:

To assess the prevalence of xerostomia among patients visiting private dental hospitals in chennai.

Material and methods:

This was a retrospective study done in a university setting . Case sheets of patients who were diagnosed with xerostomia n=24 were obtained from DIAS for analysis between June 2019 - February 2021. The data was then collected using SPSS tools for statistical analysis.A comparison was made between xerostomia with age, gender and predisposing factor.

Results:

There was a high prevalence of xerostomia in females (83.3%) when compared to males (16.7%) among the patients visiting private dental hospitals. Xerostomia was more prevalent in the age group of 55-65 years (41.6%). Most common reason for xerostomia was found to be drug medications (60.87%) followed by other factors like diabetic mellitus, radiation therapy etc. On comparison of age with the predisposing factor of xerostomia it was found that the age group of 55-65 year were mostly affected with drug medications as the most common reason to induce xerostomia which was found to be a statistically insignificant (P value =0.151) Similarly on comparison of gender with predisposing factor of xerostomia, it was found that females were found to be most affected with drug medications as the main predisposing factor which was found to be a statistically significant with p =0.037

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Conclusion:

Despite the limitations of this study, it can be concluded that oral dryness will continue to be a significant health problem as life expectancy rises. As a result, it's critical to comprehend the pathophysiology of xerostomia, as it may be a contributing factor in any systemic disorder.

Keywords:

Xerostomia, radiation, drug medication, dental caries, prevalence, complications, management, innovative technology, novel method

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INTRODUCTION:

Saliva is a complex mixture of fluids, electrolytes, enzymes, and macromolecules that work together to perform many important functions. Salivary functions include lubrication to aid swallowing, the production of amylase enzymes to aid digestion, taste control, defence against caries and pathogens, and speech communication.The paired parotid, submandibular, and sublingual glands are the main salivary glands, and there are hundreds of smaller salivary glands in the oral cavity (1). Dry mouth and objective findings of salivary gland dysfunction are common in the elderly, resulting in both acute and permanent oral and systemic problems. Salivary gland dysfunction, on the other hand, is a temporary illness that can be brought on by systemic diseases, medications, or head and neck radiotherapy. Saliva is one of the body's most important fluids (2). Patients don't know how important it is until it's gone, and everyday tasks like eating and communicating become a challenge. In clinical practise, dry mouth, also known as xerostomia, is a common complaint (3). Xerostomia is described as "a subjective sensation of dry mouth" that is often linked to low salivary flow rates .Nonetheless, many patients experience a dry mouth despite usual salivary flow rates, implying that xerostomia is not always due to a lack of salivary gland activity. Hyposalivation is characterised as a decrease in the rate of salivary flow. Saliva is classified as either unstimulated (resting) or stimulated (active). The basal flow rate aimed at preserving the oral mucosa has been estimated to range from about 0.29 ml/min to 0.4l ml/min in unstimulated saliva.Saliva stimulation aids in mastication and digestion, and has been measured at 1-2 ml/min . Xerostomia is a very common problem. Its prevalence is difficult to assess since it differs across geographical zones and age groups, as well as variations in study inclusion criteria and methodology. Patients can be unaware that their salivary flow is being reduced before some of the consequences, such as a rise in cervical dental caries, become evident (4) . The patient is likely to seek treatment from the doctor only after experiencing symptoms such as soreness, burning, or trouble swallowing (5). The salivary glands are innervated by both the parasympathetic and sympathetic nervous systems. More watery secretions are produced by parasympathetic stimulation, while the sympathetic system

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produces a sparser and more viscous discharge (6) . As a result, a feeling of dryness can occur during episodes of acute anxiety or stress, which cause changes in salivary composition due to prevailing sympathetic stimulation during these times (7). Dehydration of the oral mucosa, which occurs when the production of the major and/or minor salivary glands decreases and the layer of saliva that covers the oral mucosa is decreased, may cause symptoms of a lack of saliva or oral dryness (8). Antihypertensives, antidepressants, analgesics, tranquilisers, diuretics, and antihistamines are only a few of the drug medication that may induce or intensify xerostomia. These medications affect the quantity and probably the consistency of saliva, but the problem is typically temporary or reversible (9). When xerostomia is combined with xerophthalmia, also known as "dry eyes," it may indicate a chronic autoimmune disease known as Sjögren's syndrome, which mostly affects women in their forties and fifties (10). The progressive lymphocytic invasion that progressively kills the secretory acini of the main and minor salivary glands has been blamed for the xerostomia associated with primary and secondary Sjögren's syndrome. Another cause of glandular dysfunction may be a blockage of glandular nerve stimulation (11). The reduction in secretions may first affect the minor salivary glands, causing xerostomia symptoms. Radiation can cause damage to the major and minor salivary glands, resulting in secretory atrophy and varying levels of temporary or permanent xerostomia (12). Arthritides, parotid gland enlargement, and xerostomia have all been linked to HIV infection. Since receiving allogeneic bone marrow transplantation, patients who acquired chronic graft-vs.-host disease developed xerostomia . Loss of saliva and a variety of immunological disorders have also been linked to silicone breast implants as possible side effects (13). Patients with diabetes, particularly those with poor glycemic control, are more likely to experience xerostomia and have reduced salivary flow .The opportunistic fungus Candida albicans, also known as thrush, will invade the oral cavity and oropharynx if there isn't enough saliva. Oral erythema, white, curd like patches that cling to the mucosal surfaces, and inflamed fissures at the corners of the mouth, a condition known as cheilitis, are all symptoms of Candida infection (14) . Thus the aim of this study is to assess the prevalence of xerostomia which would contribute in controlling and diagnosing systemic conditions thereby reducing complications. Our team has extensive knowledge and research experience that has translate into high quality publications (15),(16),(17),(18),(19),(20),(21),(22),(23),(24),(25),(26),(27),(28),(29),(30),(31),(32),(33),(34).

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MATERIALS AND METHODS:

A retrospective study was conducted from June 2019 - February 2021 with a total of n= 24 patients with xerostomia visiting Saveetha dental college in Chennai. Data were collected by reviewing records of 535951 patients. All the case sheets included in this study were approved and reviewed. Also, cross verification of data was done by photographs. Parameters such as age, gender, and the predisposing factor of xerostomia were collected. Approval from the ethical committee was taken before the start of the study. All the data were calculated and tabulated in MS Excel. The analysis is done by using SPSS software version 23, Chicago. The results were interrupted in graphs.

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RESULTS:

This study was conducted to assess the prevalence of xerostomia among patients visiting private dental hospitals. Patients with xerostomia visited the dental college were randomly selected (n=24). Then the cases were sorted according to the age, gender and predisposing factors. After collecting the data, the prevalence of xerostomia in different genders was analysed. It was found that mostly females (83.33%) were affected by xerostomia when compared to males (16.67%) in the given population (Figure 1). Xerostomia prevalence in different age group was also estimated, in which age group of 56-65 years old (41.67%) were more prone to xerostomia, 33.33% were 46-55 years old, 12.50% were 66-75 years old, 8.33% were 36-45 year old and 4.17% were 76-85 years old (figure 2). Predisposing factor of xerostomia was also noted in this analysis (Figure 3). Almost over in half of the population xerostomia was mainly due to usage of drug medications (50.00%). Other predisposing factors that contributed to xerostomia were diabetes mellitus (20.83%), radiation therapy (16.67%), idiopathic xerostomia (8.33%) and smoking (4.17%). The association of age and predisposing factor of xerostomia was also analysed (Figure 4). It implies that the age group of 55-65 years were mostly prone to xerostomia with major cause as drug medications (20.83%). 46-55 years age group due to medication intake induced xerostomia (20.83%), 36-45 years age group were mostly affected with both medication and diabetes mellitus in equal proportion (4.17%), 66-75 years age group were had idiopathic xerostomia and 76-85 years age group was mostly affected by drug medication (4.17%). We observed that the age group of 55-65 years were mostly prone to xerostomia with drug medication as a major reason though $p = 0.151$ ($p<0.05$), and was not statistically significant . Similarly another comparison done between gender and predisposing factor of xerostomia (Figure 5) and it was found that females were mostly affected with xerostomia with usage of drug medication (45.83%) and in males xerostomia was mostly due to radiation therapy (8.33%). From this analysis we can imply that females were mostly prone to xerostomia which was found to be statistically significant usage of medication $p= 0.037$ ($p<0.05$).

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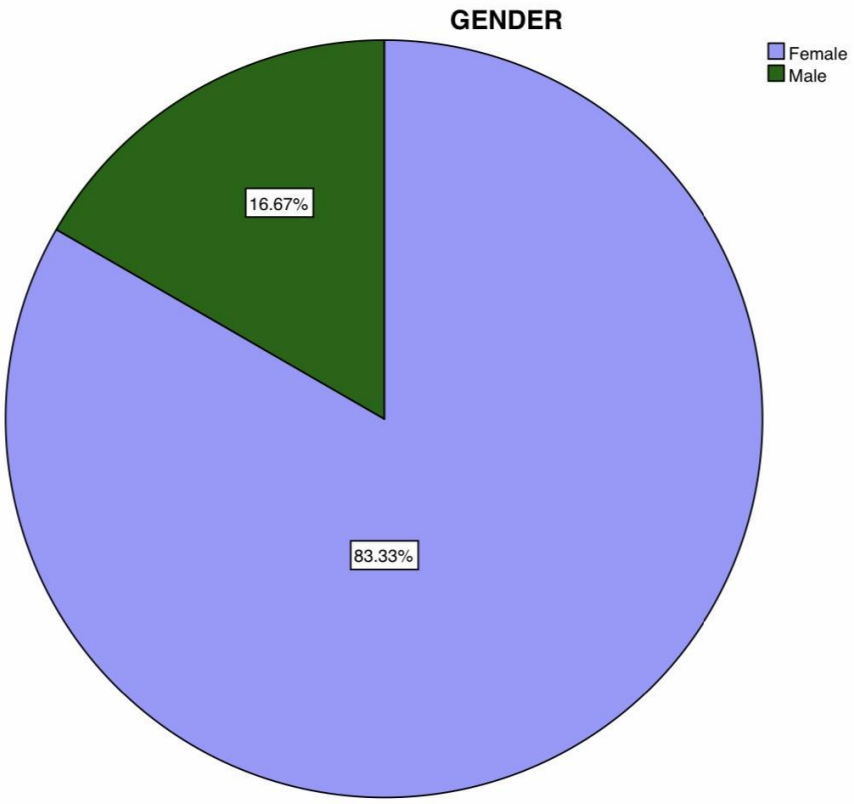

Figure 1: This pie chart represents the distribution of xerostomia in relation to gender. Blue colour in the pie denotes the female population and green colour represents males population. Nearly more than half of the study population who are affected by xerostomia were females (83.33%) and only 16.67% were males.

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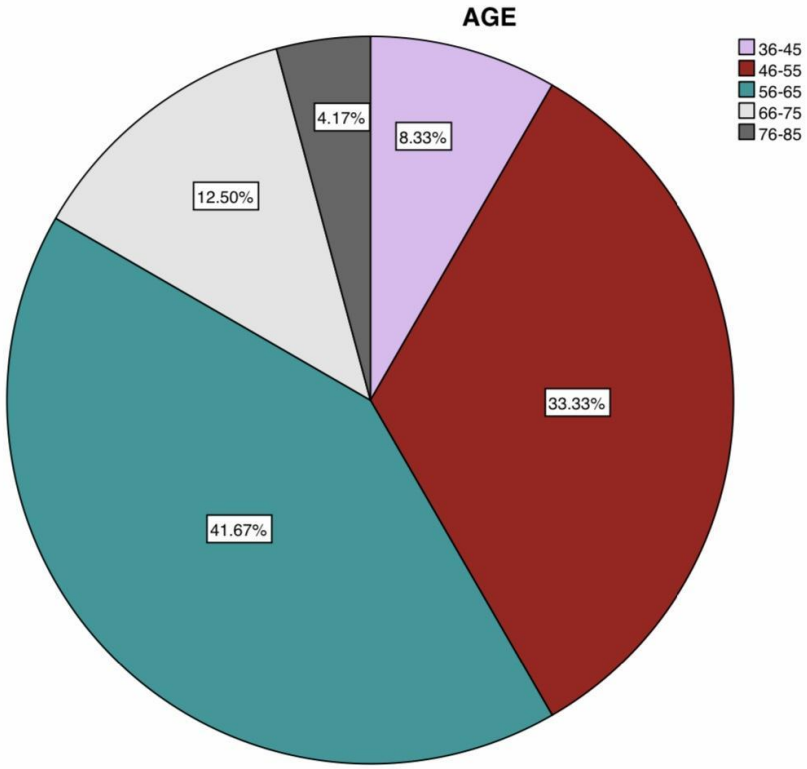

Figure 2: This pie chart depicts the age distribution of patients affected with xerostomia. In which xerostomia was more prevalent among age group of 56-65 years old (41.67%) followed by 46-55 years old (33.33%), 66-75 years old (12.50%), 36-45 years old (8.33%) and 76-85 (4.17%).

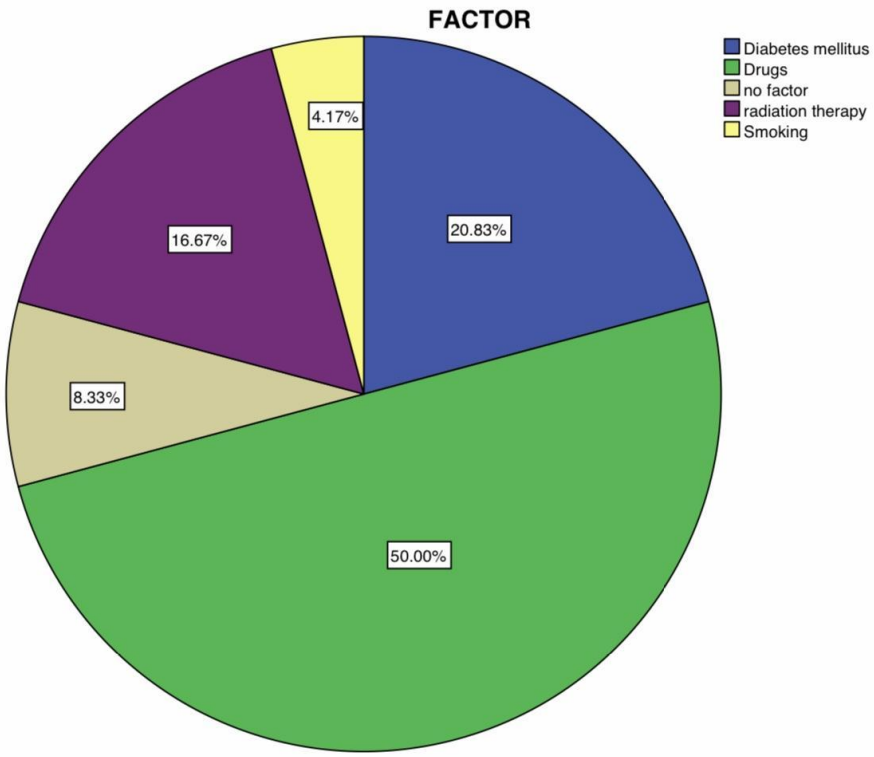

Figure 3: This pie chart represents the predisposing factor of xerostomia. It was found that usage of drug medication (50.00%) was found to be the most common predisposing factor of xerostomia followed by 20.83% was by diabetes mellitus, 16.67% was by radiation therapy, 8.33% was no factor (reason not known) and 4.17% was by smoking.

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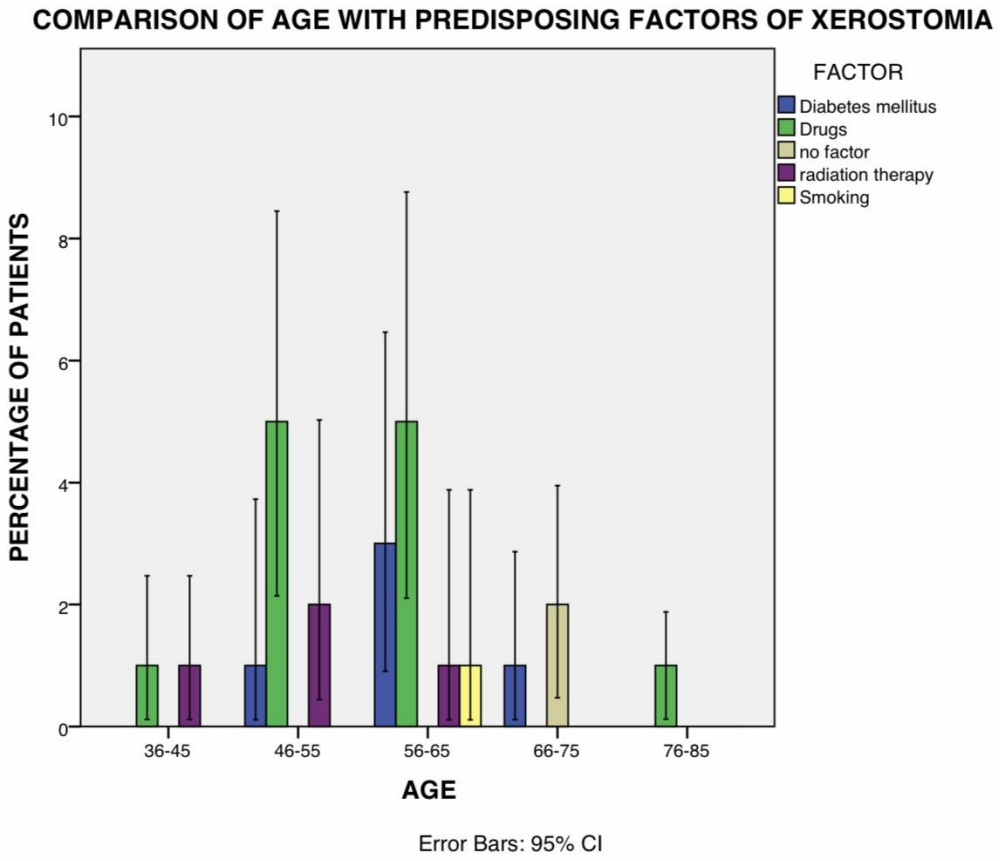

Figure 4: Bar graph depicting the association of age and predisposing factor of xerostomia .X axis represents age distribution and Y axis represents predisposing factors of xerostomia which would include diabetic mellitus, radiation therapy, drug medication, smoking and no factors. It was found that xerostomia was more prevalent in the age group of 55-65 years with drug medication (20.83%) as the main predisposing factor, in age group of 46-55 years xerostomia was mostly by drug medication (20.83%), in age group of 36-45 years, xerostomia was mostly by by both drug (4.17%) and diabetes mellitus (4.17%), in age group of 66-75 years xerostomia reason was mostly not known (8.33%) and in age group of 76-85 years xerostomia was mostly caused by drug medication (4.17%). This was found to be a statistically insignificant P value = 0.151, P=>0.05. So, from this graph we can interpret that the age group of 55-65 year (20.83%) are more prone to xerostomia by usage of drug medication.

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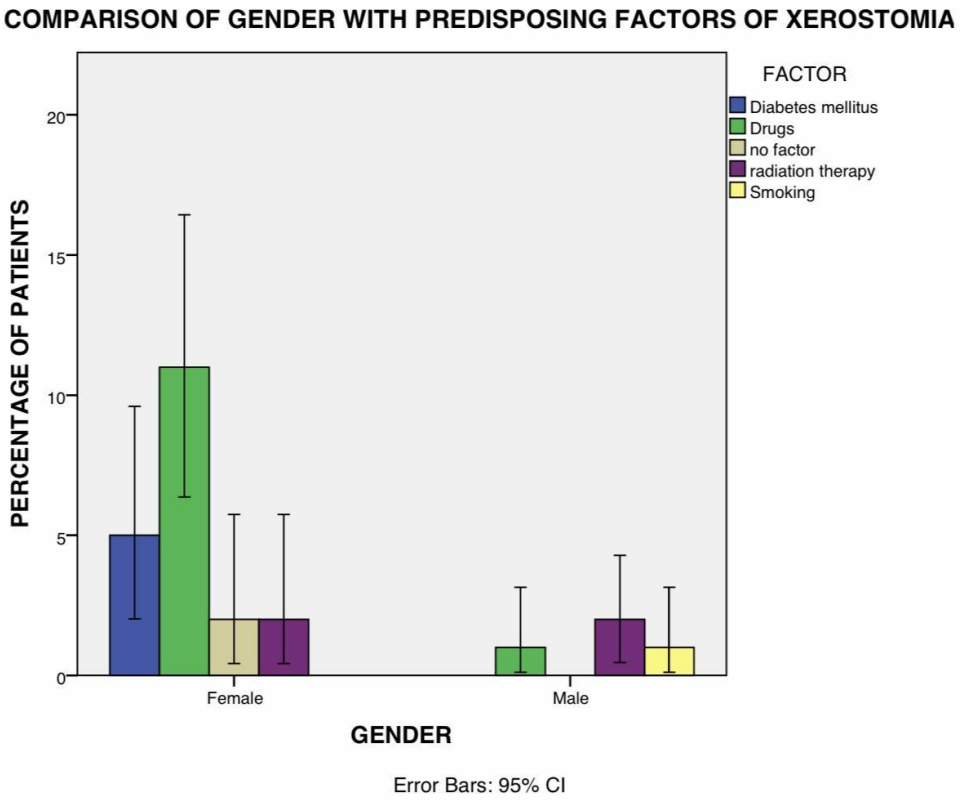

Figure 5: Bar graph depicting the association of gender and predisposing factor. X axis represents gender distribution and Y axis represents predisposing factors which would include diabetic mellitus, radiation therapy, drug medication, smoking and no factors. It was found that xerostomia was more prevalent in the females with drug medication (45.83%) as the main predisposing factor. In males xerostomia was mostly by radiation therapy (8.33%). This was found to be a statistically significant P value = 0.037, P=<0.05.So, from this graph we can interpret that the females (45.83%) are more prone to xerostomia by usage of drug medication.

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DISCUSSION:

Dry mouth, also known as xerostomia, is a disease in which the salivary glands do not provide sufficient saliva to keep your mouth moist. Xerostomia is a common side effect of some treatments, as well as age conditions and cancer radiation therapy. Dry mouth is most often affected by a disease that affects the salivary glands directly. From this study it was found that females (83.33%) were more prone to xerostomia when compared to males (16.67%) (figure 1). In a study by Mustafa et al., states that prevalence of xerostomia was significantly higher among

females (19.51%) than males (11.91%) (P=0.001). This might be related to the women's menopausal age of in this regard, it has been suggested that both quantity and quality of saliva will be influenced by the menopause change, thus being mainly important for xerostomia. Some studies on healthy women have reported higher salivary secretion before menopause than after whilst others did not find any difference (35). Puberty and menopause in women brings about some changes in the salivary content (36). The difference in saliva content amongst perimenopausal and postmenopausal women has been suggested to be due to the amount of oestrogen present, as well as the possibility that women show higher pain severity and are more vocal regarding their overall disease.(37) In contrast to this study, a presnt study by Murray et al., states that no appreciable sex difference was observed (38).

It was found that the prevalence of xerostomia in the age group of 55-65 years was more when compared to other age groups (Figure 2). In a survey by JOHANSEN and colleagues , 65-year-old Swedish people, discovered a 15% prevalence of xerostomia. According to an Australian report on the prevalence of xerostomia, 20% of participants in the 65–69 year old age group had "frequently" or "often" dry mouth . Cause of xerostomia in geriatric population has been attributed to use of medication ,chronic disorders and radiation therapy to the head and neck region which could reduce the function of salivary glands. Dry mouth affects many older adults for a number of reasons (39). Surprisingly, the development of the main salivary glands does not decrease clinically in healthy elderly people. In the absence of significant medical conditions or drug use, some reports indicate age-related improvements in salivary constituents, while other research indicates age-stable development of salivary electrolytes and proteins. Clinicians should not attribute an older person's symptoms of dry mouth and findings of salivary hypofunction to his or her age; instead, a proper diagnosis is needed. Systemic diseases and their therapies are the most common causes of salivary disorders in the elderly population (for example, anticholinergic medications or radiation therapy) (40). In contrast to this previous study, a New Zealand study found a 10% prevalence of xerostomia in a population of 32-year-old adults These results could imply that xerostomia is not caused solely by age (41) .

Xerostomia is caused by various factors. Only when we know the cause can it be treated correctly. Figure 3 shows the predisposing factors of xerostomia. In which usage of drug medication was found to be more (50.00%). In support of the present study, Jose et al., prevalence of drug induced xerostomia was found to be more. One of the most common causes of oral health issues in elderly people on long-term drug therapy is drug-induced xerostomia. The drug medication that causes xerostomia are termed as xerogenic drug medication. More than 500 drug medications have been linked to the etiology of xerostomia to date (42). The drug medication that causes xerostomia are anticholinergic agents ,antidepressants and antipsychotics are both antidepressants and antipsychotics, antihypertensive medication, diuretics, muscle relaxants, sedatives, and anxiolytics, as well as analgesics , nonsteroidal anti-inflammatory drug medication (NSAIDs) are medications that are used to treat inflammation (NSAIDs) and antihistamines are medications that are used to treat allergies (43). Radiation therapy, smoking, diabetes mellitus, and idiopathic xerostomia are some of the other causes of xerostomia (44). The

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degree of radiation exposure of the salivary tissues determines the intensity of xerostomia. Dry mouth is common in uncontrolled diabetic patients due to polyuria and dehydration (45). When compared to patients with well-regulated diabetes, patients with poorly controlled diabetes have lower parotid flow rates. Unknown-origin xerostomia may be caused by neuropathic etiology, changes in saliva composition, smaller salivary gland size, and illnesses like oral lichen planus. Some of the recent research has shown conflicting findings when it comes to decreased salivary flow in people taking multiple xerostomia-inducing drug medication (46) .

We also observed the association between age and predisposing factors of xerostomia. In which age group of 55-65 years were more prone to xerostomia with drug medication as reason when compared to other age groups (Figure 4). This was found to be a statistically insignificant P value = 0.794, P=>0.05. A previous study states that, EKBACK and colleagues recorded a 30% prevalence of xerostomia in 65-year-old Norwegians from the western part of Norway in 2009 (47). Furthermore, evidence suggests that the salivary glands of elderly people are vulnerable to the harmful effects of all predisposing factors, which may explain why salivary problems become more frequent as people age (48) .

Similar association was done between gender and predisposing factors of xerostomia (Figure 5). It was found that females (45.83%) were mostly found with xerostomia when compared to males again with drug medication as a common reason. A similar study states that psychological conditions such as anxiety and depression may trigger dry mouth, as women are more likely than men to experience psychological symptoms or diseases. Females had a higher prevalence of xerostomia than males, which may be attributed to females having a significantly higher prevalence of medical problems and drug use than males (49).

The limitation of this study is minimum external validity and also the validity can be extended by subjects of a wider demographic range which would help in knowing prevalence of xerostomia in different places. The future scope is to increase the study population and analyse various types of drug medication that cause xerostomia. Therefore It can be concluded that in this given population, females in the 55-65 years are mostly affected by xerostomia due to drug medication.

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CONCLUSION:

Within the limitation of this study it was found that the prevalence of xerostomia was found to be much lesser when compared to total population. Xerostomia was more prevalent in females when compared to males in the age group of 55-65 years with major predisposing factors as drug medication. However age comparison with predisposing factors was not found to be significant. This indicates that the newer drug invention has led to this effect.The treatment of xerostomia is mostly palliative, with a focus on saliva substitutes. Furthermore, variations in the incidence of xerostomia found between studies from various periods of time may be due to the fact that new and improved treatments have less side effects. So by knowing the prevalence of xerostomia, it could be easier to identify and prevent the progression of systemic disease. This research would

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help the dentist in aiding new treatment methods and also to know about the significance of xerostomia and avoid negligence of this key factor. Thus xerostomia could serve as a main role in treating oral and systemic diseases.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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