Assessment Of Incidence Of Oral Submucous Fibrosis Patients - An Institutional Study

Research Article

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Abstract

Background: Oral submucous fibrosis (OSMF) is an oral precancerous condition characterized by inflammation and progressive fibrosis of the submucosal tissues resulting in marked rigidity and trismus. It has a malignant transformation rate of about 7.6%. The etiopathogenesis of this disease is multifactorial, yet Areca nut chewing in any formulation is considered as the most significant causative agent.

Aim: To assess the prevalence of Oral submucous fibrosis in patients reporting to private university hospital setting.

Materials and methods: All the cases reported between the month of June 2019 to March 2020 having Oral submucous fibrosis were chosen for this study. Data of OSMF patients were retrieved from dental records and analyzed. The incidence of OSMF was tabulated and was subjected to statistical analysis.

Results: From the statistical analysis, it is observed that OSMF has male predilection (91.7%), with the most commonly involved age group between 2nd to 6th decade of life and the frequency of both the arches involved were equally higher. The most common habit associated with the patients of oral submucous fibrosis was pan chewing (36.9%) followed by usage of Areca nuts (30.2%).

Conclusion: Within the limitation of the given study, oral submucous fibrosis was observed to have Male predilection, primarily affecting people between the age group of 20 to 60 years and predominantly associated with the usage of pan, Areca nuts and gutka.

Clinical Significance: With the current study as a platform, prevalence of Oral submucous fibrosis among different age groups and genders can be evaluated to enable dentists gain a thorough knowledge on susceptibility groups and will also aid in improving general public oral health.

Keywords: OSMF; Areca Nut; Pan; Gutka; Malignant Transformation; Juxta Epithelial- Inflammatory Reaction.

Introduction

Oral Submucous Fibrosis (OSMF) is a potentially malignant disorder affecting the tissues of the oral cavity. Schwartz in 1952 described oral submucous fibrosis "Atrophia idiopathica mucosae oris" and as an "insidious, chronic disease that affects any part of the mouth and sometimes the pharynx" by Jens J. Pindborg in 1966 [1]. Although occasionally preceded by, or related to, the formation of vesicles, it's always related to a juxta epithelial inflammatory reaction followed by fibroelastic change of the lamina propria and epithelial atrophy that results in stiffness of the oral

mucosa and causes trismus and an inability to eat" [1]. OSMF is additionally characterized by depapillation of the tongue, progressive reduction of mouth opening, reduced movement, blanching and leathery texture of the oral mucosa and shrunken uvula [2, 3]. Other terms used to express OSMF include idiopathic scleroderma of the mouth, juxta epithelial fibrosis, idiopathic palatal fibrosis, diffuse oral submucous fibrosis, and sclerosing stomatitis [4, 5]. Worldwide, the number of cases of OSMF was estimated to be 2.5 million in 1996 [6]. The prevalence of OSMF in India has been estimated to range from 0.2–2.3% in males and 1.2–4.6% in females, with a broad age range from 11 to 60 years [7]. The

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prevalence of OSMF in uttar pradesh was found to be 6.3% with a male to female ratio of 6.88:1. The study conducted by Nitin Kumar in 2014, proved that that OSMF was common in 36–40 yr of both sexes followed by 21–25 yr age groups of which 66.66% were gutka users, 22.22% were pan users and only 11.11% were areca nut users [7, 8].

Although the etiopathogenesis of this disease is multifactorial, areca nut-chewing in any formulation is taken into account as the most causative agent. Contributory risk factors suggested include chewing of smokeless tobacco, high intake of chilies, toxic levels of copper in foodstuffs and masticatories, vitamin deficiencies, and malnutrition leading to low levels of serum proteins, anemia and genetic predisposition [9]. The chewing of betel quid which contains betel nut, tobacco and calcium hydroxide, has been recognized collectively as the foremost important risk factors for OSMF. Areca nuts consist of alkaloids, flavonoids and trace elements. Four alkaloids are identified in areca nuts: arecoline, arecaidine, guvacine and guvacoline of which arecoline is the most potent agent [10]. Flavonoid components like tannins and catechins directly affect collagen metabolism [2]. The copper content of betel nut is high and therefore the possible role of copper as a mediator of fibrosis is supported by the demonstration of the up regulation of lysyl oxidase in OSMF biopsies [11]. Globally, 600 million people are estimated to be betel nut chewers [12]. Though, only 1-2% of betel nut users may ensue the disease. This shows a clear genetic susceptibility.

The progression of OSMF even with the absence of intraoral factors suggests the role of other factors including genetic predisposition and an increased frequency of human leukocyte antigens (HLA) [13]. It would thus be logical to hypothesize that the increased collagen synthesis or reduced collagen degradation is the possible mechanism for the development of the disease. There are numerous biological pathways involved in the above processes and it is likely that the conventional regulatory mechanisms are either upregulated or downregulated at different stages of the disease. Ultimately, the subsequent cell types are affected through these pathways, namely, fibroblasts, endothelial cells and epithelial cells. ROS activation, damage to cellular targets like DNA, protein, lipid after metabolic activation of the betel nut components by phase 1 enzymes (e.g., cytochrome P450s), the cytotoxic effects of betel nut constituents, keratinocyte inflammation and oncogene activation are considered to be the promoting factors [14]. Also, among the oral lesions encountered in HIV patients, 2% of the affected individuals had oral submucous fibrosis [15].

Numerous treatment modalities are implicated to cure OSMF, like the utilization of corticosteroids, hyaluronidase, placentrex, IFN, and microwave diathermy, etc. Surgical management for OSMF is additionally considered by excision of fibrotic tissues and covering the defect with grafts [16]. The use of Buccal fat pad graft for intra oral defects demonstrated to possess finer outcomes because the interposition material had good patient acceptance, minimal donor site morbidity, rapid epithelization of tissues, minimal intra and postoperative complications [17]. Recent literature proved that the combination of medicine aided in management of OSMF [18, 19]. Botulinum improves muscle spasms caused by cancerous mass lesions and alleviates the postoperative neuropathic pain at the site of surgery and radiation and can be used as an adjuvant in carcinomas [20]. Yet, Exodontia and dentoalveolar surgery in patients with oral premalignant conditions may cause

distressing sequelae and diagnosis of any subsequent complications like space infection would become difficult. Hence, such patients must be treated as a special care group and measures should be adopted to ease distress [21]. All the above discussions prompted us to conduct a study with limited resources in Saveetha Dental College, so as to chart out the magnitude of the OSMF among different age groups within the population. Thus, the aim of the current study is to quantitatively and qualitatively analyse the prevalence of oral submucous fibrosis among patients utilising Saveetha Dental College outpatient department.

Materials and Methods

This was a retrospective study conducted under a university setting. Ethical approval for the current study was obtained from the institutional ethical board (Ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). This study had advantages of easy access to the software, large data availability yet also had disadvantages of smaller sample size and geographic limitation. In the current study the data of patients who visited Saveetha dental college from June 2019 to April 2020 were retrieved from the dental records. The Sample size for the study was n =95.

Inclusion criteria:Patients of all age groups (from 21 to 69 years), genders (both male and females) with oral submucous fibrosis and their associated habits such as Areca nut, pan chewing, gutka habits, and usage of other tobacco related products were included in the study.

Exclusion criteria: Patients without oral submucous fibrosis and patients without follow up are excluded from the current study.

All the case sheets included in the study were approved and verified by an external reviewer to avoid errors while recording. Also Cross- verification of data was done with photographs and direct communication with dentists. Data for the study was retrieved and the collected data were tabulated in the excel sheet. Parameters such as age, gender, the arch or quadrant affected and the habits associated were included, correlated and analysed. This data was then imported to SPSS by IBM after coding. Frequency of all the parameters considered were drafted. Parametric and non-parametric correlations were done. Following which graphs were made. Non parametric tests were generated by clicking on legacy dialogue, chi square test was run and P value was determined to verify the significance of each of the variables considered and the results were interpreted and analysed statistically.

Results

From the statistical analysis done using SPSS by IBM , it can be well documented that OSMF shows higher male predilection 91.7% than females (7.3%) with p value less than 0.05 showing statistical significance (Figure 1, Table1). The most common age group affected was between the 2nd to 6th decade of life with prevalence of 51% in individuals between 20 to 40 years and 47.7% in individuals within the 40 to 60 year age bracket. P value is greater than 0.05, this insignificance can be attributed to lesser sample size and unbiased data considered (Figure 2, Table 2). With regard to the quadrant or the arch affected by oral submucous fibrosis in the oral cavity 90.6% of times both the

arches were equally involved, with p value less than 0.05 showing statistical significance (Figure 3, Table3). The commonest habits associated with patients experiencing oral submucous fibrosis are pan chewing (39.6%) followed by Areca nuts usage (30.2%) with p value less than 0.05 showing statistical significance (Figure 4, Table 4).

Discussion

Oral submucous fibrosis is an insidious chronic condition affecting any part of the oral cavity and is graded into so many different stages as given by different authors. Mathur and Jha in 1993 [22] Classified clinical features of oral submucous fibrosis into three different stages. Stage one is early OSMF which includes mild blanching, No restriction in mouth opening, no restriction in tongue protrusion. Stage two is moderate OSMF which shows moderate to severe blanching, reduction in mouth opening by 33%, presence of palpable bands and lymphadenopathy either unilateral or bilateral. Stage three is severe OSMF that includes symptoms and signs such as severe burning sensation, 66% reduction in mouth opening, ulcerative lesions in buccal mucosa, thick palpable bands and bilateral evidence of lymphadenopathy. Also that there is a significant association between OSMF, serum cortisol level and anxiety [22, 23]. Kerr et al., in 2011 [24] Proposed a disease grading system for OSMF in five grades; grade 1 is mild with features such as burning sensation, depapillation, blanching or leathery mucosa and interIncisal mouth opening >35mm. Grade 2 is moderate with interIncisal mouth opening limited to 20 to 35mm. Grade 3 is severe with inter-Incisal opening <20mm. Grade 4A is the presence of other oral potentially

Figure 1. Bar graph showing the association between gender and oral submucous fibrosis. Frequency of Male patients are represented by blue and females by red. The X axis shows the gender of the patients and Y axis scale shows the total number of cases from 0 to 100. It is evident that the prevalence of OSMF is higher among male patients(91.7%) than females (only 7.3%). Chi square test shows P value-0.000 (< 0.005), hence found to be statistically significant association gender and oral submucous fibrosis patients.
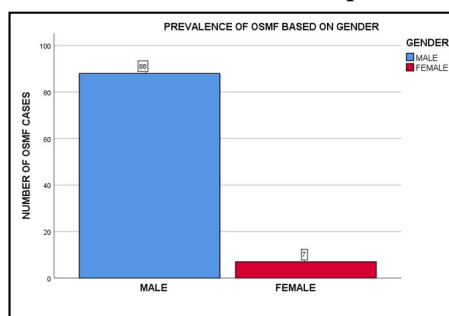
Figure 2. Bar graph showing the association between age and oral submucous fibrosis, Different age groups are represented in red colour. It is evident from the graph that the prevalence of OSMF is higher among patients between the 2nd to 4th decade of life (77%). Chi square test reveals p value to be 0.991 (p>0.05) and hence statistically not significant. Even though statistically not significant, the incidence of oral sub mucous fibrosis is more among the 20 - 50 years age group.
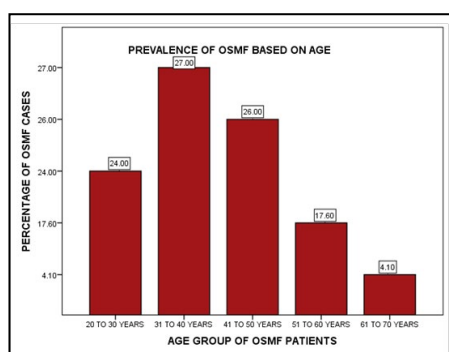
Figure 3. Bar graph showing the association between the arch or quadrant affected and oral submucous fibrosis. The X axis represents different quadrants affected by OSMF.The Y axis represents the number of OSMF patients.It is evident from the above graph that the incidence of OSMF had equally occurred on both the arches (90.6%).Chi square test showed p- 0.000 (p<0.005), hence found to be statistically significant.from the graph, it is evident that in both the arches were affected more in OSMF when compared to other arches individually.
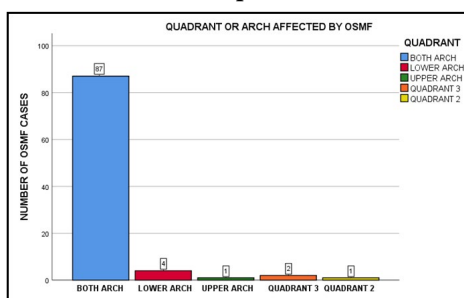
Figure 4. Bar graph showing the association between habits and oral submucous fibrosis. The X axis shows the habits associated and Y axis represents the number of osmf patients. It is evident that pan chewing (39.6%) was higher in OSMF patients followed by the usage of Areca nuts (30%), gutka and other tobacco related products. P value 0.000 (p< 0.05), hence found to have statistically significant.From the graph it is evident that pan chewing and areca nut chewing have a statistically significant role in the causation of OSMF .(Chi-Square test).
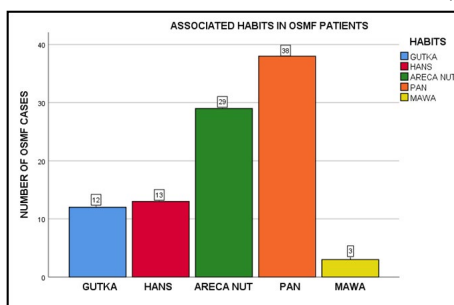

Figure 5. Comparative Bar graph showing correlations between age, gender and associated habits of OSMF patients. Red displays usage of gutka, green represents Areca Nut usage and organ represents the usage of pan. The X axis shows the gender of the patients and Y axis shows the age of the patients. It is evident that Areca nut and paan chewing habits were more prevalent higher in males of age group 40 to 60 years. Whereas in females the incidence of Areca nut chewing habit was more among females.Chi square P value 0.000(< 0.005), hence found to be statistically significant. From the graph, it is evident that habits strongly correlate with causation of OSMF in both genders and age groups.
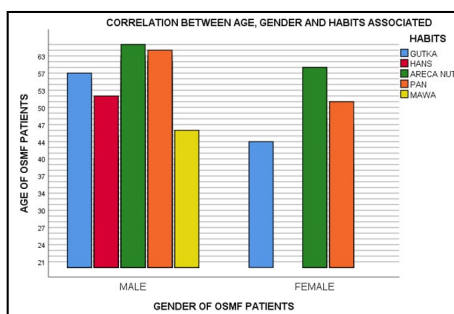

Table 1. Analysis of distribution of OSMF among different genders. This table shows the distribution of gender of the patients in oral submucous fibrosis.It is evident that the prevalence of OSMF is higher among male patients(91.7%) than females (only 7.3%).

GENDER					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MALE	88	91.7	92.6	92.6
	FEMALE	7	7.3	7.4	100.0
	Total	95	99.0	100.0	
Missing	System	1	1.0		
Total		96	100.0		

Table 2. Analysis of distribution of OSMF among different age groups.This table depicts distribution of age group of patients in oral submucous fibrosis.Percentage of osmf patients distributed among different age groups were represented in this table.It is evident from the table,that the prevalence of OSMF is higher among patients between the 2nd to 4th decade of life (77%).

AGE			
		Frequency	Percentage
Valid	20 to 30 years	23	24
	31 to 40 years	26	27
	41 to 50 years	25	26
	51 to 60 years	17	17.6
	61 to 70 years	4	4.1
	Total	95	99
Missing	System	1	1
Total		96	100

Table 3. Analysis of frequency of Quadrant affected in OSMF.This table shows the distribution of arch or quadrant affected in oral submucous fibrosis patients.It is evident from the above table that the incidence of OSMF had equally occurred on both the arches (90.6%).

QUADRANT		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BOTH ARCH	87	90.6	91.6	91.6
	LOWER ARCH	4	4.2	4.2	95.8
	UPPER ARCH	1	1	1.1	96.8
	QUADRANT 3	2	2.1	2.1	98.9
	QUADRANT 2	1	1	1.1	100
	Total	95	99	100	
Missing	System	1	1		
Total		96	100		

Table 4. Analysis of frequency of Habits associated with OSMF patients.Bar graph showing the association between habits and oral submucous fibrosis. The X axis shows the habits associated and Y axis represents the number of osmf patients. It is evident that pan chewing (39.6%) was higher in OSMF patients followed by the usage of Areca nuts (30%), gutka and other tobacco related products. P value 0.000 (p< 0.05), hence found to have statistically significant.From the table it is evident that pan chewing and areca nut chewing have statistically significant role in the causation of OSMF. (Chi-Square test).

HABITS		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	GUTKA	12	12.5	12.6	12.6
	HANS	13	13.5	13.7	26.3
	ARECA NUT	29	30.2	30.5	56.8
	PAN	38	39.6	40.0	96.8
	MAWA	3	3.1	3.2	100.0
	Total	95	99.0	100.0	
Missing	System	1	1.0		
Total		96	100.0		

Table 5. Table showing statistical analysis using the chi square test done in SPSS by IBM. This table reveals that all the parameters considered such as the gender, arch involved and habits associated with OSMF patients are statistically significant. The variable Age of the patients was not significant which states that age of patient does not have a significant role in oral submucous fibrosis which means we cannot say that this age group will commonly get affected by OSMF.

TEST STATISTICS	AGE	GENDER	QUADRANT	HABITS
Chi-Square	20.358[a]	69.063[b]	304.526[c]	42.211[c]
df	38	1	4	4
Asymp. Sig.	.991	.000	.000	.000

malignant disorders along with OSMF [25]. Grade 4B is OSMF with oral epithelial dysplasia on biopsy. Grade 5 is OSMF along with oral squamous cell carcinoma [26].

With regard to biopsies done for OSMF, Swishing the mouth with water and 0.2% chlorhexidine mouthwash for 1-2 minutes is generally done before proceeding with biopsy [27]. During biopsy Local anaesthesia will be given as an infiltration of 1.5ml of 2% of lignocaine hydrochloride solution 1cm away from the lesion [28]. Also, new research on osteotomy procedures had proved Coronoidectomy to be an effective adjunct therapy in increasing intraoperative and stabilizing postoperative mouth opening in

OSMF [29, 30]. Following the use of surgical blades for OSMF Surgery, they should be disposed of, in white coloured bins used for disposing sharp instruments [31].

According to the present study, OSMF has higher male predilection in its occurrence. 91.7% in males and 7.3% of females were affected. This result was in concordance with the study conducted by Rahul Srivastav in 2019, who argued that occurrence of OSMF was higher among male patients (97.33%) than females (2.33%) [32]. Also a study conducted by Vikash. K in 2019 in Odisha revealed that OSMF occurrence was higher among Males (91%) than females (7%) [33]. This difference could be attributed

to the fact that the availability of processed areca nuts and the widespread acceptance of its use to be higher by males than females. There are reports suggesting that males are highly addicted towards alcohol, tobacco and tobacco related productions that females, hence this might suggest a male predilection of osmf. Thus, the above mentioned results add on to the confirmation of gender orientation and male predilection in OSMF.

With regard to the frequency of OSMF prevalence among different age groups, 35.4% of individuals were between 21 to 35 years, 29.1% of patients between 36 to 45 years, 25.9 % of patients within 46 to 55 years age bracket, 13.5 % of individuals between 55 to 65 years and only 2% of individuals above 65 years were affected. This helps in concluding that individuals among the age group of 20 to 40 years where most affected and patients above the age group of 60 years were least affected by OSMF. This is in accordance to the study conducted by Gaurar Mishra in 2016, who concluded that 27.5% of patients affected were in the age group of 25-34 years and 5.6% of patients were in the age group of 65 and above [34]. The reason could be attributed to the increased addiction of adolescents and young adults towards psychological euphoria created by consumption of tobacco and tobacco related products.

As a note on the habits associated with OSMF patients, 12.5% of the patients were gutka users, 29% of them were inclined towards the usage of areca nuts and 38% of the patients were pan chewers. This is suggestive of higher inclination of patients towards pan habits. This is a bit controversial to the result gained by Nitin Kumar Nigam in 2014, who concluded that, of 63 OSMF patients 66.66% were gutka users, 22.22% were pan chewers and 11.11% of individuals were Areca nut users [35]. This dissimilarity could be attributed to lesser sample size and constructed population considered. Associated habits are of greater significance as, Tobacco contains up to 50 potential carcinogens, such as polycyclic aromatic hydrocarbons and nitrosamines. Some of them may cause modulation of the immune systems, mutations of the p53 tumour-suppressor gene or other genes that are involved in cell-cycle regulation. This thus shows that tobacco was strongly associated with OSMF and other premalignant lesions [36]. Thus many public health programmes have to be conducted further to bring awareness on tobacco and its ill-effects on Oral and general health among the general population [37].

Limitations of this study include Geographic limitation as predominantly South Indian population were only considered, and was a Unicentric study with few Incomplete and unclear data. The Future scope of this study will yield a better and more accurate result when Different ethnic populations are considered.

Conclusion

Within the limitation of the present study, oral submucous fibrosis had male predilection, predominantly between the age group of 20 to 40 years, primarily reported in both the arches and in majority was associated with the usage of pan. Thus, as a clinician, it is important to evaluate all the soft and hard tissues of the oral cavity while examining to have an early diagnosis and to prevent malignant transformation. Also awareness on harmful effects of tobacco and its related products on oral health should be brought by dentists to maintain public oral health.

Clinical Significance

With the current study as a platform, prevalence of Oral submucous fibrosis among different age groups and genders can be evaluated to enable dentists gain a thorough knowledge on susceptibility groups and will also aid in improving general public oral health.

Acknowledgement

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