

Prevalence of Oral Premalignant Lesions/Conditions and Mucosal Pathology in North Indian Population

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Abstract

Objective: The aim of this study was to determine the prevalence of the oral premalignant lesions/ conditions and oral mucosal pathologies in north Indian population. *Material and Methods:* 1000 patients were clinically evaluated from age group <25 years to > 65 years, of these 392 have smokeless and 306 have smoking habit however remaining 302 have no history of any habit. The statistical analysis was done using the SPSS software version 16.0. *Results:* Oral submucous fibrosis (23.2%) is found to be most common oral lesion however pseudomembranous candidiasis(0.3%) was least commonly reported oral lesion in this specific study population. *Conclusion:* Timely diagnosis and early prevention will help to reduce tobacco related oral diseases. However other soft tissue pathologies which have definite etiological causes can be prevented early or treated by timely intervention.

Keywords: Oral Mucosal Lesions; Soft Tissue Tumours; Prevalence; Premalignant Lesions and Conditions.

Introduction

Most studies on the prevalence of oral mucosal lesions have been conducted in the developed world such the American [1,2] European [3,4] and Asian [5,6] continents. Since there is diversity and vast cultural, ethnic and geographical differences between the Indian subcontinent and the countries on these continents, it would be unfair to imply the results of those studies to the Indian population. The tobacco and its related products are well known prime risk factors for the development of precancerous lesions and conditions which may eventually lead to oral cancer [7,8]. The prevalence of melanin pigmentation, various oral lesions and white lesions is higher among smokers [3,9]. However some studies do not identify smoking as a risk factor for oral lesions [10]. The use of dentures in the elderly has also been known to act

as a potential risk factor for oral lesions and the development of oral cancer as well as other characteristic lesions such as denture stomatitis and hyperplasia [11,12]. Traumatic ulcers are the most frequently seen oral lesion in users of dentures [13]. Tobacco and its related products plays an important role in development of oral potentially malignant disorders. A variety of oral potentially malignant disorders have been reported in literature with the consumption of tobacco [14,15]. In Asians, oral potentially malignant disorders are known to be associated with cigarette smoking, excess alcohol consumption and areca quid chewing [16]. The most common oral potentially malignant lesions are leukoplakia, erythroplakia, and oral submucous fibrosis. A large number of these oral mucosal lesions have a tendency to transform into malignancy. The malignant transformations of oral mucosal lesions including leukoplakia [17], erythroplakia [18] and oral submucous fibrosis [19] are well known and observed. Its usage poses a major public health problem. It is most widely use in smoke and smokeless form in Asian subcontinent. In India smoking is mainly in the form of bidi followed by cigarettes, chillum, hukkah and chutta etc. Smokeless tobacco is consumed in form of mawa, khaini, mishri, mainpuri tobacco, pan masala etc. The prevalence of tobacco use is higher in teen and young adult as compare to older generation. It is observed that

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tobacco habits mostly leads to cancers of oral cavity, pharynx, larynx, oesophagus and premalignant lesions and conditions in oral cavity. It is observed by many clinicians that smoking and chewing of tobacco and betel quid plays a synergistic role in developing oral carcinogenesis. The people having mixed habits are categorised under high-risk population [20]. Chewing and smoking of tobacco along with consumption of alcoholic beverages have become common social habits in India [21]. India is 2nd largest producer and consumer of tobacco after China [22,23]. Prevalence of tobacco use among Indian adults is about 35% [24]. India has a different socioeconomic status, educational, cultural and behavioural traditions. These factors may affect the oral health status. In an earlier study, the authors reported that potentially malignant and malignant oral lesions were widespread in the patients visiting a tertiary hospitals [25]. Oral mucosal lesions could be due to infection (bacterial, viral, fungal), local trauma and or irritation (traumatic keratosis, irritational fibroma, burns) [26]. Oral lesions compromise many daily activities due to discomfort or pain that interferes with mastication, swallowing, speech and producing additional symptoms such as halitosis, xerostomia, oral dysesthesia which hampers an individual's daily social activities [27]. The over irritation of oral mucous membrane may starts from a young age due to highly spicy food habits and smokeless tobacco products habits. Oral pre-cancer is an transitioned clinical state with increased cancer risk which can be recognized and treated obviously with a much better prognosis compared to the full blown malignancy [28,29].

Oral cancer is considered as 5th most common cancer in men and 7th most common cancer in women and it is continuously progressing towards pole position in charts of cancer. It is the 2nd most common cancer in india. Oral cancer in developing countries like, India is completely ignored in initial stages and poorly understood by societies. As we all know that India is the epicentre of oral cancer all over the world. India has a vast geographic area, divided into states which differ with regard to their socioeconomic, educational, cultural and behavioural traditions. These factors may affect the oral health status. Hence to obtain nationwide representative data, a nationwide study is required. A more practical alternative is to develop regional databases and review data from various regions which may give an understanding of the national scenario. We as dentists have to come forward and it is our utmost duty to detect and prevent oral cancer. Oral potentially malignant disorder and its sequelae may cause heavy impairment in quality of life. The treatment of oral

cancer requires large amount of money. This is an additional burden on government health budget. Primary prevention of oral cancer is the most cost effective prevention program as it aims to reduce the incidence of potentially malignant disorders by risk factor modification. Most of the general public is poorly informed about the risk of oral potentially malignant disorder and ways to prevent this disease. Early detection is of critical importance and survival rates markedly improve when identified at early stage. Investigating the prevalence of oral premalignant lesion/conditions and mucosal lesions will help in prevention of malignant transformation. In India, with limited literature and evidence available to draw conclusions about the prevalence of oral potentially malignant disorders, more and more studies are needed in order to better understand the epidemiology of oral diseases. Hence this study was performed to assess the prevalence of potentially malignant oral lesions/conditions, oral mucosal pathologies and to determine the potential risk factors associated with these oral lesions for development of oral cancer in north Indian population.

Materials and Methods

Material

Study Subjects

The study population is comprised of patients attending the Department of Oral medicine and Radiology, King George's Medical University from January 2015 to October 2016. The study population consists of 1000 patients. All of these patients signed the written consent to participate in the investigation and accept to be clinically evaluated by oral examination and to fulfil the inclusion criteria. The study was conducted on 1000 patients having age < 25 to patients older than 65 years.

Methods

Study Type

The present investigation was exploratory considering that the topic has not been studied before in Northern India. It is a descriptive study.

Clinical Examination

Each patient was evaluated using a designed questionnaire and was clinically examined. The clinical diagnosis was established according to the correlation in the etiological factor associated to the lesion by systematic examination of oral mucosa and

classifying those alterations according to the epidemiology guide for the diagnosis of oral mucosal diseases (WHO). In addition, in those cases requiring further examination, biopsies or cytology were performed to establish an accurate definite diagnosis. The inclusion criteria was: general status of the patient, systemic diseases, medications used, age, gender, alcohol and tobacco consumption, habits (trauma) and prosthetic or other appliances use. During the clinical examination the following elements were analyzed: features of the lesion, anatomical location, extension, etiological factors or related factors, dental status, alcohol, tobacco, trauma, use of prosthesis and if these were well adapted. All non pathological conditions or developmental anomaly such as leukoedema, lingual varices, fordyce granules, benign migratory glossitis and fissured tongue were excluded from the present study.

Statistical Analysis

The variables were analyzed on 1000 patients. The results were analyzed using the SPSS software 16.0.

Result

The study population consists 1000 study subjects selected on the basis of inclusion criteria. Of this study population 560 patients were male and 440 patients were female (Table 1).

The distribution of study population according to habit of tobacco consist of 392 subjects used smokeless tobacco, 306 smoking tobacco and 302 study subjects neither used smokeless/smoking tobacco (Table 2).

The distribution (Prevalence) of oral lesions in study population according to occurrence was as follows-Oral submucous fibrosis (23.2%) is found to be most common oral lesion occurring in oral cavity followed by Squamous cell carcinoma (21.8%), Oral

lichen Planus (16.7%), leukoplakia (13.2%), traumatic fibroma(6.6%), Pyogenic granuloma (6%), Denture Stomatitis(5.2%), Recurrent aphthous ulcer (3.1%), Candidiasis(1.8%), Angular cheilitis(1.5%), irritationalfibroma (0.6%), Pseudomembranous candidiasis (0.3%) (Table 3).

The lesions were widely distributed in oral cavity involving different structures of it. The buccal mucosa(15.9%) is most commonly affected followed by post faucial pillars(12.7%), lateral border of tongue(11.2%), Right buccal vestibule(7.9%), Mandibular alveolar ridge (4.5%), Mandibular right alveolar region(2.5%), Buccal mucosa at premolar region (2.4%), Mandibular right anterior vestibular region(2.1%), Dorsum of tongue(1.9%), Mandibular right 1st molar(1.7%), Mandibular left alveolar region in 1st molar region(1.7%), Mandibular right 1st and 2nd molar (1.5%),Buccal mucosa right side(1.5%), Lateral border of tongue(1.4%), Mandibular right 3rd molar region, Mandibular right molar region (1.3%), Buccal mucosa mandibular right side(1.2%), Lower anterior lip(1.2%), Mandibular left 1st molar(1.2%),Mandibular alveolar ridge(1.1%), Buccal mucosa in mandibular right 1st molar region(1%), Gingival margin maxillary 1st premolar region (0.9%), Left buccal mucosa(0.9%), Maxillary gingival left canine region(0.9%), alveolar region maxilla(0.8%), borders of tongue, buccal mucosa and faucial pillars, maxillary canine, mandibular left 2nd molar, mandibular right 1st premolar, mandibular 3rd molar region, buccal mucosa 2nd molar region(0.7%), Angle of mouth, mandibular left buccal mucosa, mandibular left 2nd molar region, mandibular right 3rd molar region buccally, mandibular right posterior buccal mucosa, mandibular right premolar region, maxillary left posterior buccal mucosa (0.6%), mandibular buccal mucosa and alveolar region,surface of tongue (0.5%), gingival margin maxillary 2nd premolar, maxillar left region(0.4%), buccal vestibule mandibular right vestibular region, gingival margin maxillary 1st premolar region, lower border of lip, lower border of tongue, lower lip, mandibular right 2nd molar, maxillary right buccal mucosa (0.3%), mandibular

Table 1: Showing age and sex distribution of study subjects

Age in years	Gender		Total	
	Male	Female	No.	%
	No.	%	No.	%
<25	46	33.6	91	66.4
25-35	149	39.8	225	60.2
36-45	112	65.9	58	34.1
46-55	49	76.6	15	23.4
56-65	96	78.0	27	22.0
>65	108	81.8	24	18.2
Total	560	56.0	440	44.0
			1000	100.0

Table 2: Showing distribution of study subjects according to tobacco habit

Tobacco habit	No. (n=1000)	%
Smokeless tobacco	392	39.2
Smoking	306	30.6
None	302	30.2

Table 3: Showing distribution of study subjects according to prevalence of type of lesions

Type of lesions	No. (n=1000)	%
Angular cheilitis	15	1.5
Candidiasis	18	1.8
Denture stomatitis	52	5.2
Irritational fibroma	6	0.6
Leukoplakia	132	13.2
Lichen planus	167	16.7
Oral squamous cell cancer	218	21.8
Oral Submucous Fibrosis	232	23.2
Pseudomembranous candida	3	0.3
Pyogenic granuloma	60	6.0
Recurrent aphthous ulcers	31	3.1
Traumatic fibroma	66	6.6

right vestibule anterior region(0.2%), gingival margin of maxillary 2nd premolar, lip commissures (0.1%). (Table 4).

The co-relation between tobacco habit and type of oral lesions were also calculated. It was found that in smokeless tobacco population(n=392), oral submucous fibrosis is most prevalent (56.4%) followed by oral squamous cell carcinoma(20.2%), Leukoplakia (13.3%), candidiasis (3.3%), denture Stomatitis (2.8%), traumatic fibroma(2%), lichen planus(1.8%) and recurrent aphthous ulcer(0.3%). There was no incidence reported for angular cheilitis,irritational fibroma, pseudomembranous candidiasis and pyogenic granuloma(0.0%) (Table 5).

In smoking tobacco population(n=306), oral squamous cell carcinoma is most common (45.4%) lesion followed by Leukoplakia(26.1%), Denture Stomatitis(10.5%), Recurrent aphthous stomatis (5.9%), Traumatic fibroma(4.2%), Oral submucous fibrosis (2.6%), candidiasis(1.6%), Lichen planus, pyogenic granuloma(1.3%), Pseudomembranous candidiasis (1.0%). There was no case of angular cheilitis is reported in smoking population (Table 5).

In study population having neither habit of smoking and smokeless tobacco(n=302), Lichen planus is found most commonly (51.7%), followed by pyogenic granuloma(18.5%), Traumatic fibroma(14.9), Angular cheilitis (5%), Recurrent aphthous ulcers(4.0%), Denture Stomatitis(3.0%), irritational fibroma(2.0%) and oral submucous fibrosis(1%). There was no report of candidiasis,leukoplakia,pseudomembranous candida (Table 5).

The gender wise distribution of oral lesions shows that in males(n=392), oral squamous cell carcinoma

is most common lesion(31.8%) followed by oral submucous fibrosis(28.4%), Leukoplakia (21.2%), Denture Stomatitis(7%), Lichen planus(4.1%), Traumatic fibroma(3.6%), candidiasis (1.6%), recurrent aphthous ulcers (1.2%), pseudomembranous candidiasis (0.5%), irritation fibroma(0.4%), Angular cheilitis(0.2%). There was no reported case of pyogenic granuloma is noted in male population (Table 6).

In female population(n=306), Lichen planus is most common lesion(32.7%) followed by oral submucous fibrosis(16.6%), Pyogenic granuloma (13.6%), Traumatic Fibroma(10.5%), oral SCC(9.1%), Recurrent aphthous Stomatitis(5.5%), Angular cheilitis(3.2%), Denture Stomatitis, Leukoplakia (3.0%), Candidiasis(2%), Irritational fibroma(0.9%). There was no reported case of pseudomembranous candidiasis(0.0%) in study population(Table 6).

The distribution of oral lesions according to age is also studied. It is found that angular cheilitis was most common in age group <25 yrs (n=137) oral submucous fibrosis (37.2%) followed by oral lichen planus(34.3%), Traumatic fibroma(9.5%), Recurrent aphthous Stomatitis(8.8%), Angular cheilitis(7.3%), Pyogenic granuloma(2.2%), Irritational fibroma (0.7%). zNo incidence of candidiasis, denture Stomatitis, leukoplakia, oral SCC, Pseudomem-branous candida is reported in this age group (Table 7).

In age group 25-35 yrs (n=374) oral submucous fibrosis is most common oral lesion followed by oral lichen planus (26.2%), traumatic fibroma(12.3%), Pyogenic granuloma(11.5%), leukoplakia(6.7%), Recurrent aphthous ulcer(4.3%), angular cheilitis (1.3%), candidiasis and irritational fibroma(1.1%). The denture Stomatitis, Oral SCC and

Table 4: Showing distribution of study subjects according to prevalence of site of lesions

S. No.	Site of lesions	No. (n=1000)	%
1	Alveolar region maxilla	8	0.8
2	Angle of mouth	6	0.6
3	Borders of tongue	7	0.7
4	Bilateral buccal mucosa	159	15.9
5	Buccal mucosa 36 region	10	1
6	Buccal mucosa and faucial pillars	7	0.7
7	Buccal mucosa at premolar region	24	2.4
8	Buccal mucosa right side	15	1.5
9	Buccal vestibular region of 36 region	3	0.3
10	Corner of mouth	79	7.9
11	Dorsum of tongue	19	1.9
12	Facially to 13 region	7	0.7
13	Ging margin of 25 region	4	0.4
14	Gingival margin of 14 region	9	0.9
15	Gingival margin of 24 region	3	0.3
16	Gingival margin of 25 region	1	0.1
17	Lateral border of tongue	112	11.2
18	Left buccal mucosa lower region	14	1.4
19	Lip commissur	1	0.1
20	Lower alveolar ridge	11	1.1
21	Lower ant lip	45	4.5
22	Lower ant region	12	1.2
23	Lower border of lip	3	0.3
24	Lower border of tongue	3	0.3
25	Lower buccal mucosa and alveolar region	5	0.5
26	Lower left 1st molar region	12	1.2
27	Lower left alveolar region of 37	17	1.7
28	Lower left buccal mucosa	6	0.6
29	Lower lip	3	0.3
30	Lower post buccal mucosa	6	0.6
31	Lower right 37 region	3	0.3
32	Lower right 3rd molar region	14	1.4
33	Lower right 47 region	6	0.6
34	Lower right alveolar region	25	2.5
35	Lower right ant vestibular region	21	2.1
36	Lower right buccal mucosa	12	1.2
37	Lower right mandibular 1st molar region	17	1.7
38	Lower right mandibular 3rd molar region buccally	6	0.6
39	Lower right molar region	13	1.3
40	Lower right post buccal mucosa	6	0.6
41	Lower right premolar region of jaw	6	0.6
42	Lower right vestibular region ant side	2	0.2
43	Left buccal mucosa of lower side	9	0.9
44	mandibular 1st molar right side	15	1.5
45	mandibular 2nd molar right side	15	1.5
46	mandibular 3rd molar region right side	10	1
47	mandibular left 2nd molar region	7	0.7
48	mandibular right 1st premolar region	7	0.7
49	Mandibular right 3 rd molar region	7	0.7
50	Marginal gingiva of 23 region	22	2.2
51	Posterior faucial pillars	127	12.7
52	Surface of tongue	5	0.5
53	Upper ant gingiva 23 region	9	0.9
54	Upper left post buccal mucosa	6	0.6
55	Upper left region	5	0.5
56	Upper right alveolar region	4	0.4
57	Upper right buccal mucosa	3	0.3
58	Buccal mucosa in 2 nd molar region	7	0.7

Table 5: Showing type of oral lesions in relation to smoking habit

Type of oral lesions	Smokeless tobacco (n=392)		Smoking (n=306)		None (n=302)	
	No.	%	No.	%	No.	%
Angular cheilitis	0	0.0	0	0.0	15	5.0
Candidiasis	13	3.3	5	1.6	0	0.0
Denture stomatitis	11	2.8	32	10.5	9	3.0
Irritational fibroma	0	0.0	0	0.0	6	2.0
Leukoplakia	52	13.3	80	26.1	0	0.0
Lichen planus	7	1.8	4	1.3	156	51.7
Oral squamous cell cancer	79	20.2	139	45.4	0	0.0
Oral Submucous Fibrosis	221	56.4	8	2.6	3	1.0
Pseudomembranous candida	0	0.0	3	1.0	0	0.0
Pyogenic granuloma	0	0.0	4	1.3	56	18.5
Recurrent aphthous ulcers	1	0.3	18	5.9	12	4.0
Traumatic fibroma	8	2.0	13	4.2	45	14.9

Table 6: Showing type of oral lesions in relation to gender

Type of oral lesions	Male (n=392)		Female (n=306)	
	No.	%	No.	%
Angular cheilitis	1	0.2	14	3.2
Candidiasis	9	1.6	9	2.0
Denture stomatitis	39	7.0	13	3.0
Irritational fibroma	2	0.4	4	0.9
Leukoplakia	119	21.2	13	3.0
Lichen planus	23	4.1	144	32.7
Oral squamous cell cancer	178	31.8	40	9.1
Oral Submucous Fibrosis	159	28.4	73	16.6
Pseudomembranous candida	3	0.5	0	0.0
Pyogenic granuloma	0	0.0	60	13.6
Recurrent aphthous ulcers	7	1.2	24	5.5
Traumatic fibroma	20	3.6	46	10.5

Table 7: Showing type of oral lesions in relation to age

Type of oral lesions	Age in years											
	<25 (n=137)		25-35 (n=374)		36-45 (n=170)		46-55 (n=64)		56-65 (n=123)		>65 (n=132)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Angular cheilitis	10	7.3	5	1.3	0	0.0	0	0.0	0	0.0	0	0.0
Candidiasis	0	0.0	4	1.1	10	5.9	3	4.7	0	0.0	1	0.8
Denture stomatitis	0	0.0	0	0.0	1	0.6	2	3.1	30	24.4	19	14.4
Irritational fibroma	1	0.7	4	1.1	1	0.6	0	0.0	0	0.0	0	0.0
Leukoplakia	0	0.0	25	6.7	68	40.0	33	51.6	6	4.9	0	0.0
Lichen planus	47	34.3	98	26.2	16	9.4	5	7.8	0	0.0	1	0.8
Oral squamous cell cancer	0	0.0	0	0.0	8	4.7	15	23.4	85	69.1	110	83.3
Oral Submucous Fibrosis	51	37.2	133	35.6	42	24.7	6	9.4	0	0.0	0	0.0
Pseudomembranous candida	0	0.0	0	0.0	3	1.8	0	0.0	0	0.0	0	0.0
Pyogenic granuloma	3	2.2	43	11.5	13	7.6	0	0.0	1	0.8	0	0.0
Recurrent aphthous ulcers	12	8.8	16	4.3	2	1.2	0	0.0	0	0.0	1	0.8
Traumatic fibroma	13	9.5	46	12.3	6	3.5	0	0.0	1	0.8	0	0.0

Pseudomembranous candidiasis is not found in this age group (Table 7).

In age group 36-45yrs(n=170), Leukoplakia(40%) is most common oral lesion followed by oral submucous fibrosis(24.7%), Lichen planus (9.4%), pyogenic granuloma(7.6%), candidiasis(5.9%), Oral SCC(4.7%), Traumatic fibroma(3.5%), Pseudomembranous candidiasis(1.8%), Recurrent aphthous ulcer(1.2%), denture Stomatitis and irritational fibroma(0.6%). No angular cheilitis case is reported in this age group

(Table 7).

In age group 46-55 yrs(n=64), leukoplakia(51.6%) was most common lesion followed by Oral SCC(23.4%), Oral submucous fibrosis(9.4%),oral lichen planus (7.8%), Candidiasis(4.7%), Denture Stomatitis(3.1%). No case of angular cheilitis, irritational fibroma, psedomembranous candidiasis, pyogenic granuloma, recurrent aphthous stomatitis and Traumatic fibroma(0.0%) (Table 7).

In age group 56-65 yrs(n=123), Oral SCC is most

common lesion(69.1%) followed by denture Stomatitis(24.4%), Leukoplakia (4.9%), Pyogenic granuloma and irritational > (0.8%). There was no reported case of angular cheilitis, candidiasis, Lichen planus, Oral submucous fibrosis, Pseudomembranous candidiasis, recurrent aphthous Stomatitis (Table 7).

In age group >65 (n=132) Oral squamous cell carcinoma(83.3%) is most common lesion followed by denture Stomatitis (14.4%), Candidiasis, lichen planus, recurrent aphthous Stomatitis(0.8%). There was no reported case of angular cheilitis, irritational fibroma, leukoplakia, oral submucous fibrosis, pseudomembranous candidiasis, pyogenic granuloma, traumatic fibroma (Table 7).



Fig. 3: Irritational fibroma



Fig. 1: Angular cheilitis



Fig. 4: Lichen Planus



Fig. 2: Candidiasis



Fig. 5: Recuurent aphthous stomatitis



Fig. 6: Oral squamous cell carcinoma



Fig. 9: Traumatic fibroma



Fig. 7: Pyogenic Granuloma



Fig. 10: Oral Submucous Fibrosis



Fig. 8: Denture stomatitis

Discussion

Oral health impairments can diminish one's social interactions, self-esteem, and self-image and have a dramatic effect on a person's quality of life. Aging is not a disease, but it does increase our susceptibility to disease. Oral, dental and craniofacial diseases and conditions disproportionately affect the elderly and frail elders are particularly vulnerable to increased

Morbidity due to oral infections. Dental professionals must comprehend the special prerequisites of the elderly and work meticulously with rest of their team [30]. LIN HC and Van Der Waal et al stated that the prevalence of oral mucosal lesions has been found to be higher in older patients than in the younger population [31,32]. There has been found association between oral mucosal disorders and aging. Mujica et al [33] reported that the most common lesion was denture stomatitis (18%) but in our study oral submucous fibrosis (23.2%) is

found to be most common oral lesion occurring followed by oral squamous cell carcinoma (21.8%). In another study, Mathew AL et al [34] reported that denture stomatitis was prevalent in 0.84% population and the majority of denture Stomatitis was observed in the 41-60 years of age group. The frequency was observed to be more in females (1.35%) than in men (.53%). However in our study, 7% males and 3% females have denture Stomatitis.

Mathew AL et al [34] reported that prevalence of oral lichen planus in southern Indian population was 1.26% which is comparable to that in Swedish³⁵ and Japanese populations [36] however our study, conducted on north Indian population shows higher prevalence (16.7%) of oral lichen planus. So it is concluded the prevalence of oral lichen planus in north Indian population is higher than southern Indian population. Rastogi S et al [30] stated that the most frequent sites for soft tissue lesions in oral cavity is tongue followed by buccal mucosa. Giana da Silveira et al while studying Brazilian population concluded that the most frequent soft tissue locations were the cheek mucosa (10.2%) and the alveolar mucosa (9.7%) [37]. Previous studies have shown that tongue lesions constitute a significant proportion of oral lesions and their prevalence rate varies in different parts of world. However in our study most frequent site for soft tissue lesions is buccal mucosa (15.9%) followed by posterior faucial pillars (12.7%) and lateral border of tongue (11.2%). Gambhir R S et al [38] has been found that Oro-mucosal lesions had high prevalence in the age-group of 31-40 years. This could be attributed to their long-standing oral habits however in our study 36- 45 years of group is highly vulnerable for oro-mucosal lesions. Soft tissue tumours and potentially malignant disorders were the most common finding in the study done by Gambhir R S et al [38]. Gambhir R S et al [38] also concluded that Carcinomas were most common in males than females. In another study conducted by Fierro-Garibay C et al [39], the most prevalent lesion was chronic periapical lesions in the maxilla followed by epithelial hyperplasia and fibroma in the soft tissues. Kovac Kovacic and Skaleric [40] in Slovenia concluded that Fordyce granules were the most common oral condition and had a female predilection (10%). Leukoedema was found to have a high prevalence among study population conducted by Al-Mobeeriek, A et al [41]. Similar findings have been reported among Kenyans (26%), the Swedish population (49.07%) and in the institutionalized elderly in South Africa (24.4%) [42,43,44].

Mathew A. L et al [34] stated that prevalence of oral mucosal variants and abnormalities according

to age and gender. No mucosal abnormalities were detected in 58.8% of subjects. The most prevalent normal variant was Fordyce's granules (6.55%), followed by fissured tongue (5.71%), Leukoedema (3.78%), and varices (1.17%). The most prevalent lesion was frictional keratosis (5.79%), followed by smoker's palate (2.77%), aphthous stomatitis (2.1%), oral submucous fibrosis (2.01%), oral malignancies (1.76%), leukoplakia (1.59%), median rhomboid glossitis (1.5%), oral candidiasis (1.3%), lichen planus (1.26%), traumatic ulcer (1.01%), denture stomatitis (0.84%), geographic tongue (0.84%), betel chewers mucosa (0.84%), irritational fibroma (0.84%), angular cheilitis (0.58%), herpes labialis (0.58%), and mucocele (0.16%). Mozafari, P. M et al [45] stated that most prevalent oral lesions is fissured tongue (66.5%) followed by atrophic glossitis (46.8%) and sublingual varicosity (42%). Whereas in our study oral submucous fibrosis (23.2%) is most common lesion followed by oral squamous cell carcinoma [21.8%].

Conclusion

Oral health is an important factor in determining the quality of life in individuals. As major population of India either uses smoking/ smokeless tobacco, the ill effect of tobacco is quite prevalent in form of many oral diseases as oral submucous fibrosis, Leukoplakia, Oral cancer etc. So population based studies will be an insight to governments to tobacco related oral diseases and their burden on society and governments. So timely diagnosis and early prevention will help to reduce this tobacco related burden in the form of oral diseases. However other soft tissue pathologies which have definite etiological causes can be prevented early or treated by intervention.

References

1. Bouquot JE, Gorlin RJ. Leukoplakia, lichen planus and other oral keratoses in 23,616 white Americans over the age of 35 years. *Oral Surg Oral Med Oral Pathol.* 1986; 61:373-81.
2. Sedano HO, Carreon Freyre I, Garza de la Garza ML, Gomar Franco CM, Grimaldo Hernandez C, Hernandez Montoya ME, et al. Clinical orodental abnormalities in Mexican children. *Oral Surg Oral Med Oral Pathol.* 1989; 68:300-11.
3. Salonen L, Axéll T, Helldén L. Occurrence of oral mucosal lesions, the influence of tobacco habits and an estimate of treatment time in an adult Swedish

- population. *J Oral Pathol Med.* 1990; 19:170-6.
4. Bánóczy J, Rigó O. Prevalence study of oral precancerous lesions within a complex screening system in Hungary. *Community Dent Oral Epidemiol.* 1991; 19:265-7.
 5. Gupta PC, Mehta FS, Daftary DK, Pindborg JJ, Bhonsle RB, Jalnawalla PN, et al. Incidence rates of oral cancer and natural history of oral precancerous lesions in a 10-year follow-up study of Indian villagers. *Community Dent Oral Epidemiol.* 1980; 8:283-33.
 6. Zain RB, Ikeda N, Razak IA, Axéll T, Majid ZA, Gupta PC, et al. A national epidemiological survey of oral mucosal lesions in Malaysia. *Community Dent Oral Epidemiol.* 1997; 25:377-83.
 7. Vigneswaran N, Tilshalski K, Rodu B, Cole P. Tobacco use and cancer. A reappraisal. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1995; 80:178-82.
 8. Blot WJ, McLaughlin JK, Winn DM, Austin DF, Greenberg RS, Preston-Martin S, et al. Smoking and drinking in relation to oral and pharyngeal cancer. *Cancer Res.* 1988; 48:3282-7.
 9. Hedin CA, Axéll T. Oral melanin pigmentation in 467 Thai and Malaysian people with special emphasis on smoker's melanosis. *J Oral Pathol Med.* 1991; 20:8-12.
 10. Corbet EF, Holmgren CJ, Phillipsen HP. Oral mucosal lesions in 65-74-year old Hong Kong Chinese. *Community Dent Oral Epidemiol.* 1994; 22:392-5.
 11. Mikkonen M, Nyssönen V, Paunio I, Rajala M. Prevalence of oral mucosal lesions associated with wearing removable dentures in Finnish adults. *Community Dent Oral Epidemiol.* 1984; 12:191-4.
 12. Hoard Reddick G. Oral pathology and prostheses: Are they related. Investigations in an elderly population? *J Oral Rehabil.* 1989; 16:75-87.
 13. Dorey JL, Blasberg B, MacEntee MI, Conklin RJ. Oral mucosal disorders in denture wearers. *J Prosthet Dent.* 1985; 53:210-3.
 14. G. Thomas, M. Hashibe, B. J. Jacob et al., "Risk factors for multiple oral premalignant lesions," *International Journal of Cancer*, 2003; 107(2):285-291.
 15. M. Hashibe, B. Mathew, B. Kuruvilla et al., "Chewing tobacco, alcohol, and the risk of erythroplakia," *Cancer Epidemiology Biomarkers and Prevention*, 2000; 9(7):639-645.
 16. C.-H. Chung, Y.-H. Yang, T.-Y. Wang, T.-Y. Shieh, and S. Warnakulasuriya, "Oral precancerous disorders associated with areca quid chewing, smoking, and alcohol drinking in southern Taiwan," *Journal of Oral Pathology and Medicine*, 2005; 34(8):460-466.
 17. P. C. Gupta, F. S. Mehta, D. K. Daary, et al., "Incidence rates of oral cancer and natural history of oral precancerous lesions in a 10-year follow-up study of Indian villagers," *Community Dentistry and Oral Epidemiology*, 1980; 8(6):287-333.
 18. J. E. Bouquot and S. B. Whitaker, "Oral leukoplakia – rationale for diagnosis and prognosis of its clinical subtypes or 'phases'," *Quintessence International*, 1994; 25(2):133-140.
 19. P. R. Murti, R. B. Bhonsle, J. J. Pindborg, D. K. Daary, P. C. Gupta, and F. S. Mehta, "Malignant transformation rate in oral submucous dysplasia over a 17-year period," *Community Dentistry and Oral Epidemiology*, 1985; 13(6):340-341.
 20. Ko YC, Huang YL, Lee CH, Chen MJ, Lin LM, Tsai CC. Betel quid chewing, cigarette smoking and alcohol consumption related to oral cancer in Taiwan. *J Oral Pathol Med.* 1995; 24:450-3.
 21. Saraswati TR, Ranganathan K, Shanmugam S, SowmyaRamesh, Narasimhan PD, Gunaseelan R. Prevalence of oral lesions in relation to habits: Cross sectional study in south India. *Indian J Dent Res* 2006; 17:121-5.
 22. Kaur J, Jain DC. Tobacco control policies in India: Implementation and challenges. *Indian J Public Health* 2011; 55:220-7.
 23. World Health Organization (WHO). *Fresh and alive: MPOWER, WHO report on the global tobacco epidemic*, Geneva, Switzerland: WHO; 2008.
 24. Government of India, Ministry of health and family welfare, *Global adult tobacco survey*, India 2010.
 25. Mehrotra R, Pandya S, Chaudhary AK, Kumar M, Singh M: Prevalence of oral pre-malignant and malignant lesions at a tertiary level hospital in Allahabad, India. *Asian Pac J Cancer Prev* 2008, 9(2):263-5.
 26. Parkin DM, Bray F, Ferlay J, Pisani P. *Global cancer statistics, 2002*. CA: *Cancer Journal for Clinicians*. 2005; 55:74-108. doi: 10.3322/canjclin.55.2.74
 27. Cebeci ARI, Gülahý A, Kamburođlu K, et al. Prevalence and distribution of oral mucosal lesions in an adult Turkish population. *Med Oral Patol Oral Cir Bucal.* 2009; 14(6):E272-77.
 28. Amagasa T. Oral premalignant lesions. *Int J Clin Oncol* 2011; 16:1-4.
 29. Neville Damm Allen Bouquot. *Oral & Maxillofacial Pathology*. 2nd Edition. Philadelphia: Saunders Elsevier; 2002: 5055-08.
 30. Rastogi S, Arora P, Kapoor S, Wazir SS, Vashishth S, Sharma V. Prevalence of oral soft tissue lesions and medical assessment of geriatric outpatients in North India. *Journal of Indian Academy of Oral Medicine and Radiology* 2015; 27(3):382-386.
 31. Lin HC, Corbet EF, Lo EC. Oral mucosal lesions in adult Chinese. *J Dent Res.* 2001; 80(5):1486-90.
 32. Van der Waal I. Diseases of the oral mucosa in the aged patient. *Int Dent J.* 1983; 33(4):319-24.
 33. Mujica V, Rivera H, Carrero M. Prevalence of oral

- soft tissue lesions in an elderly Venezuelan population. *Med Oral Patol Oral Cir Bucal* 2008; 13:E2704.
34. Mathew AL, Pai KM, Sholapurkar AA, et al. The prevalence of oral mucosal lesions in patients visiting a dental school in Southern India. *Indian J Dent Res.* 2008; 19(2):99-103.
 35. Axell T, Rundquist L. Oral Lichen planus a demographic study. *Community Dent Oral Epidemiol* 1987; 15:526.
 36. Ikeda N, Handa Y, Khim SP, Darward C, Axell T, Mizuno T, et al. Prevalence study of oral mucosal lesions in a selected Cambodian population. *Community Dent Oral Epidemiol* 1995; 23:4954.
 37. Lima Gda S, Fontes ST, de Araújo LM, Etges A, Tarquinio SB, Gomes AP. A survey of oral and maxillofacial biopsies in children: a single-center retrospective study of 20 years in Pelotas-Brazil. *JAppl Oral Sci.* 2008; 16: 397-402.
 38. Gambhir, R. S., Veerasha, K. L., Sohi, R., Kakkar, H., Aggarwal, A., & Gupta, D. (). The prevalence of oral mucosal lesions in the patients visiting a dental school in northern india in relation to sex, site and distribution: A retrospective study. *Journal of Clinical and Experimental Dentistry*, 2011; 3(1). <http://doi.org/10.4317/jced.3.e10>.
 39. Fierro-Garibay C, Almendros-Marqués N, Berini-Aytés L, Gay-Escoda C. Prevalence of biopsied oral lesions in a Department of Oral Surgery (2007- 2009). *J Clin Exp Dent.* 2011; 3(2):e73-7.
 40. KovacKovacic M, Skaleric U. The prevalence of oral mucosal lesions in a population in Ljubljana, Slovenia. *J Oral Pathol Med.* 2000 Aug; 29(7):331-5.
 41. Al-Mobeeriek, A., & Aldosari, A. M. (2009). Prevalence of oral lesions among Saudi dental patients. *Annals of Saudi Medicine*, 2009; 29(5): 365-368.
 42. Macigo FG, Mwaniki DL, Guthua SW. Prevalence of oral mucosal lesions in a Kenyan population with special reference to oral leukoplakia. *East Afr Med J.* 1995 Dec; 72(12):778-82.
 43. Axell T. A prevalence study of oral mucosal lesions in an adult Swedish population. *Odontol Revy.* 1976; 27(36):1-103.
 44. Van Wyk CW, Farman AG, Staz J. Oral health status of institutionalized elderly Cape Coloreds from the Cape Peninsula of South Africa. *Community Dent Oral Epidemiol.* 1971 Jul; 5(4):179-84.
 45. Mozafari, P. M., Dalirsani, Z., Delavarian, Z., Amirchaghmaghi, M., Shakeri, M. T., Esfandyari, A., & Falaki, F. Prevalence of oral mucosal lesions in institutionalized elderly people in Mashhad, Northeast Iran. *Gerodontology*, 2012; 29(2). <https://doi.org/10.1111/j.1741-2358.2011.00588.x>