



Evaluation of prevalence of oral soft tissue lesions in a public sector oral health facility of Karachi, Pakistan.

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INTRODUCTION

Oral mucosa, being protective in nature, serves as a barrier against myriad of traumatic, infectious and carcinogenic agents.¹ These lesions may present primarily as an oral finding or secondarily in coalition with skin, metabolic and endocrine conditions.²⁻⁴ Any change in its morphology can present as a wide range of oral mucosal lesions and conditions (whereby, a "lesion" being a localized entity, and a "condition" being a generalized state), which may manifest either as relatively harmless, benign lesion or as alarming, malignant or precancerous lesion, having serious repercussions.^{1,2}

Oral mucosal lesions that are most prevalent, manifest either as an ulcer, which is defined as breach in the continuity of oral epithelium or as an alteration in thickness, color or texture of oral mucosa.^{5,6}

Alteration in color can result in white, red or

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ABSTRACT... Objective: The aim of this study is to determine the prevalence of oral soft tissue lesions in patients attending the outpatient department. **Study Design:** Cross Sectional, Observational study. **Setting:** Department of Oral and Medicine DUHS. **Period:** October 2019 to March 2020. **Material & Methods:** A total of three hundred and eighty five (385) patients were enrolled in the study. Detailed history and thorough intra and extra oral examination of each patient were done. **Results:** The overall prevalence of oral mucosal lesions was found to be 58.7%. The most frequent oral mucosal lesions were reported as white with 58% of all soft tissue lesions, while the most common site was observed as buccal mucosa with 58% of all sites. As far as texture was concerned, soft texture (47%) was recorded as most frequent. **Conclusion:** Early detection and identification of oral mucosal lesions is crucial, especially in a population where multifaceted tobacco consumption, oral precancerous and cancerous lesions are reported as one of the highest in the world. The high prevalence of oral mucosal lesions, as reported in our study and their potential for malignant transformation necessitates extensive soft tissue examination of the oral cavity, in adjunct to routine dental checkup.

Key words: Lesions, Oral Mucosa, Site, Texture, Leukoplakia, Biopsy.

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pigmented lesions. Lesions which macroscopically appear as white/grey lesions are microscopically characterized by: increased thickness of epithelium (hyper-para-or-ortho-keratinization, acanthosis, intracellular oedema/spongiosis), decreased vascularity in lamina propria (fibrosis), ectopic positioning of structures (presence of sebaceous glands in lamina propria); while, red lesions are characterized by: decreased thickness of epithelium (atrophy), breakdown in the continuity of the epithelium (ulcer/erosions), increased vascularity in lamina propria (inflammation, angiomatous). Most frequent white lesion comprise of frictional keratosis, leukoplakia, lichen planus and candidiasis, whereas, most common red lesions encompass erythroplakia, denture induced stomatitis and geographic tongue.⁴

Oral mucosal lesions can result from burns; bacterial, viral and fungal infections; metabolic and immunological systemic diseases; drugs or

habitual consumption of betel quid, areca nut, tobacco or alcohol.^{4,7}

Oral squamous cell carcinoma, accounting for the sixth most common cancer around the globe, with an annual incidence of 275,000 cases, has a profound association with lifestyle modifications inclusive of alcohol and tobacco consumption.^{7,8} According to a study conducted in South East Asia, 50% or more oral cancers are associated with betel quid chewing, 25% are associated with chewable or smoked tobacco, up to 19% with alcohol consumption and up to 15% with nutritional deficiency, professedly.⁸

The increasing prevalence, myriad of clinical presentation, diversified range and close clinical resemblance of oral mucosal lesions had made diagnosis of these lesions a rather ambitious and challenging task.

Histopathological examination remains the gold standard of diagnosis but, in third world countries, including Pakistan, where the burden of disease is huge and expense of biopsy plays a crucial role in patient's decision to proceed with treatment, clinicians should promptly recognize the distinctive features pertaining to clinical presentation, to differentiate benign from potentially malignant lesions, which require further investigation.⁹⁻¹¹

As an initial step to achieve this milestone, the College of Dental surgeons of British Columbia (BC) released a set of guidelines and protocols developed by the BC Oral cancer Prevention Program.¹¹⁻¹³ According to these guidelines, a clinician should have methodical approach when evaluating the head, neck and oral regions, including detailed history and background information and step by step clinical examination.¹³ Clinical examination should include thorough extra and intraoral examination and detailed assessment of the lesion.¹³

The clinical predictive parameters, which can abet in diagnosis, include clinical subtype (homogenous versus non-homogeneous), the color of the lesion, surface texture, the size of the

lesion, the site of the lesion and the duration of the lesion.^{13,14}

The aim of this study is to determine the prevalence of oral soft tissue lesions in patients attending the outpatient department of Dow International Dental College, DUHS. This study will aid in determining the epidemiological factors associated with these lesions. The current study will further abet in the clinical assessment of oral lesions with regards to age, gender, site, size, duration, and risk factors, thereby, developing a local database for recently emerging benign, precancerous and malignant oral lesions in Karachi, Pakistan.

MATERIAL & METHODS

A cross sectional observational study was conducted at Dow International Dental College (DIDC), Dow University of Health Sciences (DUHS). The study was conducted from October 2019 to March 2020 (period of 6 months). The study sample comprised of patients attending the Oral Diagnosis department of DIDC for various dental complaints. The patients younger than 10 years of age; having grade III trismus [having 0-15mm mouth opening (I/I)]¹⁵ and having generalized extrinsic stains were excluded from this study.

The sample size of the study was calculated using an online sample size calculator Openepi (Proportion based), keeping 95% confidence level and 5% confidence limit.¹⁶ According to an online source, World population review, the population of Karachi in 2019 was approximately 15.7 million.¹⁷ Based on this data, confidence level of 95% and confidence interval of 5%, the calculated sample size of the study was 385.

Ethical consent was taken by the Department of Oral Diagnosis and Medicine. Three hundred and eighty five (385) subjects were interviewed and clinically examined in the department of Oral Diagnosis and Medicine, DIDC by Oral Medicine specialist.

The protocols which were followed during the course of this study, as described by the College of Dental surgeons of British Columbia^{12,13}

comprised of:

Step-1:

Patient history – This step comprised of patient's personal history (age, gender and ethnicity), chief complaint, medical/drug history, family history and social history (tobacco use and alcohol consumption). This information was recorded on the standard DUHS dental history form.

Step-2:

Visual screening examination – This step comprised of both an extraoral and intraoral examination. The extraoral examination comprised of inspection, palpation, percussion and auscultation of the head and neck region. Intraoral examination comprised of detailed soft tissue examination of the oral cavity, utilizing dental mirror, dental explorer, and cotton gauze, in the presence of artificial light on the dental chair.

Step-3:

Lesion assessment – If an abnormality, which in case of this study, an oral mucosal lesion was observed, then the site, color, texture, distribution, appearance and duration of the lesion was recorded.

Descriptive statistics (frequency distribution of the studied parameters) and inferential statistics (chi-square test of independence) were performed using SPSS.

RESULTS

Our study comprised of a cohort of three hundred and eighty five (385) dental patients. Out of this cohort, two hundred and twenty six (226) patients presented with oral mucosal lesion(s), which makes an overall prevalence of patients presenting with oral mucosal lesions around 59%. Of those who presented with lesions, one hundred and thirty one (131) presented with white lesion, eighty five (85) presented with red lesion and ten (10) presented with grey lesion, respectively. Males and females were almost equally distributed. Nearly half of the patients belonged to 31 to 50 years age group.

Lesions most commonly presented on buccal mucosa (n=130, 57.5%), while, least common presentation was on the floor of the mouth (n=1, 0.4%). Nearly 70% of the patients had bilateral distribution. At the time of examination, almost half of the patients presented with lesion more than 2cm in size (n=123, 54.4%) while, remaining patients had a lesion less than 2cm in diameter (n=103, 45.6%). At the time of history taking, nearly 53% (n=119) of the patients stated that the lesion developed approximately two weeks earlier (14 days), while, only 10% (n=22) stated that the lesion occurred more than one year ago. On intra oral examination, 47% (n=107) of the lesions were soft on palpation, while, only 1% (n=2) were granular or rubbery on palpation. Lastly, 43% of the patients had a history of consumption of chewable tobacco, which includes moist and dried forms of snuff (as shown in Table-I).

Our study reported that around 95% of lesions which occurred on buccal mucosa were white in appearance; in contrast, 100% of lesions which occurred on tongue, retromolar area, gingiva, floor of the mouth and palate were red in appearance. Approximately 96% of all lesions which were less than 2cm in diameter were white in color, while 85% of all lesions more than 2cm in diameter were red in color. Surprisingly, 100% of lesions which had duration of less than two weeks were white in appearance, in contrast, 100% of lesions having duration of seven months to one year and more than one year was red lesions. Notably, 71% of the subjects who consumed smokeless tobacco developed white lesion, in contrast, nearly 29% of these subjects developed red lesions. Lastly, 100% of lesions with a soft texture were white in appearance while, 63%, 100% and 100% of lesions with leathery, striae or irregular and granular or rubbery were red in appearance, respectively (as shown in Table-II).

Univariate analysis revealed a statistically significant association between color of the lesion (white/red) with site (p 0.0001), size (p 0.0001), duration (p 0.0001), habit (p 0.0001) and texture (p 0.0001) of the lesion. Association between color of the lesion with age and gender were found to be insignificant.

Characteristics	N = 226 (%)
Age in years (Mean ± SD)	1.82 ± .80
Lesions	
White	131 (58%)
Red	85 (37.6%)
Grey	10 (4.4%)
Age	
10-30	87 (38.5%)
31-50	103 (45.6%)
51-65	26 (11.5%)
66 Above	10 (4.4%)
Gender	
Male	110 (48.7%)
Female	116 (51.3%)
Site	
Buccal	130 (57.5%)
Labial	38 (16.8%)
Gingival	15 (6.6%)
Retromolar	3 (1.3%)
Tongue	35 (15.5%)
Floor of mouth	1 (0.4%)
Palate	4 (1.8%)
Distribution	
Unilateral	158 (69.9%)
Bilateral	68 (30.1%)
Size	
Less Than 2cm	123 (54.4%)
More Than 2cm	103 (45.6%)
Duration	
Up to 2 Weeks	119 (52.7%)
2 To 3 Months	45 (19.9%)
4 To 6 Months	28 (12.4%)
7 Months To 1 Year	12 (5.3%)
More than 1 Year	22 (9.7%)
Texture	
Soft	107 (47.3%)
Leathery	67 (29.6%)
Rubbery	2 (0.9%)
Firm	6 (2.7%)
Striae	24 (10.6%)
Irregular	18 (8.0%)
Granular	2 (0.9%)
Habit	
Smokeless tobacco	97 (42.9%)
Smoked tobacco	2(0.9%)
No habit	127(56.2%)

Table-I. Descriptive Statistics for Lesions.

DISCUSSION

Oral mucosal lesions, either occurring isolated or in association with skin, endocrine, and other systemic conditions, presents significant oral and general health problem. Despite having potential for malignant transformation, these lesions are not reported regularly and scarce data regarding its prevalence in terms of site, size, texture and association with habits is available in Pakistani population.

The present observational, cross-sectional study, aims to report the prevalence of oral mucosal lesions in a public sector hospital in Karachi, Pakistan. The overall prevalence of these lesions was found to be as 58.7%, which is comparable to results of studies conducted by Sujatha et al in India (60%), Ali et al in Kuwait (58.1%), Cadugo et al in Slovenia (61.6%), Skaleric et al in Philippines (61%) and Vallejo et al in Spain (58.8%) (1,18–20). However, many dentists lack the knowledge or do not perform detailed soft tissue examination of the oral cavity thus, many of these oral mucosal lesions go unnoticed.²¹

The high prevalence of these mucosal lesions was observed to be associated with habitual consumption of smokeless tobacco in the form of both moist and dried snuff. Our study reported consumption of smokeless tobacco among 43% of subjects diagnosed with oral mucosal lesions. Similar results (43.3%) of consumption of smokeless tobacco were reported by Sujatha et al in Indian population, whereas, significantly higher prevalence (89%) was reported by Al Attas et al in Saudi population.^{18,20} The high prevalence of these deleterious habits were most likely attributed to lack of awareness, low level of education and lower socioeconomic status.¹⁸ Such associations emphasize the importance of designing and implementing oral health and oral cancer screening and awareness programs within a populous.

Our study reported buccal mucosa (58%) as most prevalent site, with labial mucosa (17%) and tongue (16%) being the other most common sites.

Characteristics	Lesions			P-Value
	White (n=131)	Red (n=85)	Total	
Age				0.892
0-30	50 (60.2%)	33 (39.8%)	83	
31-50	58 (58.6%)	41 (41.4%)	99	
51-65	17 (68.0%)	8 (32.0%)	25	
66 above	6 (66.7%)	3 (33.5%)	9	
Gender				0.167
Male	44 (40%)	66 (60%)	110	
Female	57 (49%)	59 (51%)	116	
Site				0.0001**
Buccal	121 (94.5%)	7 (5.5%)	128	
Labial	10 (26.3%)	28 (73.7%)	38	
Retromolar and tongue	0 (0%)	30 (100%)	30	
Other sites (gingiva, floor of the mouth, palate)	0 (0%)	20 (100%)	20	
Distribution				0.0001**
Unilateral	98 (62%)	60 (37.9%)	158	
Bilateral	3 (0.04%)	65 (95.6%)	68	
Size				0.0001**
Less than 2cm	117 (95.9%)	5 (4.1%)	122	
More than 2cm	14 (14.9%)	80 (85.1%)	94	
Duration				0.0001**
Up to 2 weeks	118 (100%)	0 (0%)	118	
2 to 3 months	13 (28.9%)	32 (71.1%)	45	
4 to 6 months	0 (0%)	28 (100%)	28	
7 months to 1 year	0 (0%)	12 (100%)	12	
More than 1 year	0 (0%)	13 (100%)	13	
Habit				0.0001**
Smokeless tobacco	69 (71.1%)	28(28.8%)	97	
Smoked tobacco	2 (100%)	0 (0%)	2	
No habit	54 (42.5%)	73 (57.4%)	127	
Texture				0.0001**~
Soft	106 (100%)	0 (0%)	106	
Leathery	25 (37.3%)	42 (62.7%)	67	
Striae/irregular	0 (0%)	35 (100%)	35	
Other textures (Granular, firm, rubbery)	0 (0%)	8 (100%)	8	
~Cells proportion>20%				
**Significant at 1%				

Table-II. Relationship between Lesions with Age, Size, Site, Duration, Texture.

The variation depicted in sites of tobacco induced oral mucosal lesions is directly associated with the habitual differences of tobacco consumption among different cultures, ethnicities and societies, whereby, buccal mucosa is considered as a common site for development of lesions such as tobacco induced keratosis, leukoplakia, erythroplakia etc in South Asian countries, in contrast, lateral border of tongue as floor of the mouth are more commonly associated with such lesions in European countries because of the aforementioned difference in tobacco usage.^{15,18,22} Our findings supported this argument as buccal mucosa was the most common site in our study.

The Centers for Disease Control and Prevention, USA reported a striking finding that only 16% of the respondents disclosed that they were examined for precancerous and cancerous oral mucosal lesions during routine dental examination.²¹ This finding augments our results and signifies the importance of screening during routine dental checkup.

The limitations of our study include 1) cross sectional study design; 2) absence of lugol iodine and toluidine blue staining during clinical examination (because of their invasive nature). Future studies can be conducted to decipher the cause – effect relationship on tobacco usage and oral mucosal lesions and correlation of histopathological and clinical diagnosis of oral mucosal lesions.

CONCLUSION

Early detection and identification of oral mucosal lesions is crucial, especially in a population where multifaceted tobacco consumption, oral precancerous and cancerous lesions are reported as one of the highest in the world. The high prevalence of oral mucosal lesions, as reported in our study and their potential for malignant transformation necessitates extensive soft tissue examination of the oral cavity, in adjunct to routine dental checkup.

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



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2	Salik Rasool	Conceptualization, Data collection, Investigation, Review and editing.	
3	Syed Hammad Ahsan	Methodology Validation, Formal analysis, Data collection, writing draft.	
4	Shahnawaz Jamali	Methodology, Validation, Writing draft, Review and editing.	
5	Ramsha Azhar	Conceptualization, Methodology, Data analysis, writing draft.	