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## Presence of oral mucosal lesions associated with tobacco use – among the patients visiting OPD: A prevalence study, at the oxford dental college Bangalore

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### Abstract

**Background:** Use of tobacco in any form smoke or smokeless has been implicated with the development of oral mucosal lesions like Leukoplakia (LE), lichen planus (LP), oral lichenoid lesions (OLL), oral submucous fibrosis (OSF), smokers palate (SP) and smokers melanosis (SM).

**Aim:** To assess the presence of oral mucosal lesions associated with the use of tobacco.

**Material and Methods:** In this prevalence study 216 patients (200 males and 16 females) with habit of smoking, chewing tobacco in any form and smokeless tobacco users were enrolled and evaluated based on thorough history and soft tissue examination. Patients not willing to participate, those with infections, local trauma /irritation or systemic diseases that causes oral mucosal lesions and alcoholics were excluded. Statistical analysis was performed using statistical package for social sciences [SPSS] for Windows, Version 22.0. Released in 2013. Armonk, NY: IBM Corp.

**Result:** Among the 216 participants, 200 (92.6%) were males and 16 (7.4%) were females; with the mean age of 46.03 years. The prevalence of smoking tobacco use was 60.6% and smokeless 39.4%. The most common finding was smoker's palate (34.7%), tobacco pouch keratosis (25.5%), homogenous leukoplakia (20.8%) and smokers melanosis (14.4%).

**Conclusion:** The study emphasizes the association of harmful effects of tobacco (smoke and smokeless forms) with the development of oral mucosal lesions.

**Keywords:** Oral mucosal lesion, smoke tobacco, smokeless tobacco

### Introduction

Both the smoking and non – smoking forms of tobacco, has the potential to cause a wide spectrum of oral mucosal alterations or lesions including oral cancer and pre-cancer<sup>[1]</sup>.

Recent years has embarked the availability of various commercial preparations of tobacco in and around the world, making these products highly addictive and popular among people of all age group<sup>[2, 3]</sup>.

Tobacco was introduced in India by the Portuguese about 400 years ago and ever since it has become part and parcel of socio-cultural milieu. India has been ranked the world's third largest tobacco growing country and second largest tobacco product consumer (Shaik *et al.*, 2016). The Global Adult Tobacco Survey GATS-2 fact sheet India 2016-2017 shows the involvement of 10.7% of all adults in smoked tobacco use, while 21.123e4% in smokeless tobacco use<sup>[4, 6]</sup>.

Cigarette and beedi comprises the smoking form of tobacco, whereas the smokeless forms includes – pan masala – dry tobacco – areca nut preparation along with mixture of betel leaf with lime, arecanut, gutkha (crushed betel nut, tobacco and savory and sweet flavourings) mawa (thin arecanut shavings with added tobacco, slaked lime wrapped in a cellophane paper). In both smoked and smokeless forms thousands of chemical compounds are detected which acts not only as irritants but are also deadly carcinogens<sup>[4]</sup>.

Smokers have at least six times increased risk of cancer then non -smokers and the habit of smokeless tobacco has the potential of causing oral cancer by 50 times.

This link between the use of either forms of tobacco and oral cancer has been attributed to the significant rate of epithelial dysplasia, which can eventually contribute to carcinoma in situ<sup>[5]</sup>. The oral lesions which has been positively associated with use of tobacco includes tooth stain acute necrotising ulcerative gingivitis, burns keratotic patches, Leukoplakia (LE), lichen planus (LP), oral lichenoid lesions (OLL), oral submucous fibrosis (OSF), smokers palate (SP) and smokers melanosis (SM). There will be variability in the location and type of the lesion based on the – frequency, duration and the way it is used<sup>[1,4]</sup>.

Since these lesions can interfere with the normal physiological activities like mastication, swallowing and speech, this study was aimed to evaluate the presence of oral mucosal lesions associated with tobacco use to promote an early diagnosis, thereby aiding in reduction of the associated potential risk of malignant transformation.

### Material and Methods

216 patients (200 males and 16 females) who visited the outpatient department of Oral Medicine and Radiology in the Oxford Dental College, Bangalore were enrolled. The study was carried out for a duration of six months. The informed consent was obtained from all the patients.

The inclusion criteria were patients who had habit of smoking, chewing tobacco in any form and the smokeless tobacco users.

Exclusion criteria were people not willing to participate, alcoholics, those with infections, local trauma /irritation or systemic diseases that were a cause for oral mucosal lesions.

All the subjects were informed regarding the nature of study and informed consent was obtained. Following which they were evaluated based on their tobacco habits such as form, type, frequency, site of placement of quid in the oral cavity and duration in years. All the subjects were clinically examined intra-orally using mouth mirrors and gauze under good illumination for the presence of any tobacco associated lesions. The clinical diagnosis was established based on the criteria provided by the epidemiology guide for the diagnosis of oral mucosal diseases by the World Health Organisation (Kramer *et al.*, 1980)<sup>[4]</sup>. After which required investigations and treatment protocols were carried out for the patients who presented with mucosal lesions.

All the obtained data were collected and summarized in Microsoft excel sheet and were statistically analysed using Statistical Package for Social Sciences [SPSS] for Windows, Version 22.0. Released in 2013. Armonk, NY: IBM Corp.,

Descriptive analysis were carried out which included expression of all the explanatory and outcome variables in terms of frequency and proportions for categorical variables, whereas in terms of Mean & SD for continuous variables.

Inferential statistics were done using chi square test to compare the frequency and duration of tobacco habit between beedi & cigarette smokers, site of placement between gutka & zarda chewers, age wise prevalence of different tobacco related lesions, associate different oro-mucosal lesions based on the type of tobacco habit, different site of location of oro-mucosal lesions based on the type of tobacco habit, correlation of age and duration of tobacco related lesions and also the duration of tobacco related lesions based on the type of tobacco habit. The level of significance [p-value] was set at  $P < 0.05$ .

### Results

A total of 216 individuals comprising 200 (92.6%) males and

16 (7.4%) females; with the mean age of 46.03 years, constituted the study population. Based on the tobacco habit reported among the study subjects, predominant were smokers with (60.6%) and smokeless were relatively less with (39.4%) [Table 1]

Distribution of smokeless tobacco habit characteristics among study subjects, revealed that, most predominant study subjects had habit of gutka with 85.9% and frequency of 1-5 nos (90.6%). The maximum habit duration recorded for all smokeless users were 1-10 yrs with 69.4%. Only a smaller proportion of people were using pan and zarda with 7.1%. [Table 2]

Distribution of tobacco smoking habit characteristics among study subjects revealed that predominant were beedi smokers with 63.4% and few were cigarette smokers with 36.6% and the frequency consumption was higher with 1-5 nos (78.6%) per day. The maximum habit duration recorded among both the types were 1-10 years with 62.6%. [Table 3]

On comparison of frequency and duration of tobacco habit among beedi & cigarette smokers it was found that majority of beedi (77.1%) and cigarette smokers (81.3%) were smoking with a frequency of 1-5 nos in a day and a relatively lesser number of cigarette and beedi smokers were smoking more than 5 nos in a day with a range of 7-15%. In terms of frequency of use, no significant difference was noted among the two groups with a P value of 0.43. Majority of the cigarette (68.8%) and beedi (59.0%) had habit duration in the range of 1-10 years, followed by 11- 20 years with 23-30% and relatively small proportion had habit more than 20 years in both groups. However no statistical significant difference was noted in terms of duration of use with a P value of 0.21. [Table 4]

On comparison of site of placement it was found that among gutka chewers about 20.5% preferred the labial vestibule, but majority 79.5% kept it in the buccal vestibule. Whereas among the zarda users all 100% placed it in the labial vestibule. Among the two groups labial and buccal vestibule were among the predominant site of placement in the zarda and gutka chewers respectively. This difference was statistically significant ( $P < 0.001$ ) [Table 5]

The most common tobacco related lesion among the study subjects were smoker's palate (34.7%) followed by tobacco pouch keratosis (25.5%), homogenous leukoplakia (20.8%) and smokers melanosis (14.4%). Where as other associated lesions like Oral lichen planus, OSMF Stage 1,2,3, ulcerative proliferative growth CA and pre-leukoplakia ranged from 1-5%. [Table 6]

Age wise comparison of prevalence of different tobacco related lesions revealed that tobacco pouch keratosis was significantly more associated in the age group  $P < 45$  years (37.1%) as compared to elder age group of  $> 45$  years (12.0%), in contrast smokers melanosis was more prevalent among elder age group  $> 45$  years (24.0%) and lesser in  $< 45$  years (6.0%). The oral lichen planus was almost three times more among elder age group  $> 45$  years (3.0%) in contrast to age group  $P < 45$  years (0.0%). The above differences were significant with  $P < 0.001$ ,  $P < 0.001$  and  $P < 0.04$  for tobacco pouch, smokers melanosis and oral lichen planus respectively. A border line significance was noted among homogenous leukoplakia, smokers palate and ulcerative proliferative growth ca, which was more prevalent among elder age group  $> 45$  yrs (26.0%), (41.0%), (5.0%) in contrast to  $< 45$  years (16.4%), (29.3%), (0.9%) with P-values (0.08), (0.07), (0.007) respectively. However other lesions did not show any significant difference when compared between different age. [Table 7]

On comparison of different oro-mucosal lesions based on the type of tobacco habit, revealed that tobacco pouch keratosis was significantly more associated in the smokeless category (62.4%) and only (1.5%) in smoking, homogenous leukoplakia was (3.5%) in smokeless and (32.1%) in smoking, smoker’s melanosis (0.0%) in smokeless and (22.9%) in smoking, smoker’s palate was (0.0%) smokeless and (57.3%) in smoking, in comparison to OSMF stage 3 which was more in smokeless (12.9%) and (0.0%) in smoking, all the above lesions showed statistical significance with P value (<0.001). A border line significance was noted in OSMF stage 1 and 2 with P value 0.03\* and 0.002\* respectively. However other lesions like oral lichen planus, ulcerative proliferative growth and pre-leukoplakia, did not show any significant statistical difference. [Table 8]

The most frequently involved intra-oral site among different tobacco related lesions was hard palate (50.90%), followed by buccal mucosa (42.10%), buccal vestibule (20.40%), labial vestibule (14.40%), attached gingiva and labial mucosa (1.40%) and floor of mouth (0.90%). [Table 9]

On comparison of locations of oro-mucosal lesions based on the type of tobacco habit revealed that oral mucosal lesions like smoker’s palate was more prevalent in hard palate among smoking (66.4%) in contrast to smokeless (27.1%), whereas (buccal, labial) vestibule and labial mucosa were more involved in smokeless (48.2%) (36.5%) and (3.5%), in contrast to smoking (2.3%), (0.0%) and (0.0%) respectively.

The above results were statistically significant with  $P < 0.001^*$  and  $P < 0.03^*$ . However other locations like buccal mucosa, floor of mouth, attached gingiva did not show any statistical significance. [Table 10]

Majority of the study subjects presented the lesion in the duration within the last 1-3 years with (64.4%), followed by 4-6 years (34.3%) and relatively a smaller proportion had lesions persisting >6 years (1.4%). [Table 11]

On age wise comparison of duration of tobacco related lesions among study subjects it was found that, a lesser duration of 1-3 years was more prevalent in younger age group of <45 years (86.2%) in contrast to older age group >45 years (39.0%). Whereas longer duration of habit about 4 - 6 and >6 years was observed in older group with (58.0%) and (3.0%) respectively. The above result was statistically significant  $P < 0.001$ . [Table 12]

On comparison of duration of tobacco related lesions based on the type of tobacco habit among study subjects it was observed that, a lesser duration of 1-3 years was prevalent among smokeless tobacco users (74.1%) in contrast to smoking (58.0%), whereas a longer duration of 4-6 and >6 years was mostly associated with smokers with 39.7% and 2.3% respectively. The above differences were statistically significant, in terms of duration of lesion based on tobacco habit with  $P < 0.03$ . [Table 13]

**Table 1:** Age and gender wise distribution of study subjects

Variable	Category	n	%
Age	20-40 yrs.	91	42.1%
	41-60 yrs.	85	39.4%
	61-80 yrs.	40	18.5%
	Mean	46.03	SD
	SD	19 - 80	
	Gender	Males	200
Females		16	7.4%

**Table 2:** Distribution of smokeless tobacco habit characteristics among study subjects

Variable	Category	n	%
Type	Pan	6	7.1%
	Gutka	73	85.9%
	Zarda	6	7.1%
Frequency	1-5 nos.	77	90.6%
	> 5 nos.	8	9.4%
Duration	1-10 yrs.	59	69.4%
	11-20 yrs.	17	20.0%
	21-30 yrs.	3	3.5%
	31-40 yrs.	2	2.4%
	> 40 yrs.	4	4.7%

**Table 3:** Distribution of tobacco smoking habit characteristics among study subjects

Variable	Category	n	%
Type	Beedi	83	63.4%
	Cigarettes	48	36.6%
Frequency	1-5 nos.	103	78.6%
	6-10 nos.	17	13.0%
	> 10 nos.	11	8.4%
Duration	1-10 yrs.	82	62.6%
	11-20 yrs.	36	27.5%
	21-30 yrs.	8	6.1%
	31-40 yrs.	5	3.8%

**Table 4:** Comparison of frequency and duration of tobacco habit between beedi & cigarette smokers using Chi Square Test

Variable	Category	Beedi		Cigarettes		P-Value
		n	%	n	%	
Frequency	1-5 nos.	64	77.1%	39	81.3%	0.43
	6-10 nos.	13	15.7%	4	8.3%	
	> 10 nos.	6	7.2%	5	10.4%	
Duration	1-10 yrs.	49	59.0%	33	68.8%	0.21
	11-20 yrs.	25	30.1%	11	22.9%	
	21-30 yrs.	4	4.8%	4	8.3%	
	31-40 yrs.	5	6.0%	0	0.0%	

**Table 5:** Comparison of site of placement between gutka & zarda chewers using Chi Square Test

Variable	Vestibule	Gutka		Zarda		P-Value
		n	%	n	%	
Site of Placement	Labial	15	20.5%	6	100.0%	<0.001*
	Buccal	58	79.5%	0	0.0%	

\* - Statistically Significant

**Note:** Pan Chewers have been omitted from comparison as there is no site of placement

**Table 6:** Distribution of different tobacco related lesions among study subjects

Variable	Category	n	%
Tobacco Related Lesions	Tobacco Pouch Keratosis	55	25.5%
	Homogenous Leucoplakia	45	20.8%
	Smokers Melanosis	31	14.4%
	Smoker's Palate	75	34.7%
	Oral Lichen Planus	3	1.4%
	OSMF Stage 1	3	1.4%
	OSMF Stage 2	6	2.8%
	OSMF Stage 3	11	5.1%
	Ulcerative Proliferative Growth CA	6	2.8%
	Pre-Leucoplakia	4	1.9%

**Table 7:** Age wise comparison of prevalence of different tobacco related lesions among study subjects using Chi Square Test

Lesions	Category	< 45 yrs. (n=116)		> 45 yrs. (n=100)		P-Value
		n	%	n	%	
Tobacco Pouch Keratosis	No	73	62.9%	88	88.0%	<0.001*
	Yes	43	37.1%	12	12.0%	
Homogenous Leucoplakia	No	97	83.6%	74	74.0%	0.08
	Yes	19	16.4%	26	26.0%	
Smokers Melanosis	No	109	94.0%	76	76.0%	<0.001*
	Yes	7	6.0%	24	24.0%	
Smoker's Palate	No	82	70.7%	59	59.0%	0.07
	Yes	34	29.3%	41	41.0%	
Oral Lichen Planus	No	116	100.0%	97	97.0%	0.04*
	Yes	0	0.0%	3	3.0%	
OSMF Stage 1	No	114	98.3%	99	99.0%	0.65
	Yes	2	1.7%	1	1.0%	
OSMF Stage 2	No	111	95.7%	99	99.0%	0.14
	Yes	5	4.3%	1	1.0%	
OSMF Stage 3	No	111	95.7%	94	94.0%	0.57
	Yes	5	4.3%	6	6.0%	
Ulcerative Proliferative Growth CA	No	115	99.1%	95	95.0%	0.07
	Yes	1	0.9%	5	5.0%	
Pre-Leucoplakia	No	114	98.3%	98	98.0%	0.88
	Yes	2	1.7%	2	2.0%	

\* - Statistically Significant

**Table 8:** Comparison of different oro-mucosal lesions based on the type of tobacco habit using Chi Square Test

Lesions	Category	Smokeless (n=85)		Smoking (n=131)		P-Value
		n	%	n	%	
Tobacco Pouch Keratosis	No	32	37.6%	129	98.5%	<0.001*
	Yes	53	62.4%	2	1.5%	
Homogenous Leukoplakia	No	82	96.5%	89	67.9%	<0.001*
	Yes	3	3.5%	42	32.1%	
Smokers Melanosis	No	85	100.0%	101	77.1%	<0.001*
	Yes	0	0.0%	30	22.9%	
Smoker's Palate	No	85	100.0%	56	42.7%	<0.001*
	Yes	0	0.0%	75	57.3%	
Oral Lichen Planus	No	83	97.6%	130	99.2%	0.39
	Yes	2	2.4%	1	0.8%	
OSMF Stage 1	No	82	96.5%	131	100.0%	0.03*
	Yes	3	3.5%	0	0.0%	
OSMF Stage 2	No	79	92.9%	131	100.0%	0.002*
	Yes	6	7.1%	0	0.0%	
OSMF Stage 3	No	74	87.1%	131	100.0%	<0.001*
	Yes	11	12.9%	0	0.0%	
Ulcerative Proliferative Growth CA	No	82	96.5%	128	97.7%	0.59
	Yes	3	3.5%	3	2.3%	
Pre-Leukoplakia	No	83	97.6%	129	98.5%	0.66
	Yes	2	2.4%	2	1.5%	

\* - Statistically Significant

**Table 9:** Distribution of site of location of tobacco related lesions among study subjects

Variable	Category	n	%
Site of the Lesion	Labial Mucosa	3	1.40%
	Buccal Mucosa	91	42.10%
	Labial Vestibule	31	14.40%
	Buccal Vestibule	44	20.40%
	Hard Palate	110	50.90%
	Floor of Mouth	2	0.90%
	Attached Gingiva	3	1.40%

**Table 10:** Comparison of different site of location of oro-mucosal lesions based on the type of tobacco habit using Chi Square Test

Lesions	Category	Smokeless (n=85)		Smoking (n=131)		P-Value
		n	%	n	%	
Labial Mucosa	No	82	96.5%	131	100.0%	0.03*
	Yes	3	3.5%	0	0.0%	
Buccal Mucosa	No	55	64.7%	70	53.4%	0.10
	Yes	30	35.3%	61	46.6%	
Labial Vestibule	No	54	63.5%	131	100.0%	<0.001*
	Yes	31	36.5%	0	0.0%	
Buccal Vestibule	No	44	51.8%	128	97.7%	<0.001*
	Yes	41	48.2%	3	2.3%	
Hard Palate	No	62	72.9%	44	33.6%	<0.001*
	Yes	23	27.1%	87	66.4%	
Floor of Mouth	No	83	97.6%	131	100.0%	0.08
	Yes	2	2.4%	0	0.0%	
Attached Gingiva	No	85	100.0%	128	97.7%	0.16
	Yes	0	0.0%	3	2.3%	

\* - Statistically Significant

**Table 11:** Distribution of duration of tobacco related lesions among study subjects

Variable	Category	n	%
Duration of Lesion	1-3 yrs.	139	64.4%
	4-6 yrs.	74	34.3%
	> 6 yrs.	3	1.4%

**Table 12:** Distribution of duration of tobacco related lesions among study subjects

Variable	Category	n	%
Duration of Lesion	1-3 yrs.	139	64.4%
	4-6 yrs.	74	34.3%
	> 6 yrs.	3	1.4%

\* - Statistically Significant



**Table 13:** Comparison of duration of tobacco related lesions based on the type of tobacco habit among study subjects using Chi Square Test

Variable	Category	Smokeless (n=85)		Smoking (n=131)		P-Value
		n	%	n	%	
Duration of Lesion	1-3 yrs.	63	74.1%	76	58.0%	0.03*
	4-6 yrs.	22	25.9%	52	39.7%	
	> 6 yrs.	0	0.0%	3	2.3%	

\* - Statistically Significant

## Discussion

Global smoking pandemic, according to the WHO is expected to remain as one of the major cause leading to premature death, illness and suffering for several decades. (WHO1999) [7]

The Indian scenario is no far behind, with India in the second phase of tobacco epidemic, owing to the prevalent use of both smokeless and smoked forms of tobacco amidst the rural or semi urban population. As per the Global Adult Survey (GATS), it is estimated that 247.9 million people are tobacco consumers, whereby 68.9 million are smoked and 163.7 million are smokeless form users [4, 6, 8].

The diversity among tobacco useage habits like smoking and chewing has lead to an immense rise in oral mucosal lesions, which varies in forms and location and many of these carry a potential risk for the development of cancer. It becomes essentially important to understand the prevalence, distribution and risk factors contributing to these mucosal lesions, with this background a hospital-based prevalence study was conducted in order to identify, the presence of oral mucosal lesions, associated with tobacco use [4, 9, 10].

The present study comprised of 216 tobacco users of which 92.6% were males and 7.4% were females and this is probably because the number of male patients were more then females. Tobacco smoking was more predominant among males than females, this corresponds with other studies by Sujatha *et al.* (2015), Monisha *et al.* (2017) and Maher *et al.* (2019) [3, 4, 5].

Most among the tobacco users belonged to the age group of 20-40 years (42.1%), this is similar to the findings from other studies by Pimple *et al.* (2012) and Vandita *et al.* (2018) [11].

Among men the most commonly used smokeless form of tobacco was gutka (85.9%), which is contrast with the study done by kaset *et al.* (2012), where gutka was the second most commonly used smokeless product. Its increasing use may be contributed to the advertising and the marketing strategies of manufacturer [12].

The present study showed beedi smoking (63.4%) was significant among the tobacco smoking habit which is supported by study done by Prena *et al.* (2015), where it was a significant predictor of oral mucosal lesions. Beedi smoking is predominant in many parts of India, in comparison to cigarette beedi produces only a smaller volume of smoke, its considered to cause about 2-3 times greater nicotine and tar inhalation than conventional cigarettes [13].

It was observed that most of the gutka (79.5%) and zarda chewers (100%) predominantly preferred buccal and labial vestibule as site of placement, results are consistent with findings of Nada *et al.* (2021) and Lesan *et al.* (2014), where the most preferred placement site by SLT users were labial and buccal vestibule [14, 15].

In the present study, smoker's palate (37.4%) was the most common oral mucosal lesion among smokers, a similar finding was observed in a study conducted by Safia *et al.* (2014), Lin *et al.* (2001), Shayam *et al.* (2015) and Manjiri *et al.* (2021). According to Axell *et al.* smoker's palate is probably related more to high temperature rather then the

chemical composition of the smoke [9, 16, 17, 18].

Upon age wise comparison of prevalence of different tobacco related lesions, tobacco pouch keratosis was found to be significant amidst younger age group (<45 years), consistent with findings of Rani *et al.* (2015), it becomes apparent after 5-10 years of tobacco habit initiation and regresses with habit cessation. Among the elder age group (>45 years) smokers melanosis was more prevalent consistent with findings of Binti Shahroom *et al.* (2020), it is clinically characterised by brown to black discolouration, leading to melanin deposition, resulting from heat of smoke and melanocytes stimulation [19, 20].

In our study the use of smokeless tobacco revealed significant association of mucosal lesions like tobacco pouch keratosis and OSMF stage 3 similar findings were reported by Prashant *et al.* (2013) [2] and Sujatha *et al.* (2015) [3]. OSMF stage 3 could be due to the absence of betel leaf known for its anti-oxidant properties and proportionately higher dry weight of areca nut with concurrent tobacco use [3]. Whereas lesions like homogenous leukoplakia, smokers melanosis and smokers palate were more prevalent among smokers this finding was compatible with that of Naveen *et al.* (2016) [9], Aida Kusiak *et al.* (2020) [21].

Oro-mucosal lesions based on type of tobacco habit revealed that smoking habit was predominantly associated with lesions involving the hard palate like smokers palate this finding was same as that of Saraswathi *et al.* (2006) [22], whereas smokeless use of tobacco had lesions involving the labial mucosa, buccal and labial vestibule as placement of, consistent with findings of Lesan *et al.* (2013) [15] and Ayo-Yusuf *et al.* (2000) [23].

Majority of the study subjects presented the lesions in the duration within the last 1-3 years (64.4%), this was inconsistent with findings by Sujatha *et al.* (2015) [3], where maximum lesions were among subjects with duration of 5-10 years. This difference could be attributed to the fact that most of the subjects in the present study were around 20-40 years.

As per the literature available, no other study has categorised the duration of tobacco related lesions in the oral mucosa in terms of age and type of tobacco habit, our study revealed that a lesser duration of 1-3 years and smokeless habit was more prevalent among the younger age group <45 years, whereas lesions persisted for longer duration about 4-6 years among the older age group and those with habit of smoking.

Limitations of the study are information bias as self-reporting by the individuals might have led to underreporting of tobacco use and detection bias as researcher was aware of the habit history of the individuals prior to oral examination.

## Conclusion

In conclusion, we observed the marked presence of the main risk factors (smoking and smokeless) forms of tobacco use associated with prevalence of various oral mucosal lesions, on aggregate, the available data suggests that the risk of developing potentially malignant lesions and oral cancer with smoking and chewing habit is high. It as well acknowledges the importance of having regular screening protocols to increase the awareness regarding the adverse effects of

tobacco use, hence emphasis should be given for cessation of habit through counselling, proper referral and treatment procedures for better control over prevention of such oro-mucosal lesions.

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