



PREVALENCE OF HABITS RELATED ORAL MUCOSAL LESIONS AMONG PATIENTS VISITING TAGORE DENTAL COLLEGE AND HOSPITAL: A CROSS-SECTIONAL STUDY IN CHENGALPATTU DISTRICT

P. Sangavi CRRI^{1,*}, Dr. Narmadha MDS², Dr. GS Asokan MDS³, Dr. S Angelin Teena MDS⁴, N.M. Rajapriya⁵, M. Charulatha⁶

¹*CRRI, Department of Oral Medicine and Radiology, Tagore Dental College and Hospital, Rathinamangalam, Chennai.

²Senior lecturer, Department of Oral Medicine and Radiology, Tagore Dental College and Hospital, Rathinamangalam, Chennai.

³Professor and Head of the Department, Department of Oral Medicine and Radiology, Tagore Dental College and Hospital, Rathinamangalam, Chennai.

⁴Senior lecturer, Department of Oral Medicine and Radiology, Tagore Dental College and Hospital, Rathinamangalam, Chennai.

⁵CRRI, Department of Oral Medicine and Radiology, Tagore Dental College and Hospital, Rathinamangalam, Chennai.

⁶CRRI, Department of Oral Medicine and Radiology, Tagore Dental College and Hospital, Rathinamangalam, Chennai.

***Corresponding Author:** P. Sangavi CRRI

*CRRI, Department of Oral Medicine and Radiology, Tagore Dental College and Hospital, Rathinamangalam, Chennai.

ABSTRACT

Background:

Oral mucosal lesion (OML) refers to abnormal changes in the color, appearance, swelling, or loss of integrity of oral mucosal surface, resulting from bacterial, viral, fungal, or local damage, systemic disorders, or adverse habits like excessive alcohol, cigarette, or betel nut use. This research aims to raise public awareness and encourage people to give up indulgence in these habits.

Aim:

The study aims to assess the prevalence of habit-related oral mucosal lesions among patients visiting Tagore Dental College and Hospital in Chengalpattu district.

Methodology:

The study screened 384 patients at Tagore Dental College and Hospital for oral mucosal lesions-related habits. A thorough clinical history was taken, and oral mucosal lesions were diagnosed following WHO guidelines. The findings were compiled and statistically analyzed.

Results:

In a study of 384 participants, oral leukoplakia (37.2%) was the most common oral mucosal lesion, followed by tobacco pouch keratosis (34.1%) and other lesions. The analysis revealed a strong association between oral mucosal lesions and various habits, with erythroplakia (69%) predominantly associated with smoking and alcohol use. Other lesions unrelated to premalignant lesions (28.6%)

were significantly associated with smokeless tobacco and alcohol use. Oral Candidiasis (100% within cases) was exclusively associated with smoking and alcohol. Oral Leukoplakia shows varied habit associations, with the highest prevalence (53.3%) in cases involving smoking and alcohol. Overall, a statistically significant difference was observed ($\chi^2 = 223.075$; $P < 0.001$).

Conclusion:

This study concluded that habits such as tobacco use and alcohol consumption have a significant association with the occurrence of oral mucosal lesions. These findings could help healthcare professionals raise patient awareness and provide useful data for mitigation and targeted interventions.

Keywords: Oral mucosal lesions, Tobacco chewers, Smoking, Alcohol, Leukoplakia

INTRODUCTION:

The oral cavity is a dynamic environment that is susceptible to a wide range of lesions, from benign to potentially malignant. Tobacco use, alcohol consumption, and poor oral hygiene have all been identified as major risk factors for oral mucosal lesions. Furthermore, emerging lifestyle and dietary trends may contribute to the increased prevalence of these lesions.

Oral cancer is the most common and lethal form of oral mucosal lesions associated with tobacco, making it the sixth most common cancer globally. It is particularly prevalent in developing countries, like India, due to the high risk of pan-tobacco chewing. Oral cancer, particularly potentially malignant disorders, is lethal, making early diagnosis crucial to prevent further complications. The high risk in the Indian subcontinent is attributed to the widespread use of pan-tobacco. Epidemiological studies aid in determining disease incidence, prevalence, and severity, as well as assessing distribution, risk factors, and associated etiology^[1,2].

The term "oral mucosal lesion" (OML) refers to any abnormal change in the color, appearance, swelling, or loss of integrity of the oral mucosal surface. The effects of OMLs on the functions of the oral cavity with feelings of burning, irritation, and pain, can also negatively impair a patient's everyday quality of life^[3]. OMLs can have a variety of aetiologies, including bacterial, viral, fungal, or local damage or irritation, systemic disorders, and adverse habits like excessive alcohol, cigarette, or betel nut use^[4,5].

The consumption of tobacco and alcohol has become a widespread social habit worldwide. Tobacco and alcohol consumption is estimated to contribute 50% to squamous cell carcinoma (SCC) and 30% to the global cancer burden^[6]. One of the most significant risk factors for the emergence of oral mucosal lesions, including oral cancer and pre-cancer, is tobacco^[7].

Tobacco is a major source of carcinogens, including polycyclic aromatic hydrocarbons, aromatic amines, and nitrosamine, and all these are cytotoxic. Smoking tobacco contains over 4000 chemicals, with at least 50 known carcinogens, while smokeless tobacco contains 28 carcinogens. Both forms produce oral mucosal lesions, ranging from melanin pigmentation to potentially malignant disorders.^[8] Pan masala and gutkha, two commercially available preparations, are now widely available in India and many other Asian countries. On the labels of several of these products, it is noted that they include tobacco and areca nuts, both of which have been connected to the emergence of oral cancer^[9]. Patients with a combination of these habits are at a higher risk of developing oral lesions.

This research seeks to fill gaps in the existing literature by providing specific insights into the habits of patients with oral mucosal lesions, enabling targeted public health interventions and educational campaigns. The study's findings can help to develop effective preventive measures, early detection protocols, and personalized treatment plans to address the community's oral health challenges.

It is crucial to understand the prevalence of habits that are associated with oral mucosal lesions for early intervention and preventive healthcare strategies. Thus, this study aims to assess the prevalence of habit-related oral mucosal lesions among the Chengalpattu population.

MATERIALS AND METHODS:

STUDY DESIGN AND SETTINGS:

A Descriptive cross-sectional study was conducted on patients visiting our institute during the period between July 2023 and November 2023, at the Department of Oral Medicine and Radiology, Tagore Dental College and Hospital, Rathinamangalam [Chengalpattu]. The study received approval by the Institutional Ethical Committee (Ref. IEC/TDCH/070/2023 dated 06.11.2023).

STUDY PARTICIPANTS:

The study population using convenience sampling comprised 384 patients with oral mucosal lesions and a favorable record of adverse oral habits. The data based on the patient's responses were tabulated in Microsoft Excel sheet with information on age, gender, adverse oral habits with frequency, duration, quitting attempts, and presence of oral mucosal lesions.

INCLUSION CRITERIA:

The study includes patients aged 18-65 years old who had a past and present history of adverse oral habits like smoking, chewing tobacco, alcohol consumption, or a combination of these habits associated with oral mucosal lesions and who are willing to participate in the study and allow the collection of relevant data.

EXCLUSION CRITERIA:

Patients who are less than 18 years of age; who are not willing to participate in the study and who are mentally challenged and uncooperative are excluded from the study.

SAMPLE SIZE ESTIMATION:

The sample size was calculated with an expected frequency of 50% based on the published research articles. With an acceptable margin of error of 5% and a design effect of 1.0; 99.99% CI, the sample size of 384 participants was to be included in this study.

DATA COLLECTION:

Informed written consent was obtained from all the participants before commencing the study. The patient provided demographic information, and a trained dental surgeon performed a comprehensive intra-oral and extra-oral examination.

The data was collected using a verbal questionnaire based on a patient proforma that included details such as the patient's name, age, gender, occupation, chief complaint, past medical and dental history, family history, and personal habit history, which included the frequency and duration of alcohol, smoking, and chewing habits, as well as previous quit attempts.

DIAGNOSIS OF THE ORAL LESIONS:

On examination, the existence of any intraoral lesions was documented. The distinctive features of oral mucosal lesions, including their location, size, color, type, margins, surface, discharge, and duration, were also noted.

The diagnosis was exclusively based on the history, clinical findings, examination, and characteristic location of the lesions, where appropriate [Figure 1-3]. The clinical diagnosis was established based on the criteria provided by the *Epidemiology Guide for the diagnosis of oral mucosal diseases (WHO)* [10].

STATISTICAL ANALYSIS:

The prevalence of oral mucosal lesions was determined using a percentage analysis and the collected data were tabulated. IBM SPSS software (Statistical Package for the Social Sciences Version 21.0) was used for statistical analysis.

The variables such as age, gender, tobacco usage, and alcohol consumption with frequency, duration, quitting attempts, and prevalence of oral mucosal lesions were considered for statistical analysis.



Figure 1: (a) *Smoker's Palate*; (b) *Oral Lichen Planus* ; (c) *Oral Leukoplakia on buccal mucosa*; (d) *Oral Leukoplakia on tongue*

RESULTS:

Among 384 participants, 372 (96.9%) were males and 12 (3.1%) were females as shown in Figure 2

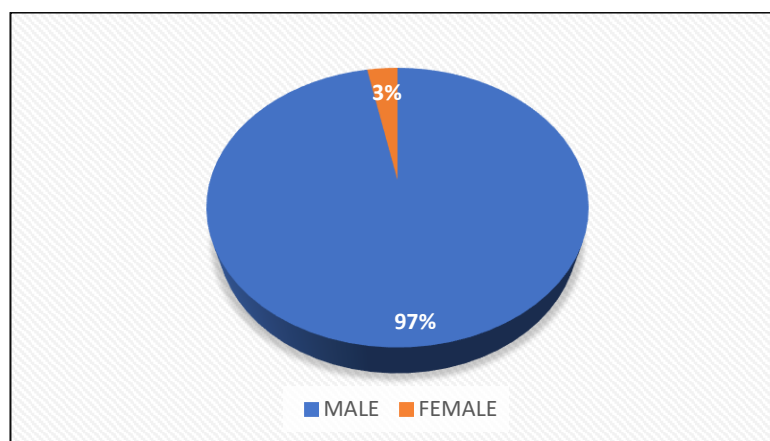


Figure 2. *Distribution of gender*

Table 1 shows that the average age of participants is 42.08, with a standard deviation of 11.551, ranging from 20 to 80. Smokers have an average daily smoking habit of 3.08 packs, with a positively skewed distribution. The average daily smoking frequency is 1.77, ranging from 0 to 10.

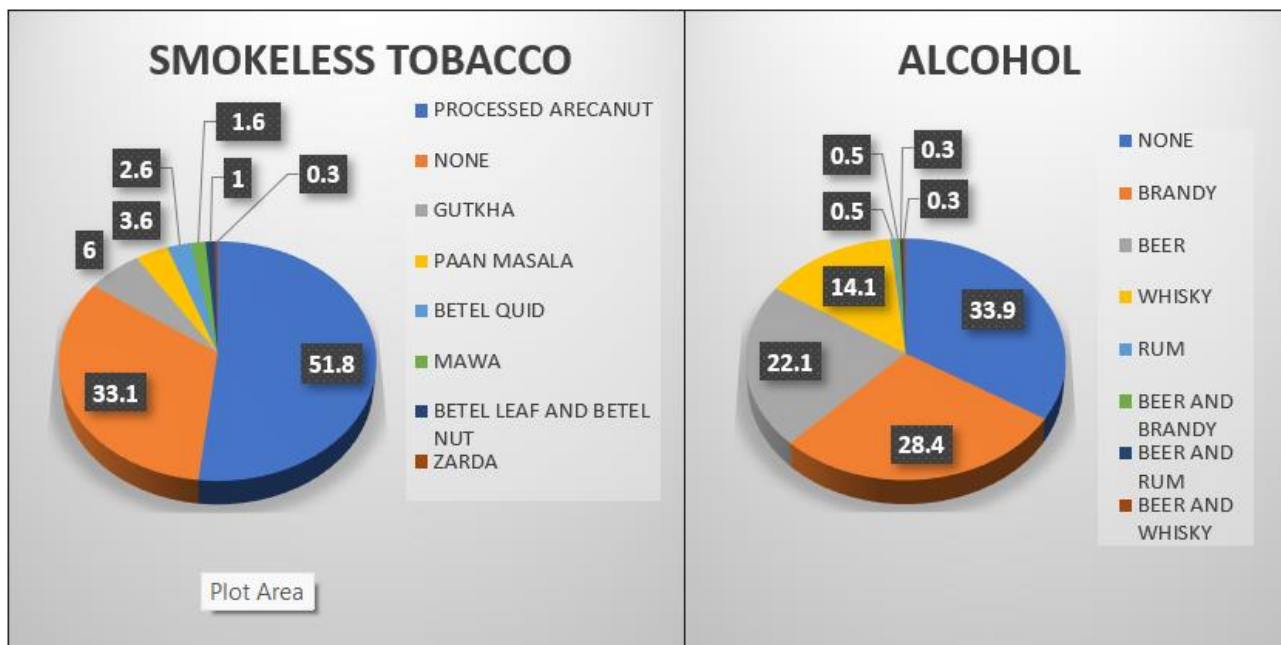


Figure 3. Distribution of participants based on various forms of smokeless tobacco usage and alcohol consumption

The analysis of the data shows that processed areca nut (51.8%) is the most prevalent smokeless tobacco, used by more than half of respondents, while a sizable proportion (33.1%) does not use any form of tobacco. Other prevalent types include gutkha (6.0%), paan masala (3.6%), betel quid (2.6%), Mawa (1.6%), betel leaf and betel nut (1.0%), and Zarda (0.3%). Zarda has the lowest prevalence of all smokeless tobacco forms as shown [Table 2 and Figure 3].

Among 384 participants, (33.9%) of the population consumes no alcohol, with brandy (28.4%) being the most commonly consumed alcohol followed by Beer (22.1%) and whisky (14.1%). Rum has a lower consumption rate, with only 0.5% of participants reporting its use. A small percentage of participants consume combination drinks like beer and rum (0.3%), beer and brandy (0.5%), and brandy and whisky (0.3%). [Table 3 and Figure 3]. In the study population, only 8.3% of them had attempted to quit the habit while the majority (91.7%) reported that they had never attempted to quit as shown in [Figure 4].



Figure 4. Distribution of participants based on quitting attempts of habits

Among the study population, the majority reported having multiple lesions concurrently. Table 4 reveals the presence or absence of various oral mucosal lesions, along with the frequency and percentage of each condition in the study population where oral leukoplakia (37.2%) was found to be the most common oral mucosal lesion followed by tobacco pouch keratosis (34.1%), oral submucous fibrosis (OSMF) (19%), smoker's palate (18%), erythroplakia (7.8%), oral lichen planus (OLP) (7.3%), oral candidiasis (6.8%), smokers melanosis (6.3%), leukoedema (3.9%) and frictional keratosis (1.6%). [Figure 5]

Table 5 reveals the prevalence and a strong association between oral mucosal lesions and various habits. The majority of cases (69.0%) with Erythroplakia are associated with the habit of both smoking and alcohol use. The largest percentage of cases with other lesions (28.6%) such as tobacco pouch keratosis, leukoedema, frictional keratosis, smoker's palate, and smoker's melanosis without any association with premalignant lesions, are associated with the habit of both smokeless tobacco and alcohol use. Oral Candidiasis is exclusively associated with smoking and alcohol consumption, constituting 100.0% of cases within this category. Oral Leukoplakia is associated with various habits, with the highest prevalence in smoking and alcohol cases (53.3%). The majority (35.3%) of Oral Lichen Planus cases are associated with mixed habits. OSMF is most commonly associated with the habit of smokeless tobacco consumption, representing 27.6% of cases.

Overall, the highest percentage of pre-malignant lesions (29.7%) is observed in cases with the habit of smoking and alcohol use. The difference between the prevalence of oral mucosal lesions in association with various habits was statistically highly significant ($\chi^2 = 223.075$; $P < 0.001$).

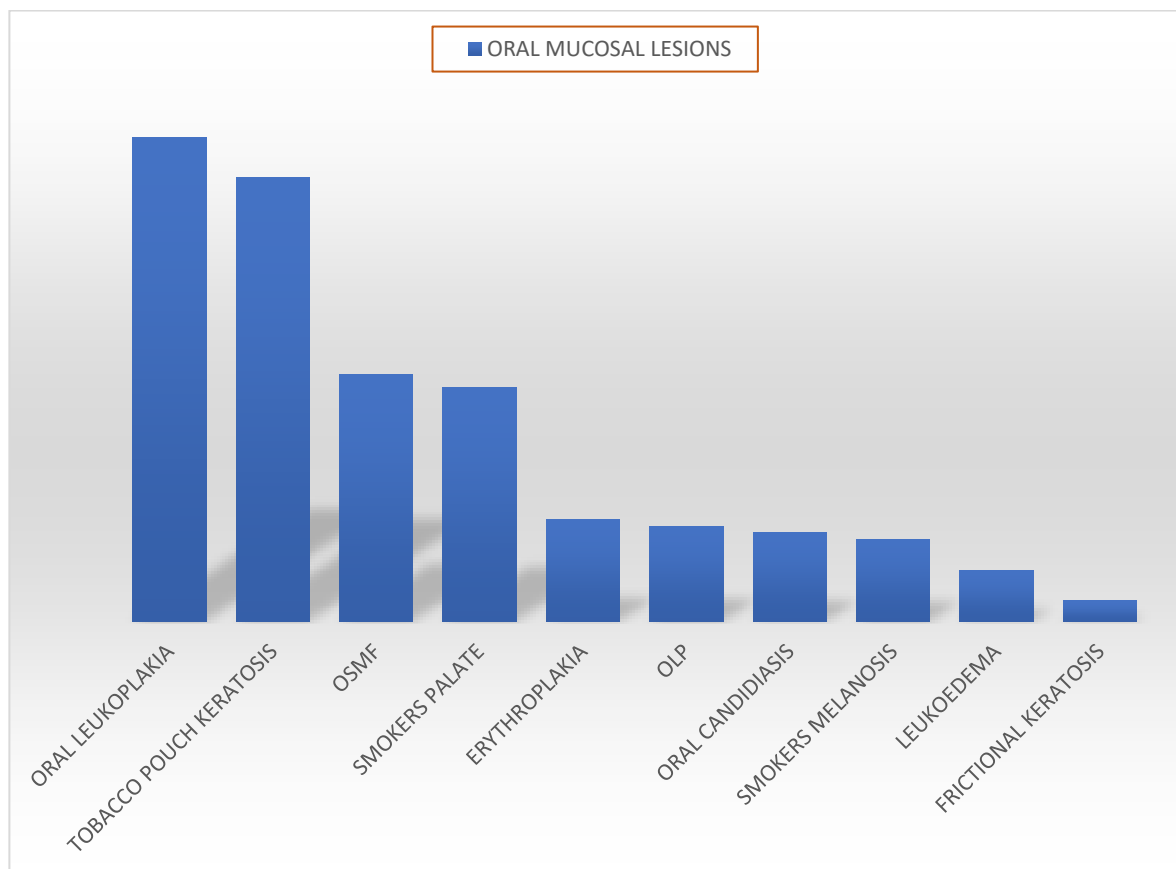


Figure 5. BAR DIAGRAM SHOWS THE PREVALENCE OF ORAL MUCOSAL LESIONS
OSMF – Oral submucous fibrosis; OLP – Oral Lichen planus

Table 1. Distribution of participants (based on age, smoking per day, and frequency of smoking)

	Total	Minimum	Maximum	Mean	Standard Deviation
AGE	384	20	80	42.08	11.551
TOBACCO PACKS/Day	384	0	20	3.08	3.613
FREQUENCY/DAY	384	0	10	1.77	1.492

Table 2. Distribution of participants (based on smokeless tobacco usage)

VARIOUS FORMS OF SMOKELESS TOBACCO	FREQUENCY	PERCENTAGE
PROCESSED ARECA NUT	199	51.8
BETEL QUID	10	2.6
PAAN MASALA	14	3.6
BETEL LEAF + BETEL NUT	4	1.0
NO FORM OF SMOKELESS TOBACCO	127	33.1
GUTKHA	23	6.0
MAWA	6	1.6
ZARDA	1	0.3
TOTAL (N)	384	100

Table 3. Distribution of participants (based on Alcohol consumption)

VARIOUS FORMS OF ALCOHOL	FREQUENCY	PERCENTAGE
NONE	130	33.9
BEER	85	22.1
RUM	2	0.5
BRANDY	109	28.4
WHISKY	54	14.1
BEER AND RUM	1	0.3
BEER AND BRANDY	2	0.5
BRANDY AND WHISKY	1	0.3
TOTAL (N)	384	100

Table 4. Percentage analysis showing the presence/absence of different oral mucosal lesions among the study population

ORAL MUCOSAL LESIONS	PRESENCE OF LESION	FREQUENCY	PERCENTAGE (%)	TOTAL (N)
LEUKOEDEMA	Yes	15	3.9	384
	No	369	96.1	
FRICTIONAL KERATOSIS	Yes	6	1.6	384
	No	378	98.4	
TOBACCO POUCH KERATOSIS	Yes	131	34.1	384
	No	253	65.9	
SMOKERS PALATE	Yes	69	18	384
	No	315	82	
SMOKERS MELANOSIS	Yes	24	6.3	384
	No	360	93.8	
ORAL CANDIDIASIS	Yes	26	6.8	384
	No	358	93.2	
ORAL LEUKOPLAKIA	Yes	143	37.2	384
	No	241	62.8	
ERYTHROPLAKIA	Yes	30	7.8	384
	No	354	92.2	
ORAL SUBMUCOUS FIBROSIS	Yes	73	19	384
	No	311	81	
ORAL LICHEN PLANUS	Yes	28	7.3	384
	No	356	92.7	

Table 5. Distribution of participants based on the prevalence and association of various oral mucosal lesions with habits

ORAL MUCOSAL LESIONS		HABIT						TOTAL	χ^2	P
		SMOKING	SMOKELESS TOBACCO	SMOKING AND SMOKELESS TOBACCO	SMOKING AND ALCOHOL	SMOKELESS TOBACCO AND ALCOHOL	MIXED HABITS			
ERYTHROPLAKIA	COUNT	1	1	2	20	0	5	29	223.075	< 0.001
	% WITHIN LESION	3.4%	3.4%	6.9%	69.0%	0.0%	17.2%	100.0%		
OTHER LESIONS WITH NO ASSOCIATION WITH PREMALIGNANT LESIONS	COUNT	4	32	31	18	38	10	133		
	% WITHIN LESION	3.0%	24.1%	23.3%	13.5%	28.6%	7.5%	100.0%		
ORAL CANDIDIASIS	COUNT	0	0	0	1	0	0	1		
	% WITHIN LESION	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%		
ORAL LEUKOPLAKIA	COUNT	0	0	1	0	0	0	1		
	% WITHIN LESION	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%		
ORAL LEUKOPLAKIA	COUNT	7	2	8	65	4	36	122		
	% WITHIN LESION	5.7%	1.6%	6.6%	53.3%	3.3%	29.5%	100.0%		
ORAL LEUKOPLAKIA, ORAL LICHEN PLANUS	COUNT	0	0	0	4	0	0	4		
	% WITHIN LESION	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%		
ORAL LEUKOPLAKIA, ORAL LICHEN PLANUS	COUNT	0	0	0	2	0	0	2		
	% WITHIN LESION	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%		
ORAL LICHEN PLANUS	COUNT	1	5	2	3	0	6	17		
	% WITHIN LESION	5.9%	29.4%	11.8%	17.6%	0.0%	35.3%	100.0%		
ORAL LICHEN PLANUS, ORAL LEUKOPLAKIA	COUNT	0	0	0	1	0	0	1		
	% WITHIN LESION	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%		
ORAL LICHEN PLANUS, ERYTHROPLAKIA	COUNT	0	0	0	0	0	1	1		
	% WITHIN LESION	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%		
OSMF	COUNT	0	16	14	0	15	13	58		
	% WITHIN LESION	0.0%	27.6%	24.1%	0.0%	25.9%	22.4%	100.0%		
OSMF, ORAL LEUKOPLAKIA	COUNT	0	2	1	0	2	7	12		
	% WITHIN LESION	0.0%	16.7%	8.3%	0.0%	16.7%	58.3%	100.0%		
OSMF, ORAL LICHEN PLANUS	COUNT	0	0	0	0	2	1	3		
	% WITHIN LESION	0.0%	0.0%	0.0%	0.0%	66.7%	33.3%	100.0%		
TOTAL	COUNT	13	58	59	114	61	79	384		
	% WITHIN LESION	3.4%	15.1%	15.4%	29.7%	15.9%	20.6%	100.0%		

(χ^2 – Chi-square test)

DISCUSSION:

This study aims to assess the prevalence of habit-related oral mucosal lesions and their implications for public health initiatives. The study seeks to raise awareness about the detrimental effects of these habits and inspire individuals to adopt healthier oral practices by examining the relationship between adverse oral habits and the occurrence of oral mucosal lesions.

In the present study, the distribution of oral mucosal lesions was more prevalent in male patients (96.9%) compared to female patients (3.1%). Male predominance in the present study was in agreement with Kasat et al^[11] (91.7%), which is reported as greater than the findings from Mishra et al^[12] (75.80%), Sinha et al^[13] (71%), and Gupta et al^[14] (52.6%). This difference is likely due to the higher proportion of male patients seen associated with the habits compared to females and also due to the added attribution to the Indian culture.

The mean age of the study participants is 42.08, which is in close agreement with the mean age (40.1) reported by Sami El Toum et al ^[15]. This similarity suggests a notable prevalence of tobacco and alcohol use, thought to serve as coping mechanisms to alleviate social stress.

The prevalence of processed areca nut (51.8%) as the predominant smokeless tobacco is seen to be higher than the findings from the study (21%) by Karthik et al ^[16] and lower than the findings from Saraswathi et al ^[17]. This is due to the cultural significance and popularity of areca nut-based products in certain regions. The observed 33.1% who do not use any form of tobacco contrasts with the literature, suggesting a notable proportion refrains from tobacco habits. The lowest prevalence of Zarda corroborates the literature noting its relatively limited usage compared to other smokeless tobacco types.

Among the alcohol usage, Brandy was the most prevalent (28.4%), followed by beer (22.1%) and whisky (14.1%). This aligns with the study by Saraswathi et al ^[17]. Rum had a lower consumption rate (0.5%). Some participants reported consuming combination drinks (0.3-0.5%). The comparison prompts a discussion on the co-occurrence of various forms of alcohol within populations, emphasizing the need for comprehensive understanding and analysis.

Understanding the relationship between habits and oral mucosal lesions is crucial for diagnosing local and systemic health issues. In this study, the most common oral mucosal lesion was found to be oral leukoplakia (37.2%), which is similar to the findings by Sujatha et al ^[18] and in contrast to Kasat et al ^[11] findings (most common - tobacco pouch keratosis), Manjiri et al ^[19] (most common - smoker's palate), and are higher than those reported by Patil et al ^[20] (19.2%) and Chandra et al ^[21] (3.5%). Leukoplakia was found to be mostly associated with the habit of smoking and alcohol (53.3%). This association is justified by the presence of carcinogens and irritants in tobacco smoke and alcohol, which individually and synergistically contribute to chronic oral mucosal irritation ^[22], dysplasia, and an increased risk of cancer.

In the current study, the second most prevalent oral lesion was tobacco pouch keratosis 34.1% which was less than that reported by Kasat et al ^[11] (78.14%) but higher than Mishra et al ^[12] (31.83%), Manjiri et al ^[19] (30.1%) and Chandra et al ^[21] (1.4%). These lesions reveal the prevalence of risk factors such as tobacco use and alcohol consumption within a specific population. The diversity in reported prevalence rates highlights the need for region-specific insights into cultural, socioeconomic, and environmental factors impacting oral health patterns.

In the present study, the prevalence of oral submucous fibrosis was 19%. These results are higher than those reported by Kasat et al ^[11] (15.30%), Patil et al ^[20] (7.1%), Mishra et al ^[12] (5.43%), Chandra et al ^[21] (2.2%), Gupta et al ^[14] (3.2%), Saraswathi et al ^[17] (0.05%). The study reinforces the stronger association of OSMF with areca nut chewing (27.6%).

The present study found a strong association between smoking and alcohol use and the prevalence of Erythroplakia at 69.0%, which supports the conclusion drawn by Hashibe et al ^[23], highlighting the consistent and significant impact of these habits on the occurrence of Erythroplakia.

A significant percentage (28.6%) of oral mucosal lesions, including tobacco pouch keratosis, leukoedema, frictional keratosis, smoker's palate, and smoker's melanosis, are linked to the dual habit of consuming smokeless tobacco and alcohol, despite no clear association with premalignant lesions.

Oral Candidiasis emerges as an exclusive outcome of smoking and alcohol consumption, constituting 100.0% of cases within this category which is similar to the finding by Axell et al ^[22] shows the synergistic effect of the habits. A significant proportion of Oral Lichen Planus cases (35.3%) is

associated with mixed habits, emphasizing the complex interplay of multiple factors contributing to this condition.

LIMITATIONS

This study's generalizability might be limited due to the small sample size of 384 participants, suggesting caution when extrapolating findings to a larger population. Convenience sampling introduces selection bias, while patient self-reporting may introduce recall or social desirability bias. The diagnosis of oral lesions is based solely on clinical examination, with no histopathological confirmation, raising concerns about misdiagnosis or underestimation. To overcome these limitations, increase sample size through random sampling, include histopathological confirmation for accurate diagnosis, and address gender disparity for balanced gender representation. Collaborating with diverse institutions will broaden the study population and improve external validity and overall reliability.

FUTURE PROSPECTS:

Further studies are required to explore risk factors beyond habits, conduct longitudinal studies, investigate genetic and molecular mechanisms, develop targeted interventions, implement health education programs, and conduct global comparative studies to assess regional variations in oral mucosal lesions and these prospects improve advanced knowledge and refine preventive strategies to improve oral health outcome in a broader scale.

CONCLUSION:

In conclusion, the present study reveals that Oral leukoplakia emerges as the most common lesion and the highest percentage of pre-malignant lesions (29.7%) was observed in cases with combined habits of smoking and alcohol use revealing erythroplakia being the most prevalent in this combination. This underscores the critical role of these habits such as tobacco and alcohol consumption as risk factors that play a significant role in the occurrence of oral mucosal lesions. This study underscored the importance of a multidimensional approach in preventive healthcare and the need for targeted interventions to mitigate the impact of adverse oral habits on community well-being. Despite its limitations, the study provides valuable insights for early intervention and education campaigns. To improve oral health prevention efforts and for our further understanding, more research examining other factors and intervention strategies is needed in the future.

ETHICAL CONSIDERATIONS: The data collected will be treated with strict confidentiality, and personal information will be anonymized and stored securely.

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CONFLICTS OF INTEREST: The authors declare no conflicts of interest.

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