

## Prevalence of Oral Mucosal Lesions among Tobacco Consumers: A Cross-Sectional Study

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### Abstract:

**Background and Aim:** Tobacco use, whether it's smoking or using smokeless products, poses a significant risk for oral disorders. It can lead to various changes in the oral mucous membrane, ranging from reversible lesions like smoker's palate to the development of oral cancer. Our study aimed to examine the frequency of different mucosal lesions in participants and explore any potential connections with clinicopathological factors. Additionally, we aimed to provide comprehensive data on tobacco use within the study group.

**Material and Methods:** A total of 500 individuals were included in the study, all of whom sought dental care at the Dentistry Department of the Gujarat Adani Institute of Medical Sciences in Bhuj, Kutch, and Gujarat for duration of six months. Information about individuals and their behaviours was collected through a standardised questionnaire administered by an interviewer. A biopsy was performed on the oral mucosal lesions to evaluate their histopathological characteristics and correlate them with the clinical diagnosis. The data was subjected to statistical analysis.

**Results:** A total of 500 patients who were 15 years or older underwent evaluation. Among them were 300 men and 200 women. Men had a higher tendency to smoke, while women preferred chewing tobacco. Oral mucosal lesions made up 18% of the cases. There is a strong correlation between the frequent occurrence of oral mucosal lesions and the widespread use of tobacco-related practices. The most common lesions observed were smoker's palate, smoker's palate with melanosis, leukoplakia, and smoker's melanosis.

**Conclusion:** It was found that 18% of the research population had oral mucosal ulcers related to tobacco use. Furthermore, it was found that there is a higher prevalence of smoking among men compared to chewing, and smoking is associated with an increased incidence of leukoplakia lesions. There are various changes that can be observed, including hyperkeratosis and smoker's melanosis, as well as premalignant and malignant lesions.

**Keywords:** Hyperkeratosis, Oral Mucosal Lesions, Smokers Palate, Tobacco.

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### Introduction

The oral mucous membrane is a crucial indicator of both oral and overall health, serving as a gateway to our digestive system. [1] Oral mucosal lesions (OMLs) are often seen as precursors to oral malignancy, a type of cancer that ranks as the sixth most common worldwide. OMLs can develop due to various factors, including bacterial and viral interactions, changes in metabolism or immune function, adverse reactions to medications, and unhealthy habits like tobacco, betel quid, and alcohol consumption. [1,2] Tobacco consumption is a significant global issue that not only poses health risks but also has economic implications. The growth has been significant over the past few

decades. There is a wide range of tobacco products available in the market, offering consumers a plethora of options to choose from. [3] There are various options available in the market for consuming it, including chewable forms and different smoking methods. [4] There are various types of chewable tobacco products such as pan masala, zarda, and gutkha. Additionally, bidi and cigarette are the main forms of smoking, along with other less common forms like hookah smoking, cigar, and chillum. [5,6] There are various factors that can contribute to tobacco usage, such as physical stress, the promotion of tobacco products through banners and advertisements, and even the

influence of family members. These contribute to the addictive nature of tobacco use. It can result in the formation of different types of lesions, some of which are harmless, while others may have the potential to become cancerous. [7] There are several potentially malignant disorders identified by the World Health Organisation, such as leukoplakia, erythroplakia, erythroleukoplakia, submucous fibrosis, and more. There are other factors that can be quite common, such as melanin pigmentation caused by tobacco smoke and changes in the palate due to smoking. [8] The rise of tobacco-related lesions in young populations is a cause for concern, not just in adults. There has been a lot of discussion surrounding the use of smokeless tobacco products.

Previous studies have examined the link between tobacco habits and oral mucosal lesions from an epidemiological perspective. According to several epidemiologic surveys, the prevalence rates for various oral conditions are as follows: Leukoplakia ranged from 0.2 to 4.9%, Lichenplanus at 0.4%, Leukokeratosis nicotina palati at 2.3%, Erythroplakia at 0.1%, Submucous fibrosis at 0.1%, and cancer at 0.03%. [9,10] Numerous studies have consistently demonstrated a clear link between oral precancer and cancer and tobacco habits. [11]

According to epidemiologic studies, it was found that these habits were more prevalent among individuals with low socio-economic conditions and those who were illiterate. This could be attributed to a lack of awareness about the harmful effects of tobacco in these populations. Recognising and identifying premalignant disorders clinically is crucial for reducing the risk of malignant transformation. Various diagnostic methods can help in this process. [4,5] The study aimed to assess the prevalence of lesions in individuals who use tobacco, using toluidine blue as a screening method for tobacco-associated lesions.

### Material and Methods

A study included 500 participants who visited the Dentistry Department of Gujarat Adani Institute of Medical Sciences, Bhuj, Kutch, and Gujarat for duration of 6 months.

**Eligibility criteria:** All individuals aged 15 years and older who were visited during the study period and expressed a desire to participate were included. Individuals with chronic illnesses or undergoing radiotherapy were not included in the study. Information was gathered through the use of questionnaires and clinical examinations.

The subjects were examined according to the guidelines provided by Mehta FS and Hamner JE.

For clinical examination of the oral cavity, two mouth mirrors were utilised to retract soft tissue and provide illumination using sunlight. Personal details and information on habits were collected through a standardized questionnaire administered by an interviewer.

The personal information provided includes the individual's name, age, gender, occupation, and address. The information on habits discussed whether or not habits were present or absent. When studying habits, it is important to consider various factors such as the type of tobacco used, how the habit started, how long it has been going on, and how often it occurs on a daily basis. Additionally, the specific area where smokeless tobacco is used and how long it is used for should also be taken into account. When it comes to smoked tobacco, we gathered information about different habits and varieties, including filtered and non-filtered cigarettes.

Given the nature of this study, strict aseptic precautions were meticulously adhered to throughout the clinical examination and subsequent biopsy procedures. When oral mucosal lesions were detected, a clinical diagnosis was made. The findings from the examination and palpation were carefully documented, and detailed photographs of the lesions were taken in colour.

A biopsy was conducted using a 6mm punch instrument under local anaesthesia, following the acquisition of written consent. 46 biopsy specimens were collected and then fixed in 10% formalin. They were later embedded in paraffin and sliced into sections that were 5  $\mu$ m thick. These sections were stained with Hematoxylin-Eosin and evaluated through histopathological analysis.

The histopathological diagnosis has been determined. The presence of epithelial dysplasia, if any, was observed and classified as mild, moderate, or severe. The clinical and histopathological data were analysed statistically.

**Statistical analysis:** The recorded data was organised and inputted into a spreadsheet computer programme (Microsoft Excel 2007) before being transferred to the data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). Quantitative variables were reported using means and standard deviations or median and interquartile range, depending on their distribution. The presentation of qualitative variables was in the form of counts and percentages. Confidence level and level of significance were set at 95% and 5% respectively for all tests.

### Results

**Table 1: Prevalence of tobacco habit in the study population**

Male (300)				Female (200)			
With Habit 250			Without Habit	With Habit (150)			Without Habit
Smoked	Smoke-less	Smoked and Smokeless		Smoked	Smoke-less	Smoked and Smokeless	
160	80	10	50	90	55	5	50
Total - 500							

500 patients over the age of 15 years underwent examination. There were 300 males and 200 females among them. Among a group of 300 males, 250 engaged in the habits of chewing and smoking, while the remaining 50 did not have any such habits. Among the group of 200 females, it was observed that 150 had the habit of chewing and smoking, while the remaining 50 did not have any

such habits. Here is Table 1. The table displays the rates of tobacco use among males and females, both in the form of smoking and smokeless consumption. There was a higher incidence of smoking among males. The overall prevalence of lesions indicated that Smokers palate had the highest number of cases, followed by Smokers melanosis and Leukoplakia.

**Table 2: Correlation between prevalence of lesions and gender**

Lesions	Male	Female
Leukoplakia	12	06
Melanosis	13	02
Smoker's palate	29	02
Melanosis+ Smoker's palate	28	02
Squamous cell carcinoma	01	00
Verrucous carcinoma	00	01
Verrucous hyperplasia	01	00
Tobacco pouch keratosis	01	03
Betel chewers mucosa	01	01
Leukoedema	02	01
Oral submucous fibrosis	02	02
Lichenoid reaction	00	01
Candidiasis	01	00
Lichen planus	00	00
Total	90	21

There is a noticeable difference in the occurrence of lesions between males and females, with a higher prevalence among males. The highest number of lesions was found in the age groups between 31 to 60 years for both males and females, based on their prevalence and distribution.

**Table 3: Distribution of the lesions with anatomical location**

Lesions	Buccal mucosa			Commissures			Floor of the mouth	lip
	Right	Left	Both	Right	Left	Both		
Leukoplakia	7	4	1	2	1	1	0	1
Sc							0	
Verru ca		1						
Verru hyp	1							
TPK	1	2	1					
BCM	0	1	1					
Leukoedema	1	1	1					
Osmf	1	1	2					
Lichen rea	1							
Lichen pln			0					

The distribution of lesions across anatomical sites revealed that the buccal mucosa, including the commissures, was the most frequently affected area. The correlation between the lesions and histopathology revealed that the leukoplakia diagnosed clinically exhibited histological characteristics ranging from hyperkeratosis without

dysplasia to hyperkeratosis with mild, moderate, and severe dysplasia. The leukoplakia that was clinically diagnosed displayed various histological features, including hyperkeratosis without dysplasia, hyperkeratosis with mild dysplasia, as well as moderate and severe dysplasia. The histopathologic features of the other lesions were in

line with the clinical diagnosis, with the exception of the lichenoid reaction.

### Discussion

There is a lack of information on oral mucous membrane abnormalities, especially among the rural or semiurban population of India where tobacco use is widespread and causing significant harm. [12,13] In this study, the researchers discovered that the prevalence of OMLs was 18%.

The usage of tobacco in India shows significant variations based on the geographical location and cultural beliefs of the community. Males tended to show a greater preference for the smoked form of tobacco compared to the smokeless form. All females who were habitués were found to be quid chewers, which is in contrast to other findings. Studies conducted in India and other regions have shed light on the growing popularity of smokeless tobacco among women.

These epidemiologic studies have provided valuable insights into the use of tobacco. Men are often found engaging in more physical activities due to their higher stress levels and greater tobacco consumption. The occurrence of lesions also showed a correlation with the demographic parameters of the participants. A higher number of lesions were observed among individuals who had lower levels of education and worked in service jobs, particularly as labourers. These individuals also tended to belong to the lower socio-economic strata of society. Insufficient knowledge and awareness contribute to higher rates of tobacco use in these populations. The high prevalence of tobacco use in this study may be attributed to the easy accessibility of homemade tobacco products, which are available at a lower price. The widespread availability of these homemade products can have negative impacts on health, as their mixture and composition are not regulated and can vary significantly. [14-16]

Tobacco was commonly consumed in three primary ways, with one of them being cigarettes that were filtered. Non-filtered cigarettes and beedis. The study population did not use the other two forms considered in the questionnaire, Cigar and Pipe. One possible reason for this could be the lack of availability and the rising prices. In addition, there were no other types of smoked tobacco being used. Smoked tobacco in commercially available forms was the preferred choice, while local preparations were not popular among the population. Hyperkeratosis is often seen as the main lesion, with melanotic lesions also commonly observed. The mucosa initially shows signs of keratosis and stimulates melanocytes. These findings indicate that the majority of the lesions are in their early stages. Leukoplakia is a frequently observed premalignant disorder associated with tobacco

habits. It is worth noting that lichen plants were found to be more prevalent in females than in males, potentially indicating a higher occurrence of autoimmunity in females. Quid form tobacco is typically stored in the vestibule, making it the most common site for pouch keratosis. The buccal mucosa is frequently affected by squamous cell carcinoma, indicating a strong connection between the development of malignancy and the transformation of premalignant conditions in this area. Submucous fibrosis and lichen plans were rarely observed in the lesions that were presented. There may be a connection between the roles of various factors in the development of these diseases. Other studies have also found similar results. [17-18]

Raising awareness about the dangers of certain habits and improving access to healthcare professionals and facilities can play a crucial role in discouraging tobacco-related behaviours. It is important to implement health education strategies that utilise models, visual media, and community group discussions in order to discourage current users and prevent potential users. Tobacco use has been associated with a wide range of diseases that affect various body systems. The oral cavity serves as a container for tobacco in various forms, leading to noticeable changes in both the hard and soft tissues. The changes have been thoroughly reviewed multiple times. The study findings may not be applicable to a larger population due to the small sample size. Given that the study was conducted in a single institute, it is important to exercise caution when extrapolating the findings to the broader population.

### Conclusion

It was discovered that 18% of the individuals in the study had oral mucosal lesions linked to tobacco use. Our study also revealed a higher prevalence of smoking among men compared to chewing, and a greater number of leukoplakia lesions were found to be associated with smoking.

Many changes can be observed, including hyperkeratosis and smoker's melanosis. It's important to note that premalignant and malignant lesions may also be present. It is important to prioritise the cessation of the habit through counselling and appropriate referral and treatment procedures. It is important to have educational programmes led by qualified health professionals, including dentists, health workers, anganwadi workers, and other medical science professionals. These individuals can be trained to detect oral potentially malignant lesions (OMLs) and provide education on the harmful effects of tobacco consumption.

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