

PREVALENCE OF ORAL LESIONS AMONG SMOKELESS TOBACCO USERS IN PUNE, MAHARASHTRA: A CROSS-SECTIONAL STUDY

Dr. Lakshmi Krishnan 1 , Dr. Anannya Tripathy 2 ,

Dr. Girija Amit Ghate 3 ,Dr. James Thomas 4

1 Junior Resident, Department of ENT and Head and Neck Surgery,
Dr. D.Y. Patil Medical College, Hospital and Research Centre,
Dr.D.Y.Patil Vidyapeeth,Pimpri chinchwad ,Pune,Maharashtra-411018

Email: drlakshmikrishnan92@gmail.com

ORCID ID:0000-0001-9007-2777

2 Junior Resident, Department of ENT and Head and Neck Surgery,
Dr. D.Y. Patil Medical College, Hospital and Research Centre,
Dr.D.Y.Patil Vidyapeeth,Pimpri chinchwad ,Pune,Maharashtra-411018

Email: ananyatripathy14@gmail.com

ORCID ID:0000-0003-2262-516X

3 Consultant & HOD, Department of ENT and Head and Neck Surgery,
Manipal Hospitals, Baner

Former Professor & HOD, Department of ENT and Head and Neck Surgery,

Dr. D.Y. Patil Medical College, Hospital and Research Centre,
Dr.D.Y.Patil Vidyapeeth,Pimpri chinchwad ,Pune,Maharashtra-411018.

Email: girija.ghate@gmail.com

ORCID ID:0000-0002-9602-7093

4 Professor, Department of ENT and Head and Neck Surgery,
Dr. D.Y. Patil Medical College, Hospital and Research Centre,
Dr.D.Y.Patil Vidyapeeth,Pimpri chinchwad ,Pune,Maharashtra-411018.

Email: jaytees66@yahoo.co.in

CORRESPONDING AUTHOR:

Dr. Anannya Tripathy

Junior Resident, Department of ENT and Head and Neck Surgery,
Dr. D.Y. Patil Medical College, Hospital and Research Centre,
Dr.D.Y.Patil Vidyapeeth,Pimpri chinchwad ,Pune,Maharashtra-411018

Email: drlakshmikrishnan92@gmail.com

ORCID ID:0000-0001-9007-2777

ABSTRACT

AIM:

This study is aimed at understanding prevalence of oral lesions among smokeless tobacco users in Pune, Maharashtra.

MATERIALS & METHODS:

This observational study was carried out in 100 patients giving history of current smokeless tobacco use who visited OPD of Otorhinolaryngology in a tertiary hospital in Pune,

Maharashtra between June 2021 and October 2022 after obtaining written informed consent and using a preformed questionnaire.

RESULTS:

Smokeless tobacco use is more common among males. A definite male preponderance is observed in all age groups with maximum number of study participants belonging to the age group of 51-60 years. Prevalence of malignant lesions is more than oral potentially malignant lesions (OPML) with prevalence of malignant lesions being 64%. Tongue and buccal mucosa are the commonest sites affected. Leukoplakia and oral submucous fibrosis (OSMF) are the most common OPML in our study. Smokeless tobacco in the form of Gutka(alone) or in combination with tambaku are associated with development of oral submucous fibrosis. Longer duration of smokeless tobacco use is associated with the development of malignant lesions whereas shorter duration of smokeless tobacco use is associated with development of OPML. A definite correlation could be established between site of smokeless tobacco abuse and site of development of lesion.

CONCLUSION: Patterns of smokeless tobacco use & lesions caused could be identified among the general population in Pune, Maharashtra. This could serve as a guide for planning preventive and control strategies.

KEYWORDS: Smokeless tobacco, Substance abuse, OPML, Oral Squamous Cell Carcinoma

INTRODUCTION:

The use of smokeless tobacco (SLT) is widespread worldwide. It is estimated that SLT is used by more than 300 million people worldwide.⁽¹⁾ The developing world, particularly India, Pakistan, and Bangladesh in South and South East Asia, has the highest prevalence of SLT use, with approximately 250 million people using it in some form.⁽²⁾ India is the third largest producer of tobacco and the second largest consumer of tobacco worldwide. Smokeless tobacco appeals to Indians due to its low cost, ease of purchase, and lack of awareness. In the Global Adult Tobacco Survey (GATS), which was conducted in 2016–2017, tobacco use in the form of smoking was 10.38 percent, while use of smokeless tobacco was 21.38 percent. Tobacco use is influenced by a variety of factors, including individual attitude, stress, workload, availability, advertising campaigns, and so on. According to estimates, tobacco use accounts for 9.5% of all deaths in India each year.^(3,4) In India, the use of tobacco products varies by state and within each state. Consequently, it is essential to collect information regarding the tobacco habits of the local population. The use of SLT has been linked to a wide range of illnesses, including cancer, oral potentially malignant conditions, cardiovascular diseases, gastrointestinal problems, and dental problems. Most cases of oral cancer can be avoided. This study was carried out to evaluate the prevalence of oral potentially malignant (OPML) and malignant lesions due to the use of smokeless tobacco in various forms by recording a detailed history from the study participants. With the help of an appropriate clinical assessment and categorization of these lesions, we were able to identify patients who required periodic follow-up, directed patients who required interventions for the

same and motivated patients to discontinue their habits which remains the most important factor in preventing further deterioration of their clinical condition.

MATERIALS AND METHODS:

This observational descriptive study was carried out in 100 patients giving history of current smokeless tobacco use who visited the outpatient Department of Otorhinolaryngology in a tertiary hospital in Pune, Maharashtra between June 2021 and October 2022.

The criteria for selection of study participants were as follows:

INCLUSION CRITERIA:

*Age above 18 years and below 70 years.

*Individuals who currently (current smokeless tobacco user is defined as any use during the previous 6 months) use any form of smokeless tobacco were included in the study.

EXCLUSION CRITERIA:

*Age below 18 years and above 70 years.

*Individuals using tobacco only in smoking form.

*Individuals suffering from any obvious systemic disease that most likely may influence the oral mucosa like DM, oral thrush, patients on immunosuppressive therapy

*HIV positive patients.

*Individuals with dental problems causing oral lesions.

DATA COLLECTION METHOD:

A detailed history of the type of smokeless tobacco used, as well as the frequency and duration of SLT use, was taken from each patient who met the inclusion criteria and provided a history of current SLT abuse. The onset, duration, and progression of each complaint, including halitosis, a reduced mouth opening (trismus), oral lesions, and any present speech or swallowing difficulties, were documented. Additionally, the possibility of metastatic disease was ruled out. The patient's medical history, including any allergies or current medications, was also recorded. Each patient in the hospital's outpatient department underwent a comprehensive examination of the ear, nose, oral cavity, oropharynx, face, and neck. All of the clinical examination details were entered into a proforma. Written informed consent was taken from the study participants prior to enrolment in the study.

OBSERVATIONS AND RESULTS:

1.Age and Sex Distribution:

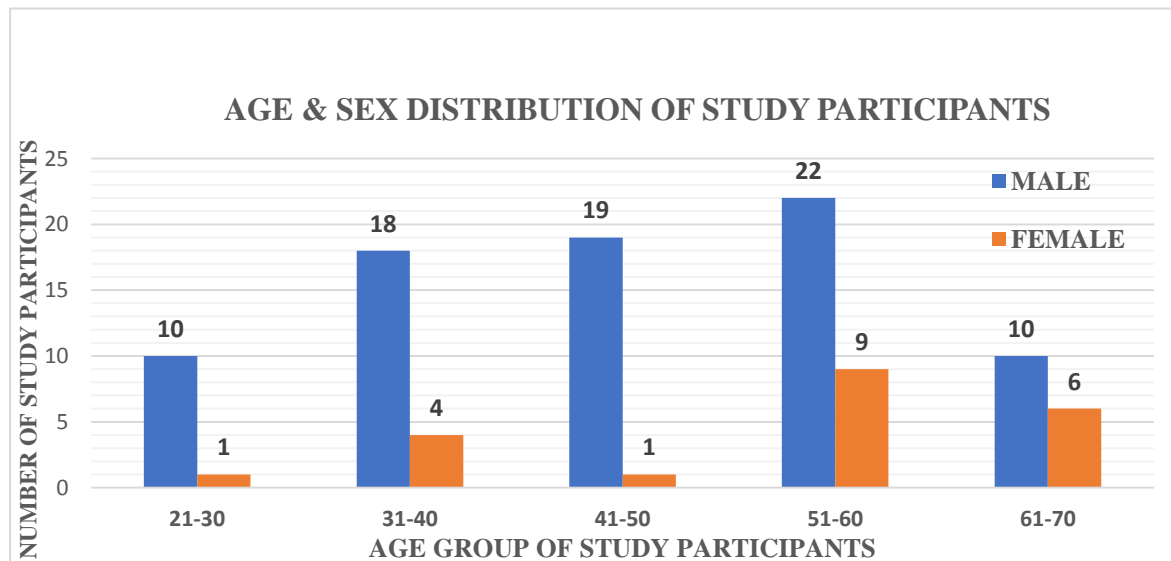


Figure 1: Bar diagram showing age and sex distribution of study participants.

A total of 100 patients who were above 18 years of age and underwent a detailed questionnaire and clinical examination were included in the study. Male preponderance was observed in every age group. Maximum number of patients were seen in the age group of 51-60 years.

2.Types of smokeless tobacco:

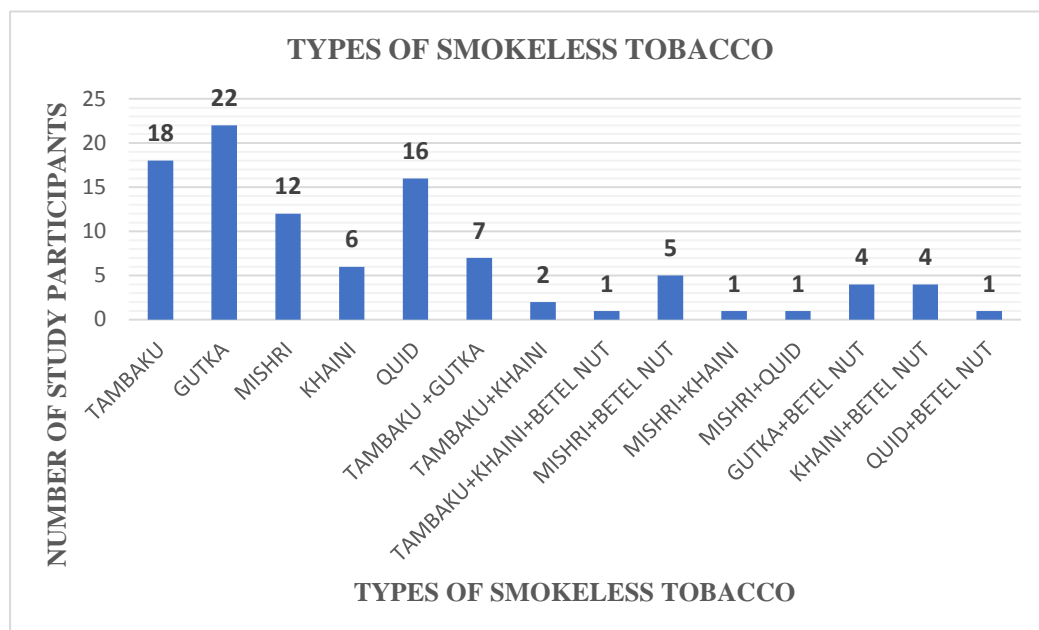


Figure 2: Bar diagram showing distribution of study participants according to different types of smokeless tobacco used.

Gutka was the most commonly used form of smokeless tobacco followed by tambaku and quid.

3. Frequency and duration of smokeless tobacco use:

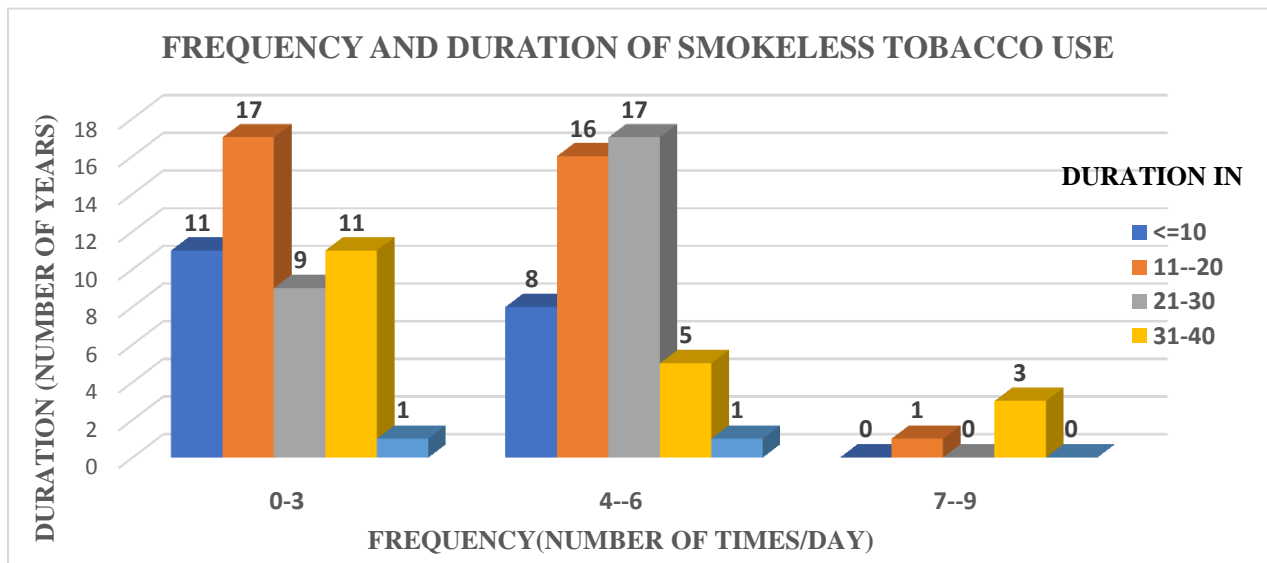


Figure 3: Bar diagram showing frequency and duration of smokeless tobacco use among study participants.

Oral lesions were maximally seen amongst patients consuming smokeless tobacco for less than 30 years with a frequency of 4-6 times per day.

4. Site of smokeless tobacco abuse

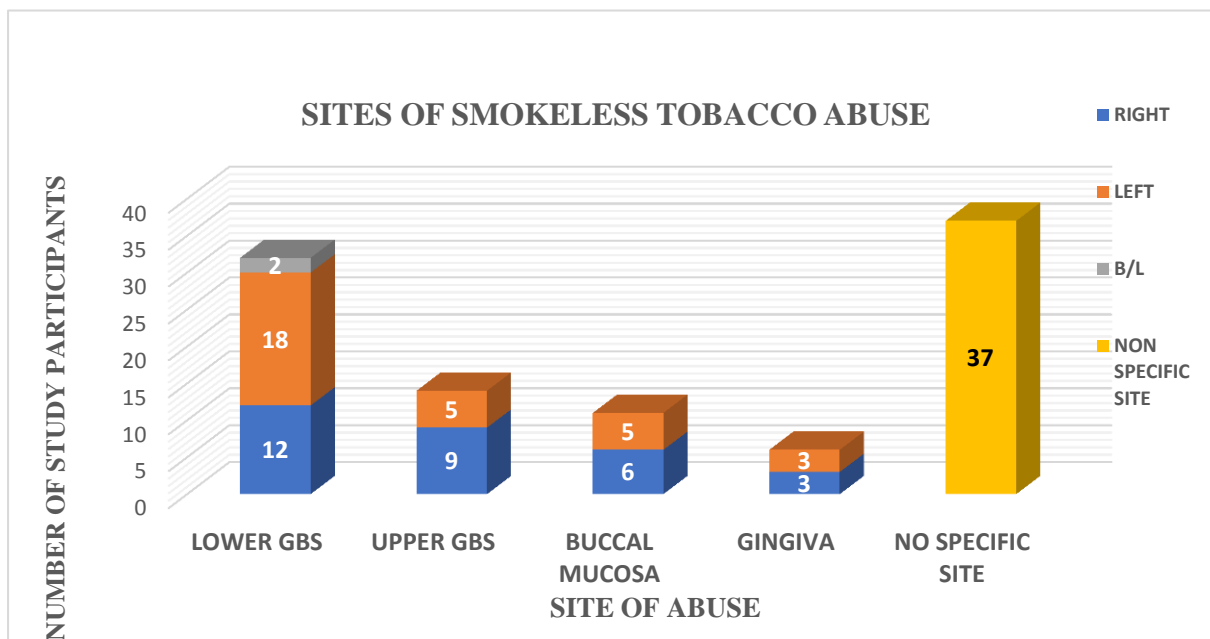


Figure 4: Bar diagram showing distribution of study participants according to the site of smokeless tobacco abuse.

Maximum number of study participants did not have a particular preferred site for placing smokeless tobacco in the oral cavity.

5.Sites of lesions in oral cavity and oropharynx:

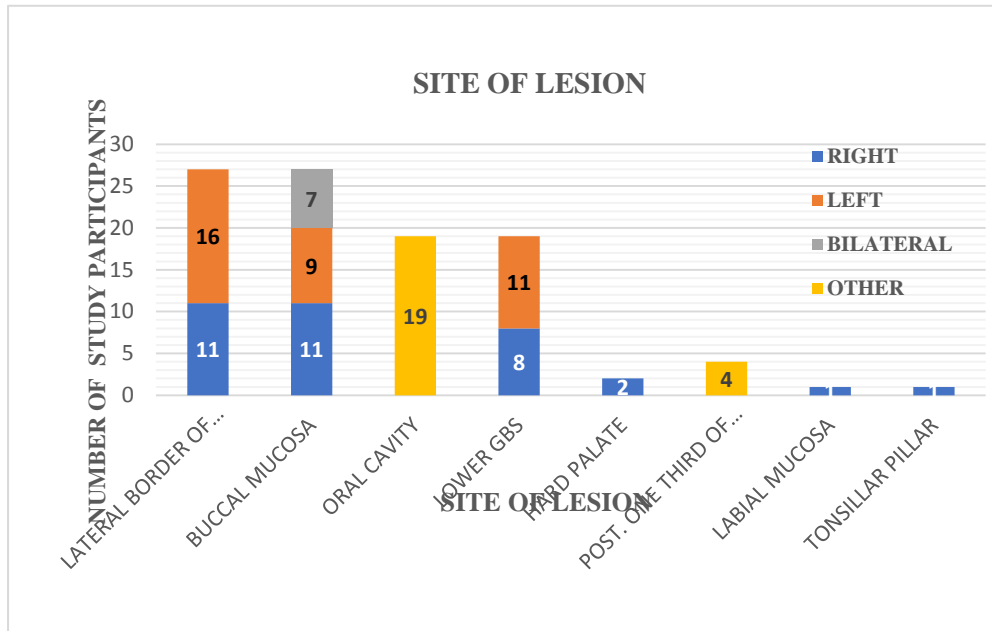


Figure 5: Bar diagram depicting distribution of study participants according to the site of lesions developed in oral cavity and oropharynx.

Lateral border of tongue and buccal mucosa were the commonest sites involved.

6.Lesions seen on clinical examination:

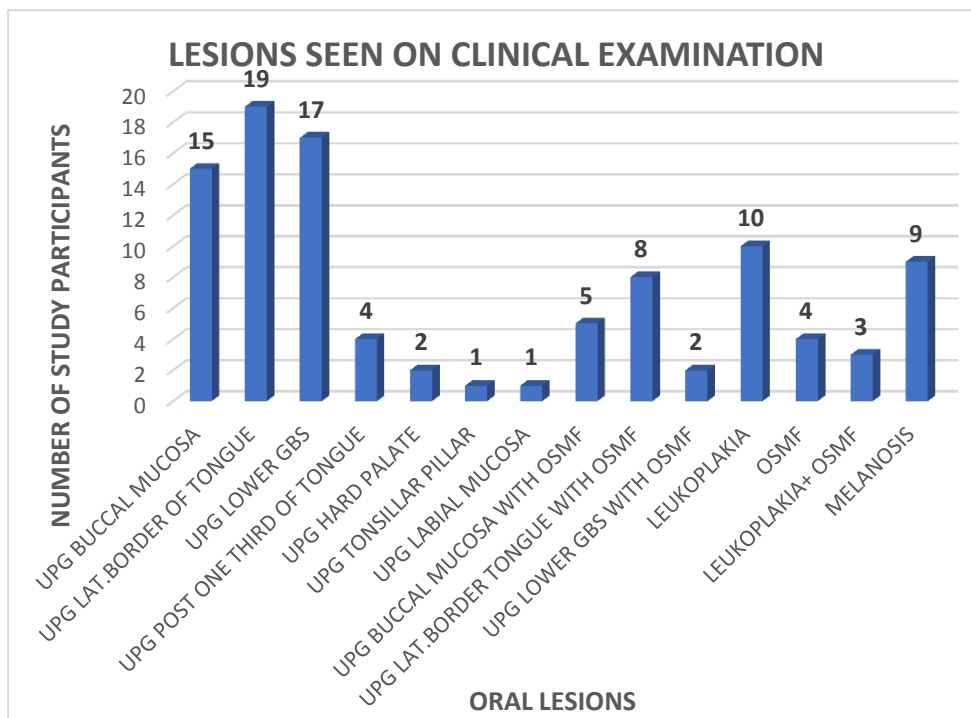


Figure 6: Bar diagram showing distribution of smokeless tobacco associated lesions in oral cavity and oropharynx.

Ulceroproliferative growth (UPG) over the lateral aspect of the tongue was the most common lesion observed on clinical examination.

7.Age group and diagnosis as per HPE reporting:

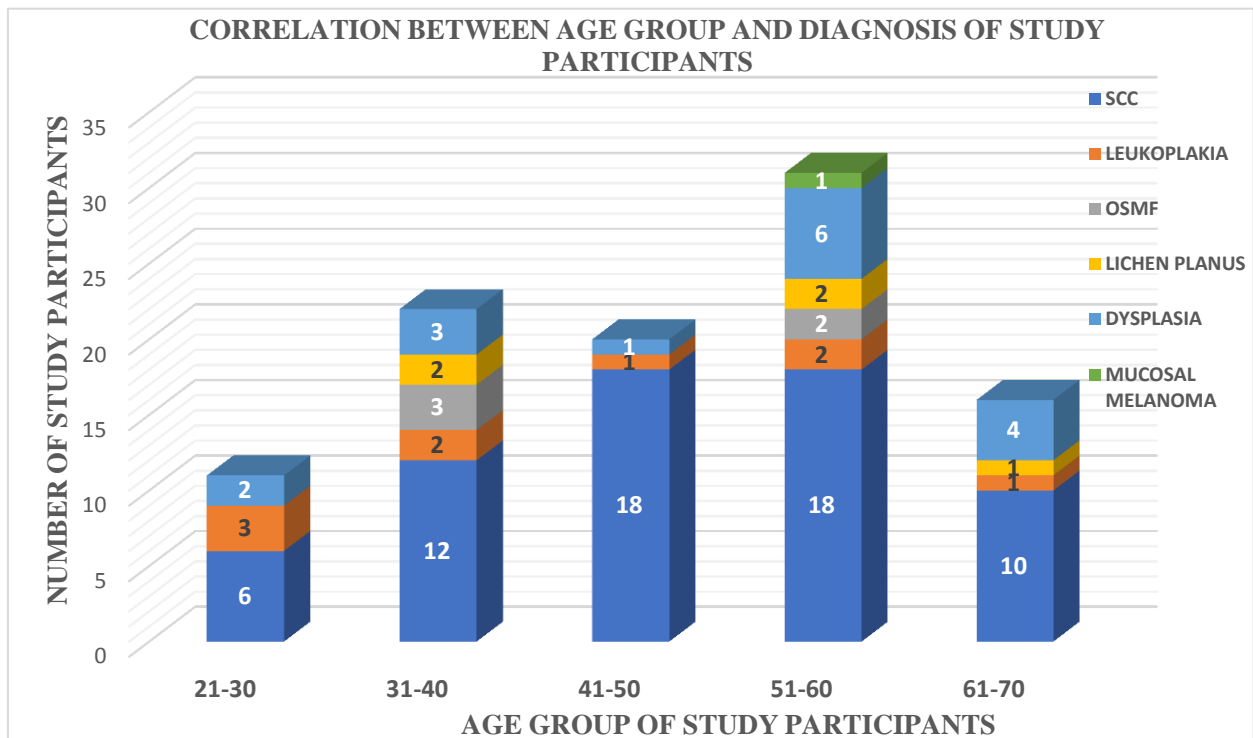


Figure 7: Bar diagram showing distribution of study participants as per age group and HPE reporting

Squamous cell carcinoma (SCC) was seen to have the highest prevalence in all age groups with maximum number of cases being reported between 41-60 years of age.

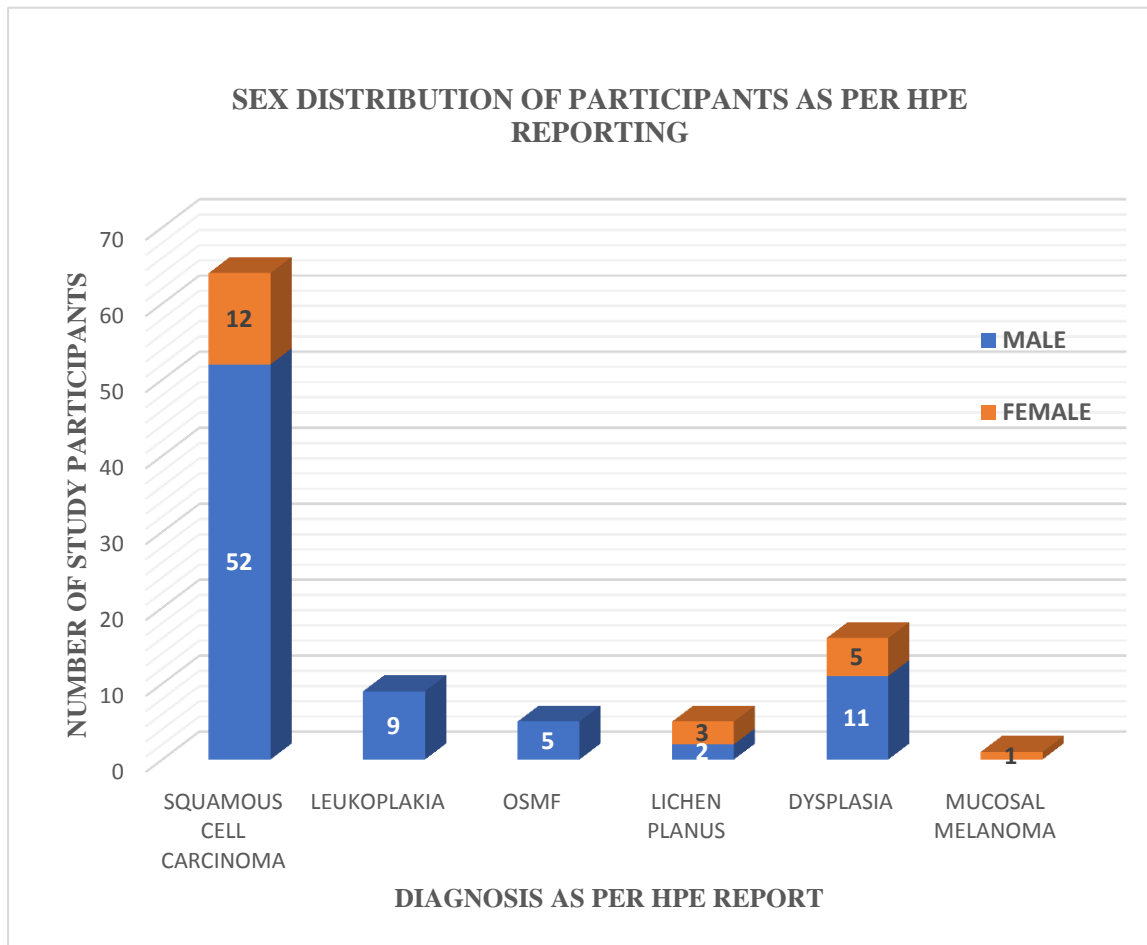
8. Sex distribution of study participants as per HPE reporting:

Figure 8: Bar diagram showing sex distribution of study participants with respect to HPE diagnosis

Malignancy was observed in both genders due to smokeless tobacco consumption with a definite male preponderance. Dysplastic changes were the second most common observation. Both leukoplakia and OSMF were exclusively seen in males in our study. SCC had a prevalence of 64% in the study population.

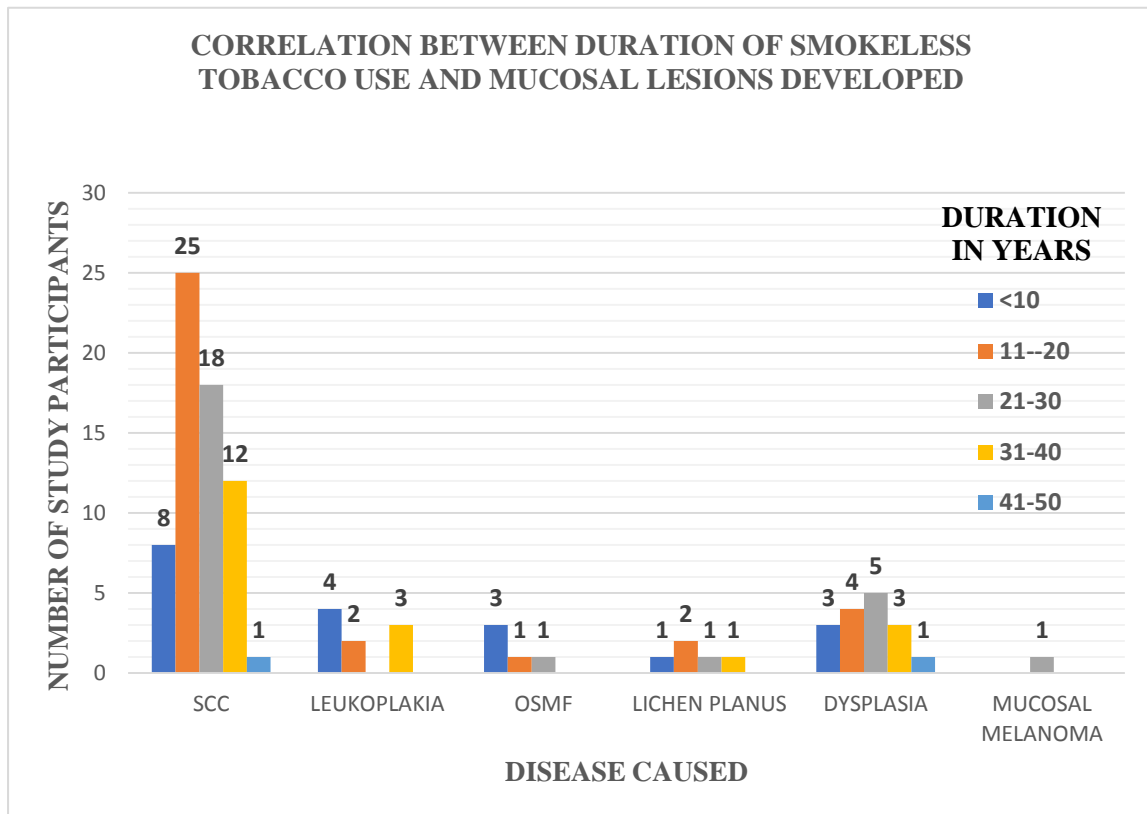
9.Duration of smokeless tobacco use and mucosal lesions developed:

Figure 9: Bar diagram showing correlation between duration of smokeless tobacco use and mucosal lesions developed.

Prevalence of malignancy was about 64% in the study population with majority of cases having smokeless tobacco habituation between 11-20 years. Majority of study subjects who developed leukoplakia and OSMF alone had smokeless tobacco habituation for less than 10 years.

10.Types of smokeless tobacco products and Lesions caused:

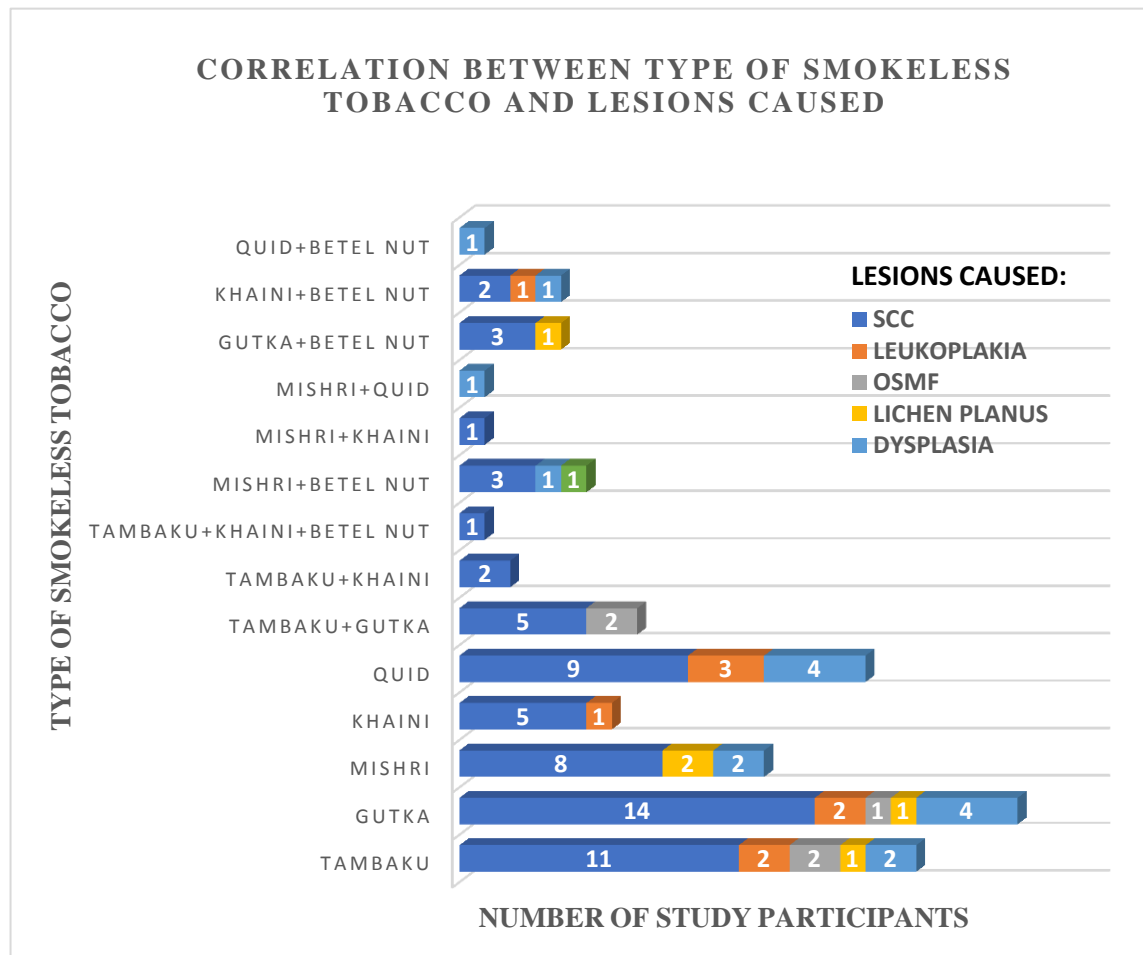


Figure 10: Bar diagram showing distribution of study participants according to the type of smokeless tobacco product used and the lesions developed.

Maximum number of SCC cases were seen in male gutka users in the age group of 41-60 years who had habituated SLT for 11-20 years. Leukoplakia cases were maximally seen among male quid users in the age group of 21-30 years with less than 10 years of SLT use. Maximum incidence of OSMF was seen in male Tambaku and Gutka users belonging to the age group of 31-40 years having less than 10 years of SLT use.

DISCUSSION

We found that smokeless tobacco use was more prevalent among males (79%) in our study. In a study by Kaveri Hallikeri et al in 2018 ⁽⁵⁾, it was found that 92.87% of men and

7.12% of women regularly used smokeless tobacco. In our study, people aged 51 to 60 were the age group most affected by smokeless tobacco use. In a study conducted by Aarthi Venkat et al.⁽⁶⁾ in 2022, it was found that people between the ages of 41 and 60 were the age group that was most frequently affected by SLT use. In our study, Gutkha was found to be the smokeless tobacco product that was used the most. In a tertiary hospital-based study by Aarish Khan et al. in 2020⁽⁷⁾, they found that gutkha (26%), followed by betel quid (24%), were the most commonly used smokeless tobacco products. The majority of patients with oral lesions in our study had been accustomed to SLT for 11 to 20 years. In a 2016 study by Boddu Naveen Kumar et al.⁽⁸⁾, the majority of patients who developed oral lesions as a result of smoking smokeless tobacco had a habit that lasted between one and ten years. 49% of the people in our study used smokeless tobacco up to three times per day, and 46% had a pattern of using SLT between four and six times per day. In a clinical study by Anirudh et al. in 2013⁽⁹⁾ on potentially malignant disorders of the oral cavity, the majority of cases (76.92 percent) had a habit of chewing SLT approximately one to five times per day. The majority of study participants did not specify a preferred location for use of smokeless tobacco. However, the remaining participants in our study preferred to place smokeless tobacco at the Lower GBS, followed by the Upper GBS. In 2019, Kamala K. A. et al.⁽¹⁰⁾ conducted research on the prevalence of oral mucosal lesions in the Western Maharashtra population, finding that patients preferred lower GBS for placement of SLT. In our study, the tongue and buccal mucosa were the two most frequently affected sites by mucosal lesions caused by SLT use. In 2022, Mahesh H. Gabhane et al.⁽¹¹⁾ conducted a clinicopathological evaluation of tobacco-related oral mucosal lesions and buccal mucosa was found to have the highest prevalence of oral mucosal lesions (51.11 percent). Similar findings were obtained in a 2022 study by Aarthi Venkat et al.⁽⁶⁾ where buccal mucosa (67.05 percent) was the most frequently involved site, followed by the tongue (17.6 percent). The majority of participants in our study did not specify a single preferred location for placing smokeless tobacco in the oral cavity. However, 35 of the 63 study participants (55.55 percent) developed oral lesions in connection with the abuse site, indicating that a significant relationship could be established between the abuse site and the lesion site. In a similar manner, Smitha Rani Thada et al. conducted a study in 2014⁽¹²⁾ in which a statistically significant association could be found between the location of oral lesions and the site of quid placement. Leukoplakia was found to have the highest prevalence (9%) among our study participants who developed isolated premalignant lesions, with the majority of participants being between the ages of 21 and 30. A 2013 clinical study by Anirudh Shukla et al.⁽⁹⁾ showed that leukoplakia was the second most common OPML, with the highest incidence in the 21- to 30-year-old age range. Males had the highest prevalence of malignant lesions, according to our study with a 4.3:1 female to male ratio. In 2022, Mahesh H. Gabhane⁽¹¹⁾ carried out a study in which the sex distribution (M: F) of lesions caused by smokeless tobacco use was 7.1:1. Males were significantly more likely than females to be affected by oral carcinoma, according to a 2007 study by Jagruti Patel et al.⁽¹³⁾ with a M:F ratio being 6.4:1. The findings of these two studies support our study, which found a clear male preponderance in oral squamous cell carcinoma (SCC) patients. In our study, Gutka was the most popular smokeless tobacco product, followed by tambaku and quid. When compared to OPML, the prevalence of malignant lesions (SCC) was high- 64%. Male gutka users between the ages of 41 and 60 had the greatest number of SCC cases. The

incidence of leukoplakia was found to be higher than that of OSMF among the study participants who only had OPML. OSMF, on the other hand, was found to be more common than leukoplakia when taking into account the overall prevalence of OPML among the study participants. Occurrence of OSMF was seen to be higher among male Tambaku and Gutka clients having a place with the age gathering of 31-40 years. Male quid users between the ages of 21 and 30 had the highest incidence of leukoplakia. However, Rashmi Goyal et al.⁽¹⁴⁾ found in 2021 that incidence of OPML was more than malignant lesions. OSMF was the most common OPML followed by leukoplakia in her study. Smokeless tobacco in the form of Gutka or quid were observed to be responsible for development of lesions. In our study, participants with 11 to 20 years of SLT use had the highest incidence of OSCC. In a study by Jayaseelan Ramasamy et al.⁽¹⁵⁾ in 2022, cases of OSCC were seen with smokeless tobacco use for more than ten years. The majority of participants in our study with leukoplakia and OSMF had SLT habituation for less than ten years. The majority of OPML such as leukoplakia and OSMF, were observed in subjects who had habituated SLT for 6-10 years, according to a 2014 study by Ambedkar D M et al.⁽¹⁶⁾

CONCLUSIONS:

In our hospital-based study, the following conclusions were made:

- Smokeless tobacco use is more common among males. A definite male preponderance is observed in all age groups with maximum number of study participants using smokeless tobacco belonging to the age group of 51-60 years.
- Prevalence of malignant lesions is more in comparison to oral potentially malignant lesions with prevalence of malignant lesions being 64%. Tongue and buccal mucosa are the commonest sites affected by smokeless tobacco use.
- Maximum number of study participants affected by squamous cell carcinoma belonged to age group of 41-60 years with male: female ratio of 4.3:1.
- Leukoplakia and oral submucous fibrosis are the most common potentially malignant lesions seen in patient with smokeless tobacco use.
- Longer duration of smokeless tobacco use is seen to be associated with the development of malignant lesions whereas shorter duration of smokeless tobacco use is seen to be associated with development of OPML like leukoplakia and oral submucous fibrosis.
- Smokeless tobacco in the form of Gutka(alone) or in combination with tambaku are associated with development of oral submucous fibrosis.
- Use of smokeless tobacco in the form of Gutka for about 11-20 years predisposes to development squamous cell carcinoma.
- A definite correlation could be established between site of smokeless tobacco abuse and site of development of lesion which makes it all the more important, to pay special attention, to the site of smokeless tobacco placement during clinical examination and follow up.
- Oral cancer is largely preventable by avoidance of risk factors. If oral cancer is detected when it is confined to oral mucosa,5-year survival rates exceed 80%. Early

presentation with oral cancer is associated with an improved prognosis and less extensive treatment in attempt to cure the patient. People giving history of smokeless tobacco use should be subjected to a detailed clinical examination and should be categorised into those who had to be kept on regular follow up and those who should be subjected to interventions at the earliest. All patients must essentially be motivated to discontinue their smokeless tobacco habits, which remains the key element to prevent further deterioration of their clinical condition.

REFERENCES:

1. Siddiqi K, Husain S, Vidyasagan A, Readshaw A, Mishu MP, Sheikh A. Global burden of disease due to smokeless tobacco consumption in adults: an updated analysis of data from 127 countries. *BMC Med.* 2020 Aug 12;18(1):222.
2. Palipudi KM, Sinha DN, Choudhury SR, Gupta PC, Asma S, Blutcher-Nelson G. Burden of smokeless tobacco use among adults in thirteen low- and middle-income countries: findings from Global Adult Tobacco Survey [poster presentation]. Singapore: World Conference on Tobacco or Health, March 2012.
3. Jha P, Jacob B, Gajalakshmi V, Gupta PC, Dhingra N, Kumar R, et al. A nationally representative case-control study of smoking and death in India. *New England Journal of Medicine.* 2008 March; 358(11):1137-1147.
4. Sinha DN, Palipudi KM, Gupta PC, Singhal S, Ramasundarahettige C, Jha P, et al. Smokeless tobacco use: a meta-analysis of risk and attributable mortality estimates for India. *Indian Journal of Cancer.* 2014;51(Suppl 1):S73-S77.
5. Hallikeri K, Naikmasur V, Guttal K, Shodan M, Chennappa NK. Prevalence of oral mucosal lesions among smokeless tobacco usage: A cross-sectional study. *Indian J Cancer.* 2018 Oct-Dec;55(4):404-409. doi: 10.4103/ijc.IJC_178_18. PMID: 30829279.
6. Venkat A, M SK, R A, K T M, A S. Analysis of Oral Leukoplakia and Tobacco-Related Habits in Population of Chengalpattu District- An Institution-Based Retrospective Study. *Cureus.* 2022 Jun 14;14(6):e25936. doi: 10.7759/cureus.25936. PMID: 35844329; PMCID: PMC9282591.
7. Khan A, Ongole R, Baptist J, Srikant N, Lukmani F. Patterns of Tobacco Use and its Relation to Oral Precancers and Cancers among Individuals Visiting a Tertiary Hospital in South India. *J Contemp Dent Pract.* 2020 Mar 1;21(3):304-309. PMID: 32434979.
8. Naveen-Kumar B, Tatapudi R, Sudhakara-Reddy R, Alapati S, Pavani K, Sai-Praveen KN. Various forms of tobacco usage and its associated oral mucosal lesions. *J Clin Exp Dent.* 2016 Apr 1;8(2):e172-7. doi: 10.4317/jced.52654. PMID: 27034758; PMCID: PMC4808313.
9. Shukla A. Potentially malignant disorders of the oral cavity: a clinical study. *Indian J Otolaryngol Head Neck Surg.* 2014 Jan;66(1):79-85. doi: 10.1007/s12070-013-0680-4. Epub 2013 Oct 13. PMID: 24605307; PMCID: PMC3938710.
10. Kamala KA, Sankethguddad S, Nayak AG, Sanade AR, Ashwini Rani SR. Prevalence of oromucosal lesions in relation to tobacco habit among a Western Maharashtra

- population. *Indian J Cancer*. 2019 Jan-Mar;56(1):15-18. doi: 10.4103/ijc.IJC_231_17. PMID: 30950437.
11. Gabhane MH, Hemagiriappa MS, Sharma VJ, et al. Clinicopathological Evaluation of Tobacco-related Oral Mucosal Lesions. *J Contemp Dent Pract* 2022;23(4):399–404.
 12. Thada SR, Pai KM. Prevalence of habit associated oral mucosal lesions among the outpatients - A prospective cross sectional study. *Int J Res Health Sci [Internet]*. 2014 Jan 31;2(1):263-73.
 13. Patel JA, Shah FG, Kothari JM, Patel KD. Prevalence of head and neck cancers in Ahmedabad, Gujarat. *Indian J Otolaryngol Head Neck Surg*. 2009 Jan;61(Suppl 1):4-10. doi: 10.1007/s12070-009-0009-5. Epub 2009 Mar 21. PMID: 23120662; PMCID: PMC3450089.
 14. Goyal R, Goyal MK. Influence of Life Style Factors on Oral Potentially Malignant and Malignant Disorders: A Cross Sectional Study. *Indian J Otolaryngol Head Neck Surg*. 2021 Dec;73(4):443-446. doi: 10.1007/s12070-020-02084-5. Epub 2020 Aug 27. PMID: 34692456; PMCID: PMC8520564.
 15. Ramasamy J, Sivapathasundharam B. A study on oral mucosal changes among tobacco users. *J Oral Maxillofac Pathol*. 2021 Sep-Dec;25(3):470-477. doi: 10.4103/jomfp.jomfp_105_21. Epub 2022 Jan 11. PMID: 35281158; PMCID: PMC8859573.
 16. Ambekar DM, Chaudhary BJ, Kulkarni VV. A Study of Prevalence of Oral Precancerous Lesions in Relation to Tobacco Habituation. *International Journal of Medical and Clinical Research*. 2014;5(1).