Risk Assessment and Association of Oral Leukoplakia and Tobacco Related Habits in Jammu Region

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Abstract:

Introduction: Leukoplakia is an asymptomatic and potentially malignant disorder in the oral mucosa and high frequencies have been reported among smokers. Tobacco chewing and smoking have been identified as major risk factors for oral pre-cancer and cancer in India. The incidence and prevalence of oral leukoplakia vary among different populations in India due to cultural and demographic differences.The present study emphasizes the assessment of leukoplakia and tobacco use, as well as the associations between the two, in the region of Jammu. This can aid in research and help in future efforts to frame policy-making in tobacco control. **Aim and Objective:** To evaluate the prevalence of oral leukoplakia and tobacco related habits and to assess the risk of developing oral leukoplakia in patients and tobacco-related habits among the inhabitants of Jammu region. **Materials and Methods:** A total of 120 cases were evaluated from July 2022- March 2024 based on age, gender, tobacco-related habits, and histopathological diagnosis. This study includes the histopathologically confirmed cases of the white lesions with no malignant changes during clinical diagnosis and Cases reported as carcinoma, patients associated with syndromes, and those patients with incomplete clinical or histopathological details were excluded.Pearson's correlation coefficient was utilized to assess the strength and relationship between variables. The statistical analysis between two variables was performed using the chi-square test. Specifically, the chi-square test was applied to examine the relationship between the duration of habits and histopathological diagnosis, with a p-value of less than 0.05 being considered statistically significant. **Result and conclusion:** Out of 120 white lesions identified, approximately 60 cases (50 %) were diagnosed as oral leukoplakia. Five percent of the population reported both tobacco and alcohol consumption. The age group most frequently affected was 41-50.Smoking was more commonly used by the study participants (73%) than tobacco consumption (27%).The oral health care providers must take utmost care and vigilance to diagnose the lesion at initial stages and provide appropriate treatment modalities and effective tobacco interventions and policy making for tobacco control.

Key words: Leukoplakia, Tobacco, Keratosis, potentially malignant, Patch

Introduction

Oral leukoplakia is the most common potentially malignant disorder. It is the ultimate response of oral mucosa to persistentphysical and chemical insult.The term “leukoplakia”

etymologically is derivedfrom the Greek words “leukos,” meaning white, and“plax,” meaning plaque[1].

The term "leukoplakia" was first used by Karl Freiherr von Rokitansky in 1861 to refer to white lesions of the urinary tract. Later, in 1877, Schwimmer was the first to use the term for an oral white lesion [2].

In 1994, WHO defined leukoplakia as "a predominantly white lesion of oral mucosa that cannot be characterized as any other definable lesion clinically or pathologically, often associated with tobacco products, some of which will transform into cancer." Tobacco use is the most common risk factor for oral leukoplakia [3].

Tobacco was introduced to Europe in the late 15th century and was brought to India by Portuguese traders in the late 16th or early 17th century. Since then, tobacco consumption has increased significantly across all sections of Indian society [4].

Globally, India is the third largest producer and the second largest consumer of tobacco. Within India, Mizoram has the highest consumption of tobacco products, followed by Manipur, Meghalaya, and Tripura, while Punjab, Chandigarh, and Kerala have the lowest rates of tobacco consumption and prevalence of oral leukoplakia.

In India, about 33.3% of men and 1.6% of women aged 15 to 49 years smoke tobacco [5]. Indians predominantly consume tobacco by smoking bidis (48% of total consumption) and through various forms of chewing tobacco such as betel quid, gutkha, mawa, zarda, khaini, kharra, and gudakhu or gul. Only 14% of tobacco consumption is in the form of cigarettes [6].

The Global Adult Tobacco Survey (GATS) conducted by the Ministry of Health and Family Welfare, Government of India, found that the prevalence of tobacco use among Indian adults aged above 15 years was 35% in 2010 and 29% in 2017. Khaini is the most commonly used tobacco product, followed by bidi smoking and gutka among Indian men.The use of smokeless tobacco is more common among Indian men and women than smoking types [3].

Tobacco consumption has been found to be higher among the people of lower socio-economic groups, particularly in tribals (52.1%) and among adolescent males (65.3%). The epidemic of tobacco consumption is a growing phenomenon among tribal population in India[7].

Alcohol consumption is also a rising socio-economic issue in India andcountry with liquor being consumed by a significant number of individuals residing in JK[8].

Associated factors for oral leukoplakia include microbial infection, chronic irritability (improper dentures), malnutrition, UV radiation, and galvanism[9].

Based on clinical features, oral leukoplakia can be divided into two types: homogenous and non-homogenous. The homogenous type appears as a flat, uniform white lesion, while the non-homogenous type presents as mixed white and red lesion ("erythroleukoplakia")

either speckled or nodular. Leukoplakia is a clinical term. A histopathological examination of the tissue must be performed to ascertain the exact nature of the lesion. Although epithelial dysplasia may be present in oral leukoplakia but it is not observed in all cases. These dysplastic changes indicate a disturbance in the homeostatic control mechanism of the epithelium and serve as an important predictor of malignant development in the premalignant lesion [10].

Materials and Methods:

Data was collected from archives of Department of Oral Pathology and Microbiology, of this institution. A total of 120 cases were analyzed based on age, gender, tobacco-related habits, and histopathological diagnosis. Patients with chief complaint of white lesion, included oral leukoplakia, tobacco pouch keratosis, lichen planus, oral submucous fibrosis and keratosis without habits This study includes the histopathology reports of the white lesions with no malignant changes during clinical diagnosis. Cases reported as malignancies or any syndromes, biopsies also not done within a mentioned period, and patients with incomplete clinical or histopathological data were excluded.

Results:

Among 120 white lesions, based on histopathological diagnosis about 60 cases, that is, 50 % were diagnosed as oral leukoplakia, followed by tobacco pouch keratosis (25%), keratosis without habits (ill-fitting denture) (16.66%) oral lichen planus (4.17 %) and oralsubmucous fibrosis (4.17 %).(Table-1)

Oral leukoplakia was most commonly seen in men (71.6 %) than women (28.3 %) in our study. Table-2 and figure-1

The most common affected age group was 41-50 years with male frequently involved (88.2%)and femalewere affected in 51-60 years of age (46.6 %) (Table-3 and figure-2).

The commonest site involved with the leukoplakia was the buccal mucosa (73%), followed by the tongue (17%), alveolar ridge (3%), retromolar area (3 %), labial mucosa and palate being the least affected site (2 %) in our study (Figure-3).

77.7 % of the study population with oral leukoplakia were associated with some form of tobacco

consumption that include cigarette, bidi smoking, pan, and tobacco chewing habits. Males show a significant high surge (85%) in the usage of tobacco products than females (22%). Smoking was more commonly in study participants (73%) than tobacco consumption (27%). Consumption of alcohol was also associated with smoking in 5% of cases.

Sharp teeth, ill-fitting dentures, and idiopathic factors were among other associated contributing factors for patients with lesions without any habits (16.6 %). The duration of the associated habits ranged from 2 years to 15 years.

Discussion

The term "Leukoplakia" originates from Greek, where 'Leucos' means white and 'Plakia' means patch. Leukoplakia is a widely recognized oral potentially malignant disorder (OPMD) worldwide and is especially prevalent in India due to various cultural, ethnic, and geographic factors. The causes of oral leukoplakia are multifaceted, including tobacco use, ill-fitting dentures, microbial agents, genetic factors, and the use of sanguinaria [10].

Recent studies indicate that approximately 4.47% of patients worldwide have OPMD, with a higher prevalence among men and the Asian population [11]. Only about 5% of oral pathoses are white lesions, including leukoplakia, verrucous leukoplakia, and lichen planus, which have a malignant potential ranging from 0.5% to 100%. Dentists play a vital role in diagnosing oral lesions to mitigate the risk of malignancy promptly. In our study we found 60 cases (50 %) of oral leukoplakia out of the 120 cases (Table 1).

Petti et al. reported that the global frequency of oral leukoplakia ranges from 1.7% to 2.7%. Several Indian studies have found the prevalence of leukoplakia to be between 0.21% and 5.22%. Our study shows that age of occurrence of most cases was with in the 41-50 years age group. Mello et al. also concluded in their systematic review that oral leukoplakia and other potentially malignant oral diseases frequently affect patients over the age of 50 [12,13].

There is no correlation between the lesion's location and dysplastic changes. However, the lesion's clinical forms, such as thickness, granularity, and those mixed with red spots (erythematous areas), exhibit more dysplastic changes compared to homogeneous forms [14].There were no such similarities present with in the present study.

Rubert et al. (2020) conducted a retrospective study on 412 patients diagnosed with oral leukoplakia, finding that about 53.2% were nonsmokers [15].This was similar to our study with

16 % of patients diagnosed with leukoplakia without any associated habits.

Previous studies have shown that oral leukoplakia is typically found locally or spread across the buccal mucosa, lip commissures, or gingiva which was similar to present study and basement membrane was most commonly affected site and palate was least commonly involved (Figure 1).

Similar observations were noted in studies conducted by Ramya et al. and Gopinath et al. Literature indicates that around 35% of Indian adults use tobacco [WHO]. In our study, we found that approximately 77% of the study population with oral leukoplakia were associated with some form of tobacco consumption, including cigarette and bidi smoking, pan, and tobacco chewing habits. Males showed a significantly higher usage of tobacco products (83.3%) compared to females (25%). Smoking was more common among the study participants than smokeless tobacco consumption in our study. Nutritional deficiencies and psychological stress exacerbate the impact and frequency of habits,

making leukoplakia an early indicator of oral malignancy [3]. The pattern of tobacco usage varies significantly in India based on social, cultural, economic, and geographical factors[16].

Histological examination of biopsied tissue remains the gold standard for diagnosing oral lesions. In our study, histopathological analysis revealed that about 33.3% of the population exhibited hyperkeratotic changes in the affected area, with an equal percentage showing mild dysplastic changes. Additionally, 10% of the population had moderate dysplasia, and around 3% showed severe dysplastic features.

Despite the availability of various treatments for oral leukoplakia, relapses and adverse effects are common. Therefore, policymakers and healthcare providers should focus on promoting the cessation and avoidance of tobacco use. Rehabilitation programs are recommended for patients who struggle to improve their oral health and lifestyle. Educating the general public, particularly young people and school-going children, about the harmful effects of tobacco-related products is crucial for significantly reducing tobacco usage.

Limitations

The limitations of this study include the unavailability of information on other associated risk factors such as oral hygiene practices, mechanical trauma, and the synergistic effects of alcohol consumption. Additionally,this was a retrospective institutional study conducted on smaller sample which may not accurately represent the true prevalence among the general public so large sample size with multicentric approach is needed to provide the more appropriate prevalence among the general population.

Conclusion

The prevalence of oral leukoplakia remained relatively consistent and stable across various continents and definitions. The pooled estimated prevalence was higher in males compared to females, with clinic-based studies showing statistically significant differences. A higher pooled estimated prevalence was also observed among individuals over 60 years old, smokers, and alcohol consumers. Alcohol consumption may possibly be a risk factor, but no statistically significant relation was observed. There is a need of further studies to clarify the relationship of alcohol intake in oral leukoplakia and other multiple oral premalignant lesions.

Oral pathologists play a crucial role in diagnosing and also may help in controlling and preventing tobacco-induced lesions through patient education, counseling, cessation support, mass screening initiatives, community-based educational programs, early lesion detection, and appropriate treatment interventions. These efforts are essential for reducing the incidence and impact of oral leukoplakia and promoting oral health in the

population. Further research is needed to develop early treatment and clinical surveillance strategies, as well as to implement habit intervention in these populations.

Declaration of patient consent Patient's consent not required as there are no patients in this study.

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Tables and Figures

Table1: Prevalenceofwhitelesionsoforalcavity

White lesion	No. of patients	Prevalence
Leukoplakia	60	50 %
Tobacco Pouch keratosis	30	25%
Keratosiswithout habit(Ill-fitting denture)	20	16.66 %
Oral lichen planus	05	4.17 %
OSMF	05	4.17 %

Table2:Year-wisedistributionofpatientsreportedwithOral Leukoplakia

Year	PatientWith OralLeukoplakia	Male	Female
2022	30	20	10
2023	20	15	05
2024	10	08	02
Total	60	43	17

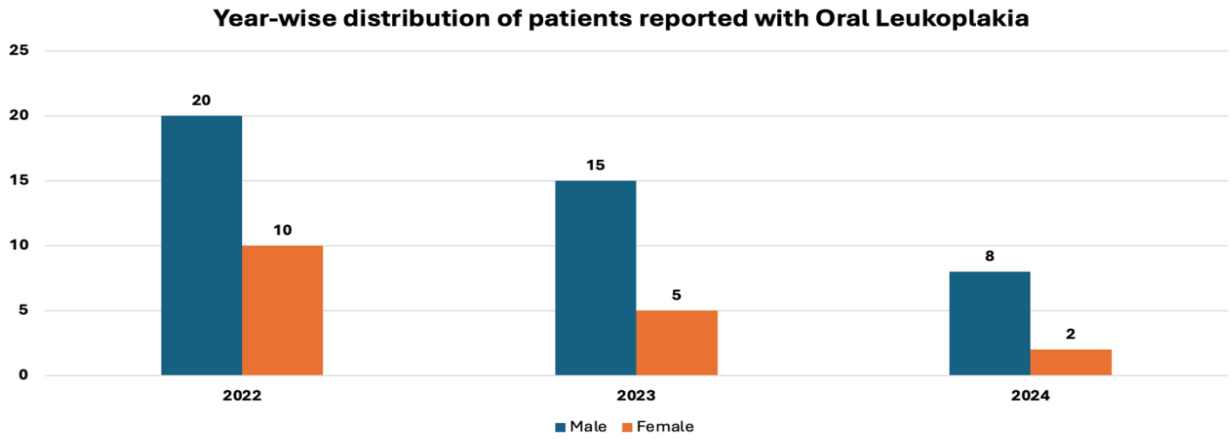

Figure-1 : Year wise distribution of patients reported with oral leukoplakia

Table3:Age and gender wise distribution of patients reported with Oral Leukoplakia			
Agegroup(inYear)	**Male**	**Female**	**Total**
20-30	07 (77.7 %)	02 (22.22%)	**09**
31-40	08 (61.53%)	05 (38.46%)	**13**
41-50	15 (88.23%)	02 (11.76%)	**17**
51-60	08 (53.33%)	07 (46.66%)	**15**
≥60	05 (83.33%)	01 (16.66%)	**06**
Total	**43 (71.66%)**	**17 (28.33%)**	**60**

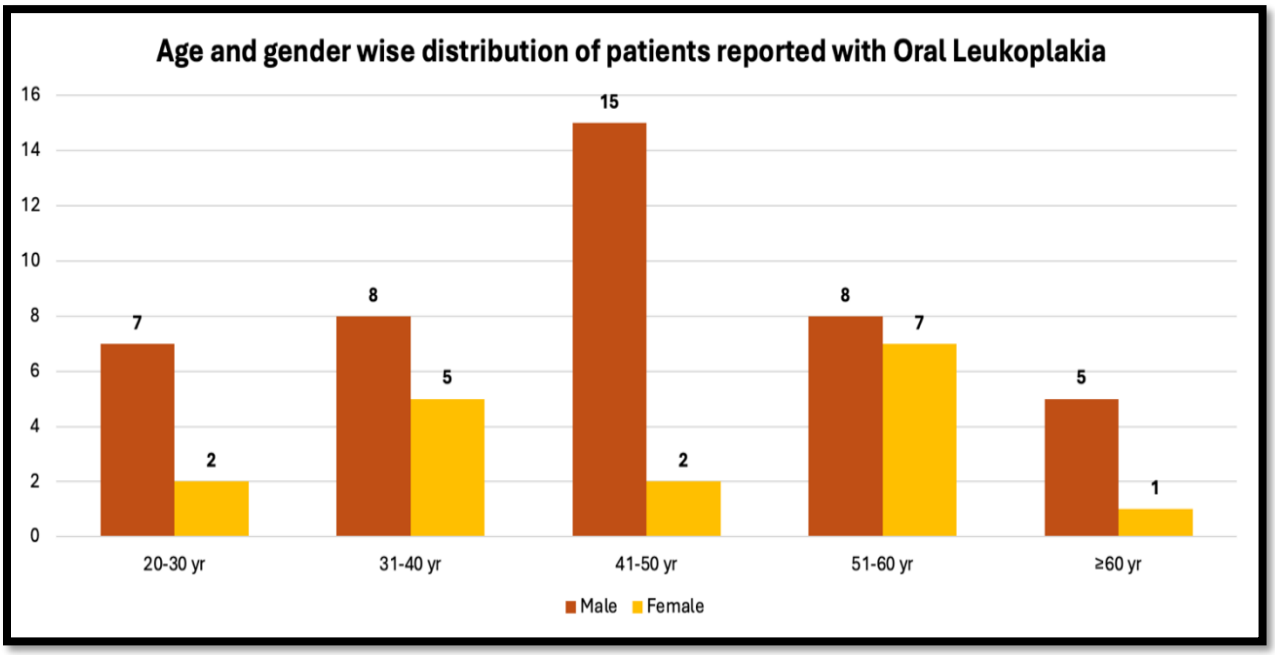

Figure-2 : Age and gender wise distribution of patients reported with oral leukoplakia

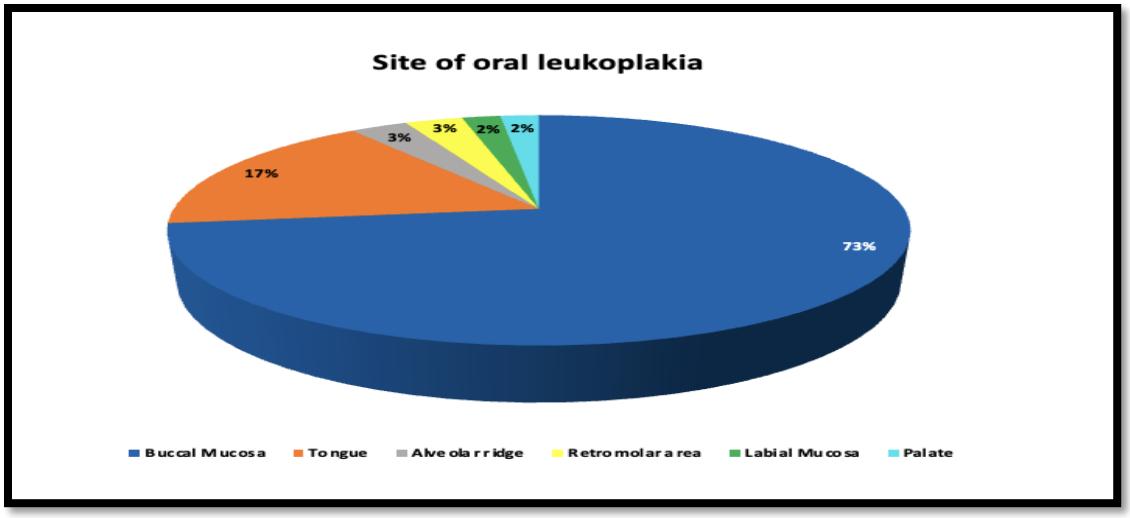

Figure-3 : Site-wise distribution of Oral Leukoplakia