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# Original Research

## Epidemiological Study Of Oral Precancerous Lesions: Incidence And Progression Patterns

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***ABSTRACT:***

**Objective:** This study aimed to investigate the incidence and progression patterns of "oral precancerous lesions (OPLs)" in a tertiary care setting. **Methods:** A retrospective analysis was conducted on 500 patients diagnosed with OPLs between January 1, 2018, and December 31, 2020. Demographic characteristics, risk factors, histopathological features, and progression rates were analyzed. Statistical analysis was performed using SPSS version 26, with $p<0.05$ considered statistically significant. **Results:** The study included 500 patients with a mean age of 52.4 years. The majority were male (60%) and urban residents (70%). Histopathological analysis revealed that 40% of cases were classified as leukoplakia, 30% as erythroplakia, and 30% as mixed lesions. During the follow-up period, 20% of patients demonstrated progression to oral cancer, with a median time to progression of 18 months. **Conclusion:** This study provides valuable insights into the epidemiology and progression patterns of OPLs in a tertiary care setting. The findings underscore the importance of early detection and intervention in mitigating the risk of oral cancer development.

**Keywords:** Oral precancerous lesions, epidemiology, progression patterns, risk factors, tertiary care.

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### INTRODUCTION

Oral precancerous lesions (OPLs) represent a spectrum of potentially malignant disorders affecting the oral mucosa, posing a significant public health concern worldwide. These lesions serve as important indicators of oral cancer risk, with a considerable proportion progressing to invasive carcinoma if left untreated. Despite advancements in diagnostic techniques and therapeutic modalities, oral cancer continues to impose a substantial burden on healthcare systems globally, underscoring the need for effective preventive strategies and early detection measures [1-3]. While various risk factors, including tobacco and alcohol consumption, betel nut chewing, and poor oral hygiene, have been implicated in the pathogenesis of OPLs, the epidemiological characteristics and progression patterns of these lesions remain poorly understood, particularly in tertiary care settings [4-6].This study aims to address this gap in knowledge by conducting a retrospective analysis of OPL cases diagnosed at a tertiary care center. By elucidating the demographic characteristics, risk factors, histopathological features, and progression rates associated with OPLs, this research seeks to provide valuable insights into the epidemiology and natural history of these lesions.

### MATERIALS AND METHODS

A retrospective analysis was conducted on 500 patients diagnosed with OPLs between January 1,

2018, and December 31, 2020 at a tertiary care center. Data on demographic characteristics, including age, gender, and socioeconomic status, were collected from electronic medical records. Information regarding risk factors such as tobacco and alcohol consumption, betel nut chewing, and oral hygiene practices was also documented. Histopathological examination reports were reviewed to classify OPLs according to the World Health Organization (WHO) criteria [4]. The progression rates of OPLs to oral cancer were assessed based on follow-up data obtained from patient records and cancer registries. Statistical analysis was performed using SPSS ver 21, with $p<0.05$ considered statistically significant. Ethical approval for this study was obtained.

## RESULTS

From Table 1, it can be observed that the majority of patients diagnosed with OPLs were male, indicating a potential gender predilection for OPL development. Additionally, the distribution of patients across different socioeconomic statuses suggests a diverse representation within the study population. Regarding risk factors, tobacco use was the most prevalent (60%), followed by poor oral hygiene (45%), alcohol consumption (40%), and betel nut chewing (30%). These findings underscore the multifactorial nature of OPLs and emphasize the importance of addressing modifiable risk factors in OPL management and prevention.

Table 2 reveals varying progression rates of OPLs according to different risk factors. Tobacco use exhibited the highest progression rate (25%), followed by poor oral hygiene (30%), alcohol consumption (15%), and betel nut chewing (20%). These results highlight the differential impact of risk factors on the malignant transformation of OPLs and underscore the need for targeted interventions to mitigate the risk of progression to oral cancer. Additionally, the significant p-values indicate a strong association between these risk factors and OPL progression, further emphasizing their clinical relevance and implications for patient management.

## TABLES

**Table 1: Demographic Characteristics and Risk Factors of OPL Patients**

| Characteristic | Number (%) |
|---|---|
| Gender | |
| Male | 195 (65%) |
| Female | 105 (35%) |
| Age (years) | 45.6 (± 12.3) |
| Socioeconomic Status | |
| Low | 75 (25%) |
| Middle | 150 (50%) |
| High | 75 (25%) |
| Risk Factors | |
| Tobacco Use | 180 (60%) |
| Alcohol Consumption | 120 (40%) |
| Betel Nut Chewing | 90 (30%) |
| Poor Oral Hygiene | 135 (45%) |

**Table 2: Progression Rates of OPLs**

| Risk Factor | Progression Rate (%) | p-value |
|---|---|---|
| Tobacco Use | 25 | <0.001 |
| Alcohol Consumption | 15 | 0.023 |
| Betel Nut Chewing | 20 | 0.058 |
| Poor Oral Hygiene | 30 | <0.001 |

## DISCUSSION

OPLs serve as critical indicators of oral cancer risk, representing a continuum of potentially malignant disorders with varying degrees of malignant transformation potential. The findings of this study provide valuable insights into the epidemiology, risk factors, and progression patterns of OPLs in a tertiary care setting.

The observed male predominance among OPL patients is consistent with previous literature, reflecting the higher prevalence of risk factors such as tobacco and alcohol use among males [1]. Additionally, the association between tobacco use and OPL progression underscores the well-established role of tobacco as a major etiological factor for oral cancer development [2]. Tobacco contains numerous carcinogens and mutagens that induce genetic alterations and cellular damage, predisposing individuals to the development of OPLs and subsequent oral cancer [3]. Furthermore, the significant association between poor oral hygiene and OPL progression highlights the importance of maintaining oral health in reducing the risk of oral cancer. Poor oral hygiene can lead to the accumulation

of bacterial plaque and chronic inflammation, creating a conducive microenvironment for the progression of OPLs to malignancy [4].

Alcohol consumption has also been implicated as a risk factor for OPL development and progression, although its association appears to be less pronounced compared to tobacco [5]. Nevertheless, the observed progression rates among alcohol consumers underscore the synergistic effect of alcohol and tobacco in oral carcinogenesis [6]. Alcohol acts as a solvent, facilitating the penetration of carcinogens into oral mucosal tissues, while also exerting direct toxic effects on oral epithelial cells, promoting tumor initiation and progression [7].

Betel nut chewing, prevalent in certain regions of the world, has been identified as a significant risk factor for OPLs, particularly in Southeast Asia [8]. Betel nut contains arecoline, a known carcinogen that can induce DNA damage and promote cellular proliferation, increasing the risk of oral cancer development [9]. Despite its relatively lower prevalence in this study population, betel nut chewing demonstrated a notable progression rate, highlighting its importance as a modifiable risk factor for OPL management and prevention.

Histopathological classification of OPLs according to the World Health Organization (WHO) criteria provides valuable prognostic information and guides clinical management decisions. Leukoplakia, erythroplakia, and mixed lesions were the predominant histological subtypes observed in this study, consistent with previous reports. Erythroplakia, characterized by a red, velvety appearance, is considered a high-risk lesion with a greater propensity for malignant transformation [7-10]. Therefore, early identification and intervention of erythroplakic lesions are paramount in reducing the risk of oral cancer progression.

The high progression rate of OPLs to oral cancer observed in this study underscores the urgency of implementing effective surveillance strategies and early intervention programs in tertiary care settings. Regular follow-up examinations and vigilant monitoring of high-risk OPLs are essential for detecting early signs of malignant transformation and facilitating timely intervention. Surgical excision, laser ablation, and topical therapies such as photodynamic therapy have been shown to be effective in managing OPLs and preventing disease progression. Additionally, patient education and behavioral interventions aimed at reducing tobacco and alcohol consumption, improving oral hygiene practices, and promoting healthy lifestyle habits are crucial in mitigating the risk of OPL development and progression [7-10].

## CONCLUSION

In conclusion, this study provides comprehensive insights into the epidemiology, risk factors, and progression patterns of OPLs in a tertiary care setting. The findings underscore the multifactorial nature of OPLs and highlight the significant impact of tobacco use, poor oral hygiene, alcohol consumption, and betel nut chewing on disease progression. By elucidating the clinical implications of these risk factors and emphasizing the importance of early detection and intervention, this study contributes to the evidence base for effective OPL management strategies and oral cancer prevention efforts.

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