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Panacea Journal of Medical Sciences

Journal homepage: https://pjms.in/

Original Research Article

Clinico-pathological correlation of Oral cavity lesions in North Indian population

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Abstract

Introduction: Oral lesions are a frequent occurrence in a person's lifetime. The association between the demographic and clinical profiles of patients and the types of oral lesions will be instrumental in identifying and quantifying the various risk factors linked to different types of oral lesions. This study aims to evaluate the histopathological profiles of oral cavity lesions and analyze their association with clinicodemographic features at a tertiary care center in North India.
Aim and Objectives: To evaluate the histopathological profile of oral cavity lesions who underwent oral mucosal biopsies.
Materials and Methods: Records of oral cavity biopsies from patients attending the ENT outpatient department (OPD) were collected. The diagnoses of all biopsies were evaluated based on histopathological findings and correlated with clinical symptoms and demographic data.
Result: Out of 146 patients, oral cavity lesions were identified in 99 males and 47 females, with the most commonly affected age group being 20 to 40 years. The buccal mucosa was the most frequently involved site, followed by the tongue. The predominant diagnosis was squamous cell carcinoma, followed by submucous fibrosis and leukoplakia. Benign lesions were present in 35 patients, while 56 patients had premalignant lesions and 55 patients had malignant lesions.
Conclusion: Our study indicates that oral cavity lesions were more prevalent in males aged 20 to 40 years, particularly in the buccal mucosa. Additionally, premalignant lesions were found to be more common. Squamous cell carcinoma was found to be the most common diagnosis among all the lesions of oral cavity.

Keywords: Oral malignancies, Submucous fibrosis, Leukoplakia, Premalignant, Malignant lesions.

Received: 10-02-2025; **Accepted:** 30-06-2025; **Available Online**: 11-12-2025

1. Introduction

Oral lesions are one of the common occurrences in the lifetime of a human being. Prevalence of oral lesions, particularly those affecting the oral mucosa, at single point of time shows considerable variation depending upon geography and demography with reports defining its range somewhere between 4.9 to 64.7%.[1-6] As per an estimate in 2010, worldwide, about 300,000 people were projected to be diagnosed as oral cancer.[7] The incidence of oral cancer is continuously increasing worldwide, and a significant disparity in geographic incidence between high and low prevalence areas suggests major differences in risk factors.[8] The risk of oral cancer is particularly high in India and other South Asian countries due to a high prevalence of harmful oral habits, such as tobacco chewing and smoking, which play a crucial role in the development of potentially malignant oral conditions. Since most cancers in the oral cavity—especially those affecting the buccal mucosa, tongue, hard palate, gingiva, and lips—are easily accessible for self-examination, individuals at high risk, particularly those with a history of tobacco and alcohol abuse, are encouraged to learn Mouth Self-Examination techniques.[9-11]

The terms and malignant lesions have been used in the literature to broadly describe clinical presentations that may have the potential to develop into cancer.

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https://doi.org/10.18231/j.pjms.10046.1759833949

The World Health Organization (WHO) classifies neoplastic lesions of the oral cavity into several categories: benign lesions, potentially malignant lesions, and malignant lesions. Benign lesions include squamous papilloma, minor salivary gland tumors, and lipomas. Potentially malignant lesions consist of leukoplakia, erythroplakia, and oral submucous fibrosis (SMF). Malignant lesions include squamous cell carcinoma and non-Hodgkin lymphomas. Additionally, non-neoplastic lesions, such as peripheral giant cell granuloma, peripheral ossifying fibroma, pyogenic granuloma, and fibrous and/or epithelial hyperplasia (also referred to as reactive lesions of the oral cavity), are among the most common clinical entities.[13,14]

Oral examination using normal (incandescent) light is the most commonly used and accepted screening method for oral squamous cell carcinoma. This method is readily available and cost-effective, proving to be equally effective in detecting potentially malignant disorders (PMDs) across all levels of training, including junior and senior dentists, as well as trained healthcare workers and auxiliaries. It is particularly useful for screening accessible sites such as the buccal mucosa, tongue, and floor of the mouth.[15]

Although clinical examination can aid in the identification of oral lesions, histopathology remains the gold standard. A cross-sectional assessment of the histopathological profiles of oral lesions within a population may enhance our understanding of the nature and distribution of various types of oral lesions, particularly the proportion of potentially malignant and malignant lesions. This understanding is crucial for accurately determining the burden of oral lesions and for formulating appropriate preventive and therapeutic strategies.

Association of demographic and clinical profile of patients with type of oral lesions will be helpful to identify and quantify the role of different risk factors associated with different types of oral lesions.

Hence, the present study was planned to carry out an evaluation of histopathological profile of oral cavity lesions and to analyze their association with clinicodemographic features at a tertiary care centre in North India.

2. Materials and Methods

This retrospective cross-sectional study was conducted in the Department of Otorhinolaryngology in collaboration with the Department of Pathology at Era's Lucknow Medical College & Hospital, Lucknow. All oral lesion biopsies performed in the Department of Otorhinolaryngology at Era's Lucknow Medical College & Hospital were included in the study. Cases with incomplete histories or reports were excluded.

This study was conducted with the approval of the Institutional Ethical Committee. Since the study involved a retrospective record review, a waiver for obtaining patient informed consent was requested from the institutional authority.

The demographic and clinical records of patients who underwent oral cavity biopsies were retrieved from the case files of the Department of Otorhinolaryngology at Era's Lucknow Medical College and Hospital in Lucknow.

Histopathological findings from related cases were obtained from the Department of Pathology at Era's Lucknow Medical College and Hospital in Lucknow. Only cases with complete clinical and histopathological information were selected for final assessment.

2.1. Histopathological diagnoses were categorized into three major classifications

Benign conditions include cavernous hemangioma, ectopic salivary gland, epidermoid cyst, epulis, lipoma, mucocele, mucous retention cyst, pyogenic granuloma, sebaceous cyst, squamous papilloma, sublingual cyst, and submental cyst.

Premalignant conditions: oral submucous fibrosis, leukoplakia, lichen planus, and erythroplakia.

Malignant squamous cell carcinoma, verrucous carcinoma, and mucoepidermoid carcinoma, respectively.

Clinical and demographic factors were correlated with histopathological diagnosis.

3. Results

Demographic and clinical records of the patients undergone oral cavity biopsy was retrieved from the case files of Department of Otorhinolaryngology. Histopathological findings of related cases were sought from the Department of Pathology then Clinical and demographic factors were correlated with histopathological diagnosis.146 patients were enrolled in the study.

Figure 1 showed patient distribution based on sex. Majority of patients were males (n=99; 66.4%). There were only 47 (33.6%) females. Sex ratio (M:F) was 2.11.

Table 1 depicts the age and sex of the patients who participated in the study and **Figure 2** depicts Patient distribution based on age. **Table 1** and **Figure 2** shows Age of patients ranged from 8 to 75 years. Majority of males (52.5%) as well as females (55.3%) were aged 21-40 years. There were only 5 (5.1%) males and 3 (6.4%) females aged <20 years. Similarly, only 6 (6.1%) males and 1 (2.1%) females were aged >60 years. Mean age of overall study population was 39.62±13.42 years. Mean age of males was 40.31±14.04 years as compared to 38.15±12.02 years for females. Statistically, there was no significant difference in mean age of males and females (p=0.364). **Table 2** and **Figure 3** showed distribution of cases according to Presenting Complaints presence of white patch (32.9%) was the most common presenting complaint followed by burning

sensation (25.3%), pain and swelling (22.6% each), difficulty in mouth opening (16.4%) and oral discomfort (15.1%). There was one case (0.7%) who presented with red patch.

Table 3 and **Figure 4** showed the Site of involvement. Buccal mucosa was the most commonly involved site (46.6%) followed by tongue (28.1%), lip (11%), palate (6.2%), floor of mouth (4.8%), retromolar trigone (2.1%) and gingiva (1.4%) respectively. Among those having involvement of buccal mucosa, majority (n=47/68; 69.1%) had unilateral involvement (29 right and 18 left) while remaining 21/68 (30.9%) had bilateral involvement. **Figure 5** depicts Distribution of cases according to major histopathologicaldiagnosis. Premalignant lesion was present in 56(38.4) of the patients followed by malignant lesion that was present in 55(37.7) of the patients and benign lesion was present in 35(23.9) of the patients.

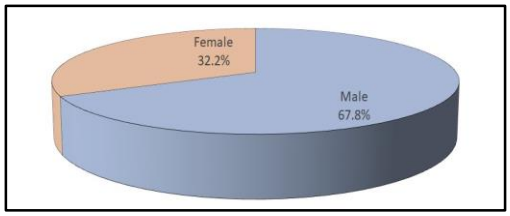

Figure 1: Distribution of cases according to sex

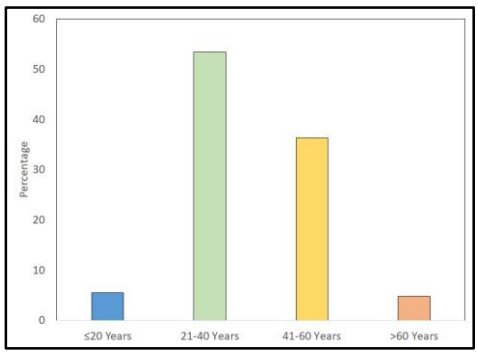

Figure 2: Distribution of cases according to age

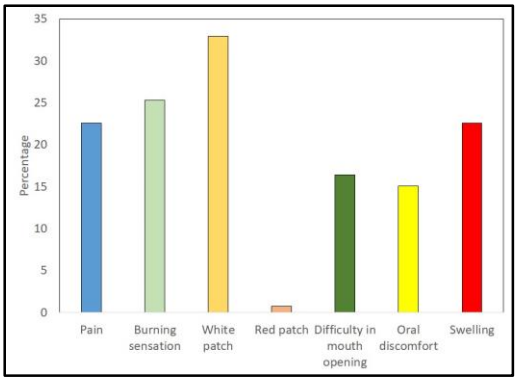

Figure 3: Distribution of cases according to Presenting Complaints

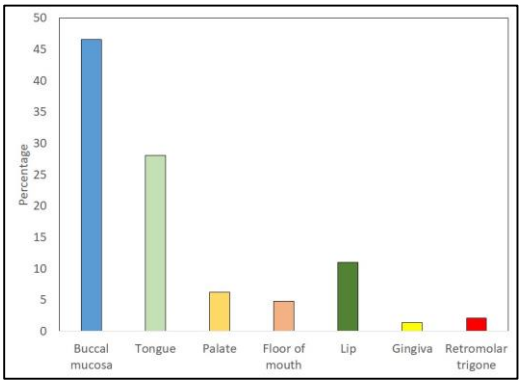

Figure 4: Site of involvement

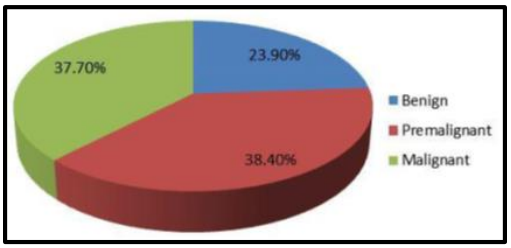

Figure 5: Distribution of cases according to major histopathological diagnosis

Table 1: Shows the age and sex profile of the patients enrolled in the study

S.No.	Age Group	Males (n=99)		Females (n=47)		Total (n=146)	
		No.	%	No.	%	No.	%
1.	≤20 Years	5	5.1	3	6.4	8	5.5
2.	21-40 Years	52	52.5	26	55.3	78	53.4
3.	41-60 Years	34	36.4	17	36.2	53	36.3
4.	>60 Years	6	6.1	1	2.1	7	4.8
Mean age±SD (Range) years		40.31±14.04 (8-75)		38.15±12.02 (9-62)		39.62±13.42 (8-75)	

Table 2: Distribution of cases according to Presenting Complaints

S.No	Characteristic	No.	%
1.	Pain	33	22.6
2.	Burning sensation	37	25.3
3.	White patch	48	32.9
4.	Red patch	1	0.7
5.	Difficulty in mouth opening	24	16.4
6.	Oral discomfort	22	15.1
7.	Swelling	33	22.6

Table 3: Site of involvement

S.No.		Site	No.	%
1.	Buccal mucosa		68	46.6
	Right		29	
	Left		18	
	Bilateral		21	
2.	Tongue		41	28.1
3.	Palate		9	6.2
4.	Floor of mouth		7	4.8
5.	Lip		16	11.0
6.	Gingiva		2	1.4
7.	Retromolar trigone		3	2.1

4. Discussion

Oral cancer is one of the most common malignancies prevalent in India. The natural history of oral cancer illustrates its progression from an inflammatory or benign lesion to premalignant and malignant conditions. Understanding the role of various demographic and clinical risk factors is crucial in reducing the risk of malignancy. Inflammatory, benign, premalignant, and malignant conditions encompass numerous types and subtypes, each with distinct risk profiles. Furthermore, it is essential to identify the clinical and demographic risk factors that elevate the likelihood of developing more severe lesions, specifically premalignant and malignant oral conditions.

With this background, the present study was conducted to assess the histopathological profile of oral cavity lesions through a retrospective review of oral mucosal biopsy cases analyzed at our center in North India. The clinical and histopathological profiles of these cases, in light of contemporary literature, are discussed below.

Case records of 146 patients who underwent oral mucosal biopsy during the designated period were collected. The demographic data indicated that the ages of the patients ranged from 8 to 75 years, with a mean age of 39.62 ± 13.42 years. The study population was characterized by a male predominance, comprising 67.8% of the cases. In this study, the majority of patients were aged between 21 and 40 years (53.4%). Agarwal et al. (2016) also reported a wide age range (8 to 80 years) among patients with oral lesions, similar to the present study, and noted a male predominance of 75.2%. Conversely, Jagtap et al. (2017) found that patients aged 50 to 59 years were the most commonly affected group, although they also reported a male predominance of 65.5%.[17] It is important to note that every oral mucosal biopsy carries a risk of premalignant and malignant potential. In this context, the patients in the present study demonstrate a heightened risk of such conditions, even at a younger age.

In the present study, white patch (32.9%), burning sensation (25.3%), pain and swelling (22.6% each) were the major presenting complaints. Compared to the present study, Oyetola et al.(2018),[18] which included benign oral conditions, only described pain, burning sensation, and itchiness as the most common presenting complaints. Shukla et al(2014)[19] reported a burning sensation as the presenting complaint in all the 100% cases of oral submucous fibrosis followed by restricted mouth opening as the major presenting complaint in 55.2% of patients. The present study included inflammatory, benign, premalignant, as well as a malignant lesion, and hence the presenting complaints, were not that specific when evaluated in terms of overall evaluation.

In the present study a total of 31 (21.2%) patients had diabetic history. As far as adverse personal habits are concerned, except for 8 (5.5%) all the other patients had one or more adverse personal habits like use of Chewing tobacco (39.7%), smoking (25.3%), pan masala (22.6%), betel quid (17.1%) and alcohol (12.3%). There were 33 (22.6%) patients having history of multiple adverse personal habits. In one such study, Gupta et al.(2016)[20] reported the prevalence of smoking, chewing tobacco and/or pan chewing in 71.5% of their cases. In our study, these habits were prevalent in as many as 94.5% of patients. The findings of the present study are consistent with previous epidemiological and histopathological research, which identifies personal habits such as tobacco use, pan masala, chewing betel quid, smoking, and alcohol consumption as common factors among patients with oral cavity lesions.

In the present study, the most commonly affected sites were the buccal mucosa (46.6%), tongue (28.1%), and lips (11%). The less commonly affected sites included the palate (6.2%), floor of mouth (4.8%), retromolar trigone (2.1%), and gingiva (1.4%). Traditionally, the buccal mucosa has been identified as the most common site involved in various studies.In the study by Gupta et al.(2016)[20] buccal mucosa was the most commonly involved site followed by tongue and base of tongue while retromolar trigone, hard palate and lip and soft palate comprised the least common sites, thus showing the profile of sites involved to be in agreement with the present study but having slight variations.

The high involvement of buccal mucosa in different studies could be attributable to its membranous, wet and

delicate nature that make it susceptible to injuries caused by stimuli like ―inflammatory conditions, medications, recurrent and mild functional injuries, or tobacco smoke (Meleti et al.,2008); Brizuela and Winters, 2021).[21,22]

In the present study, we described the histopathological profile of all oral biopsy cases irrespective of their nature and found a dominance of premalignant lesions (38.4%) followed by malignant (37.7%). Benign/inflammatory lesions comprised only 23.9% of the total specimen. Agarwal et al.(2015)[16] in their study described it in terms of neoplastic (60.9%) and non-neoplastic lesions (39.1%) and reported a dominance of malignant lesions (47.4%) as compared to benign lesions (13.5%) in the benign group. Variability in the nature of lesions in different studies is primarily attributable to the indications for specimen collection. In facilities where patients reach at an advanced stage of disease, the prevalence of more severe histopathological types is higher whereas in a relatively urban population like ours patients often avail the primary care facility in early stages of disease itself and that could have been reflected in the histopathological types too.

In the present study, there were 35 (23.9%) cases in non-malignant/benign category. Among these, mucocele and squamous papilloma (n=7 each) were the most common types followed by pyogenic granuloma (n=6). Together, these three entities comprised 58.8% of total nonmalignant/benign lesions. In all, there were 12 non-malignant/benign lesions. Of these, 6 (ectopic salivary gland, Epulis, mucous retention cyst, sublingual cyst and submental cyst) were represented by 1 case each. In the study by Sengueven et al. (2015),[23] hyperplastic lesions were identified as the most common non-neoplastic oral mucosal lesions. Gupta et al. (2016)[20] reported that pyogenic granuloma, squamous papilloma, and hemangioma were the three most prevalent histopathological types among benign cases. In the present study, we categorized inflammatory/reactive lesions along with benign lesions into a single group (non-malignant/benign lesions). The findings of this study, when compared with various earlier studies, indicate that to obtain a representative overview, a pooled analysis should be conducted, or national registries should be established.

In the present study, oral submucous fibrosis (OSMF) and leukoplakia were the predominant types of premalignant lesions, observed in 50.0% and 46.4% of cases, respectively.

The only two remaining cases were 1 case each diagnosed as lichen planus and erythroplakia respectively. The high prevalence of OSMF in our study could primarily attributed to pan masala/gutkha chewing habit in our population predisposes the patients to a risk of development of premalignant and malignant oral conditions. The findings of the present study are in agreement with the observations of Kumar et al.(2015)[24] who while assessing the prevalence of oral premalignant conditions in a cross-sectional study found OSMF to be the most dominant type (58.8%) and found erythroplakia (1.8%) to be the least common oral premalignant condition The differences in profile of premalignant lesions in different study thus seem to be dependent on the exposure to different risk factors and difference in categorization. As far as representation of premalignant lesions in the present study is concerned, it cannot be stated to be representative given the dominance of OSMF. Further studies to describe this profile are also recommended.

In the present study, out of a total of 55 malignant cases, 53 (96.4%) were oral squamous cell carcinoma and 1 (1.8%) each was mucoepidermoid and verrucous carcinoma respectively. Squamous cell carcinoma already is recognized as the most common oral malignancy in various epidemiological and review studies indicating it to be responsible for 90% of oral malignancies. (Neville et al., 2016.).[3] In a study, Patro et al.(2020)[25] also diagnosed 93.9% of malignant cases as OSCC and 1 (3%) each as basal cell carcinoma and mucoepidermoid carcinoma respectively. Thus like the present study, all the other studies also show a dominance of OSCC.

In the present study, we found that malignancy was significantly associated with older age, pain as presenting complaint, burning sensation, absence of white patch, difficulty in mouth opening, involvement of buccal mucosa or tongue, alcohol use, chewing tobacco and multiple adverse habits. Site specific risk of malignancy was reported by Halder and Halder(2019)[26] in their study in which they described malignancy to be more common when tongue was involved. In the present study we also found tongue involvement to be significantly higher in malignant cases while they found benign lesions to be most common in gingiva, however, in the present study we found involvement of gingiva in only 3.2% of benign cases.

The findings in the present study follow the trend of most of the previous studies, however, given the diversified profile of oral lesions in non-malignant, premalignant and malignant conditions, the findings of a study from a single centre cannot be generalized. An exact idea of spectrum of histopathological profile and their association with demographic and clinical profile of the patient could be obtained only through a much larger study using pooled data or through a national registry. We recommended further studies on larger sample size including multicentric collaborative studies, meta-analysis or formation of a national registry to get a more clear and authentic picture.

5. Conclusion

Case records of 146 patients who underwent oral mucosal biopsy during the blocked period were collected. The demographic data of these cases showed the age of patients in the 8 to 75 years range with a mean age of 39.62±13.42 years. In the present study, white patch (32.9%), burning sensation (25.3%), pain and swelling (22.6% each) were the major presenting complaints. A total of 31 (21.2%) patients

had diabetic history. In the present study, buccal mucosa (46.6%), tongue (28.1%) and lips (11%) were the most commonly affected sites. Palate (6.2%), floor of mouth (4.8%), retromolar trigone (2.1%) and gingiva (1.4%) were the less commonly affected sites. In the present study, we described the histopathological profile of all oral biopsy cases irrespective of their nature and found a dominance of premalignant lesions (38.4%) followed by malignant (37.7%). Our study shows oral cavity lesions were more common in males of the age group 20-40 years and site being buccal mucosa. The premalignant lesions were more common. Squamous cell carcinoma was found to be the most common diagnosis among all the lesions of oral cavity.

6. Ethical Committee Approval

This study was approved by institutional ethics committee.

7. Source of Funding

This study was not funded.

8. Conflict of Interest

We declare no conflict of interest.

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Cite this article: Bhat P, Faiz SM, Bhargava A, Srivastava S, Gupta RK, Lal N, Verma L, Gupta P, Siddiqui S. Clinico-pathological correlation of Oral cavity lesions in North Indian population. *Panacea J Med Sci*. 2025;15(3):685-690.