



## ORAL CAVITY CARCINOMA – EPIDEMIOLOGICAL AND CLINICOPATHOLOGICAL STUDY IN SOUTHEASTERN RAJASTHAN

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**ABSTRACT** **Introduction:** Tobacco use is rampant in India, specifically in Rajasthan. In Kota district, due to widespread tobacco and betel nut (lal manjan) use, oral cavity malignancy is among the most common malignancies encountered in surgical oncology practice. **Aim:** To assess the pattern of oral cavity cancer in a tertiary care medical facility in Kota, Rajasthan. **Material and Method:** A prospective observational study was conducted in the Department of Otorhinolaryngology, Head & Neck Surgery, Government Medical College & Associated Group of Hospitals, Kota. A total of 225 cases of oral cavity carcinoma and premalignant lesions were included in this study. **Results:** Oral cavity carcinoma was more common in males (61.8%). Most patients were in the 40–51 year age group (48.9%). Buccal mucosa was the most common subsite (47.6%). Tobacco use in the form of chewing paste (lal manjan) and smoking was identified as the predominant causative habit. **Conclusion:** This study quantifies epidemiological and clinicopathological parameters of oral cavity carcinoma in Kota, Rajasthan, and highlights the role of tobacco and lal manjan habits in carcinogenesis.

**KEYWORDS :** Oral Cavity Cancer, Subsite, Tobacco Habit, Histopathology, Epidemiology, Kota

### INTRODUCTION

Cancer is a major threat to public health in both developing and developed countries. At present, cancer/tumour is the second most common cause of death in the United States of America<sup>1</sup>. Oral cancer is one of the top twenty leading cancers worldwide<sup>2</sup>. In India, oral cancer is a common cancer and is a major health problem<sup>3</sup>. In Rajasthan, oral cancer is a major health issue due to rampant use of betel nut, lal manjan (chewing tobacco paste), gutkha, and khaini<sup>4</sup>.

Worldwide, tongue is the most common site of oral cancer. 90–95% of oral cancers are of squamous cell carcinoma type<sup>5</sup>. However, in India, buccal mucosa is the most common subsite due to the prevalent habit of tobacco chewing. In India, buccal mucosa (65%), lower alveolus (30%) and retromolar trigone (5%) are the most common sites of oral cancer.

The Kota district of Rajasthan witnesses a high burden of oral malignancy, particularly among working-age adults. Our study aims to provide insight into epidemiological parameters including age, sex, habits, tumour subsite, and clinicopathological parameters, and to define the local pattern of oral cavity carcinoma to help implement preventive measures.

### MATERIAL AND METHOD

A prospective observational study was conducted in the Department of Otorhinolaryngology, Head & Neck Surgery, Government Medical College & Associated Group of Hospitals, Kota, Rajasthan. A total of 225 cases of oral cavity malignancy and premalignant lesions were recruited after explaining the nature of the study to patients and obtaining informed consent.

Study parameters included: age, sex, tobacco/lal manjan habit and type of habit, anatomical site of the lesion, type of lesion (carcinoma/leukoplakia), histopathological grading, region of residence, tumour stage (T stage), and nodal stage (N stage). All parameters were noted by the PG resident and reconfirmed by the faculty of the department. Data was analysed using SPSS Statistics Windows, Version 20.0. Chi-square test was used for assessment of statistical significance and the level of significance was set at  $P < 0.05$ .

### RESULTS

**Sex Distribution:** For this study, 225 patients' data were analysed.

Oral cavity carcinoma was commoner in males (139 patients, 61.8%) compared to females (86 patients, 38.2%), which was statistically significant. This male predominance is consistent with higher tobacco habit prevalence in males in the study region.

Figure 1. Sex distribution

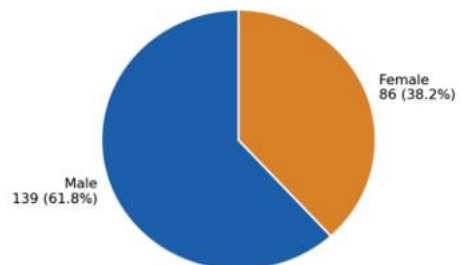


Figure 1. Male: Female Distribution

**Age Distribution:** The study included patients ranging from 17 to 50 years of age. The largest proportion were in the 40–51 year group (110 patients, 48.9%) followed by 30–40 years (94 patients, 41.8%). Younger patients under 30 years constituted 9.3% of cases, reflecting early onset due to habitual tobacco use.

Figure 2. Age distribution

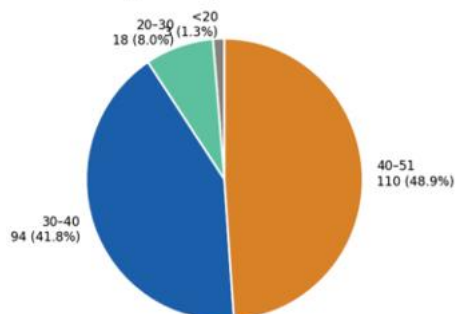
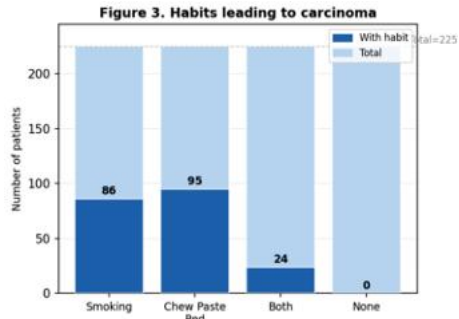


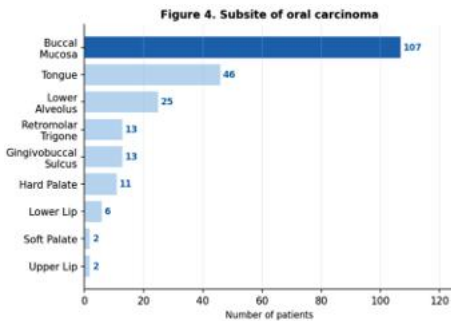
Figure 2. Age Group Distribution

**Tobacco Habits:** A total of 197 patients (87.6%) had a history of tobacco/lal manjan use. Chewing paste (lal manjan) was the most common habit (95 patients, 42.2%) followed by smoking (86 patients, 38.2%), and both combined (24 patients, 10.7%). Only 28 patients (12.4%) had no identifiable tobacco habit. These findings are consistent with published literature identifying chewing tobacco as a major carcinogen in South Asian populations.



**Figure 3. Habits Leading to Carcinoma**

**Subsite Distribution:** The oral cavity had several anatomical subsites involved. In our study, the most common subsites for cancer were buccal mucosa (107 patients, 47.6%), tongue (46 patients, 20.4%), lower alveolus (25 patients, 11.1%), retromolar trigone (13 patients, 5.8%), and gingivobuccal sulcus (13 patients, 5.8%). Less common subsites included hard palate (11 patients), lower lip (6 patients), soft palate (2 patients), and upper lip (2 patients).



**Figure 4. Subsite of Oral Carcinoma**

**Tumour Type and Grading:** The majority of lesions were carcinoma (220 patients, 97.8%); leukoplakia was noted in 5 patients (2.2%). T stage distribution is shown in Table 2. T2 was the most common T stage (90 patients, 40.0%) followed by T3 (87 patients, 38.7%). Most common nodal stage was N0 (140 patients, 62.2%) followed by N2 (38 patients, 16.9%).

**Table 1. Clinicopathological Parameters**

Parameter	Number	Percentage (%)
Tobacco habit		
Yes	197	87.6%
No	28	12.4%
Type of habit		
Smoking	86	38.2%
Chew paste red	95	42.2%
Both	24	10.7%
None	20	8.9%
Lesion type		
Carcinoma	220	97.8%
Leukoplakia	5	2.2%

**Table 2. Primary Site (T stage) and Nodal Stage (N Stage)**

Stage	Number	Percentage
T Stage		
T1	25	11.11%
T2	90	40.00%
T3	87	38.67%
T4	23	10.22%
N stage		
N0	140	62.22%
N1	21	9.33%

N2	38	16.89%
N3	26	11.56%

**DISCUSSION**

There were an estimated 18.1 million cancer cases around the world in 2020, of which 9.3 million cases were in men and 8.8 million in women. Lip and oral cavity cancer is the 16th most common cancer worldwide, constituting 2.1% of all cancers with 324,645 total cases<sup>2</sup>.

In our study, oral cavity carcinoma was more common in males (61.8%) compared to females (38.2%), consistent with findings reported by Yadav et al. from Jaipur (85.14% male predominance)<sup>6</sup> and other Indian studies. The relatively higher proportion of females in our study compared to Jaipur may reflect the increasing prevalence of tobacco chewing habits among women in the Kota–Hadoti region.

The mean age of patients in our study ranged predominantly between 30–51 years, with the largest age group being 40–51 years (48.9%). This is comparable to findings from India reporting a mean age of 47.8–49.7 years<sup>7,8</sup>. The presence of patients as young as 17 years underscores the alarming early-onset trend driven by tobacco chewing initiation in adolescence.

Our study demonstrates buccal mucosa (47.6%) as the most common subsite, followed by tongue (20.4%) and lower alveolus (11.1%). This is in accordance with Indian studies demonstrating mandibular alveolus and buccal mucosa as the most frequently involved sites<sup>9</sup>, accounted for by the practice of betel quid/tobacco chewing that keeps carcinogens in prolonged contact with the buccal and alveolar mucosa.

Chewing paste (lal manjan) was identified as the predominant causative habit (42.2%), followed by smoking (38.2%). The use of lal manjan — a locally prevalent tobacco preparation — combined with betel nut is strongly associated with oral carcinogenesis in this region. The most important risk factors for squamous cell carcinoma are tobacco use and alcohol abuse, which have a synergistic effect<sup>10</sup>. In the Indian subcontinent, betel quid containing areca nut and lime has long been strongly associated with an increased risk for oral cancer.

T2 and T3 stages were the most common at presentation (40.0% and 38.7% respectively), while N0 was the predominant nodal stage (62.2%), suggesting that a significant proportion of patients presented with locally advanced primary tumour but without nodal metastasis. A large proportion of oral cancer patients are usually not diagnosed until their disease has reached an advanced stage, ultimately requiring aggressive treatment<sup>11</sup>.

**CONCLUSION**

Oral cancer is associated with substantial mortality and morbidity, particularly when diagnosed at advanced stages. This study, conducted in south eastern Rajasthan, identifies the buccal mucosa as the most frequently affected subsite and highlights the use of chewing tobacco specifically lal manjan—as the predominant etiological factor. The findings underscore the imperative for clinicians to routinely examine the oral mucosa in addition to the dentition, especially in high-prevalence regions, as the early detection of precancerous lesions and early-stage malignancies significantly reduces both mortality and morbidity. Notably, the study reveals an early age of disease onset attributable to tobacco use among the youth in the Hadoti region. These results emphasize the urgent need for targeted public health interventions promoting tobacco cessation, with particular focus on smokeless tobacco products such as lal manjan and chewing paste

**Conflict of Interest**

Observational study – no conflict of interest.

**Funding**

Observational study – no funding issues.

**Abbreviations**

- GBS – Gingivobuccal Sulcus
- VHI – Voice Handicap Index
- SPSS – Statistical Package for the Social Sciences

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