

Original Research

Clinical Study of Risk Factors in Patients With Oral Cancer Attending a Tertiary Care Hospital

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ABSTRACT:

Background: Oral cancer is a major public health concern, particularly in developing countries, due to its strong association with preventable lifestyle-related risk factors such as tobacco use, smoking, and alcohol consumption. Despite the oral cavity being easily accessible for examination, many patients still present at advanced stages, leading to increased morbidity and mortality. Understanding the demographic profile, habit patterns, and clinical characteristics of oral cancer patients attending tertiary care hospitals is essential for early detection, prevention strategies, and improved clinical outcomes. **Aim:** The aim of the present study was to assess the risk factors and selected clinical parameters among patients diagnosed with oral cancer attending a tertiary care hospital. **Materials and Methods:** This hospital-based observational clinical study included 30 patients with clinically and histopathologically confirmed oral cancer attending the outpatient and inpatient departments of a tertiary care hospital. Data were collected using a structured proforma through patient interviews, clinical examination, and review of medical records. Information regarding demographic variables, habit-related risk factors, and clinical parameters such as site and appearance of the lesion, presenting symptoms, oral hygiene status, and cervical lymph node involvement was recorded. **Results:** The majority of patients were males (70.00%), with the highest prevalence seen in the 51–60 years age group (33.33%). Tobacco chewing was the most common habit (36.67%), followed by combined habits involving tobacco, smoking, and/or alcohol (30.00%). Buccal mucosa was the most frequently affected site (43.33%), and ulcerative lesions were the predominant clinical presentation (46.67%). Pain or burning sensation was reported by 73.33% of patients, while cervical lymph node enlargement was observed in 56.67%. A statistically significant association was found between habit history and site of lesion ($p = 0.041$). **Conclusion:** The study demonstrates a strong association between oral cancer and tobacco-related habits, with a predominance of buccal mucosa involvement and symptomatic presentation. These findings emphasize the importance of early screening, habit cessation, and public awareness programs to reduce the burden of oral cancer.

Keywords: Oral cancer; Risk factors; Tobacco use; Buccal mucosa

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INTRODUCTION

Oral cancer remains a major public health problem because it affects a readily visible and functionally critical region, yet many patients still present late with significant morbidity. The term “oral cancer” generally includes malignant neoplasms arising from the lips and oral cavity, with oral squamous cell carcinoma (OSCC) constituting the predominant histopathological type. The global burden of oral cavity cancers is substantial and shows marked geographic variation, reflecting differences in exposure to carcinogens and social determinants of health. Worldwide estimates from population-based

cancer surveillance highlight that oral cavity cancer continues to contribute meaningfully to overall cancer incidence and mortality, particularly in low- and middle-income countries where preventable risk factors are highly prevalent.¹ In recent global assessments, patterns of cancer occurrence have emphasized both the persistence of traditional risk factors and the evolving epidemiology of head and neck malignancies. While improvements in diagnostics and access to care have occurred in many regions, the overall impact on oral cancer outcomes remains uneven. Contemporary global summaries of cancer burden also underscore that oral cavity cancer

continues to be a priority due to its association with modifiable exposures, potential for early detection through visual examination, and the significant disability resulting from treatment-related functional compromise (speech, swallowing, mastication, and aesthetics).² This dual reality—preventability on one hand and late-stage presentation on the other—makes oral cancer especially relevant for clinical risk-factor profiling in tertiary care settings. The epidemiology of oral and oropharyngeal cancers demonstrates strong regional clustering, with high-incidence areas often corresponding to cultural practices involving tobacco and areca nut, patterns of alcohol consumption, and variations in healthcare-seeking behavior. Oral cancers are frequently associated with socioeconomic disadvantage, limited awareness of early symptoms, restricted access to dental and medical screening, and delays in referral. Such factors contribute to advanced stage at diagnosis and poorer prognosis. Understanding local demographic patterns and clinical presentation is therefore important, because the “typical” patient profile may differ across regions even within the same country, depending on the dominant habits and community practices.³ Among established etiological factors, tobacco use in its various forms remains central. Cigarette and bidi smoking expose the oral epithelium to numerous carcinogens, while smokeless tobacco (chewing forms) can create prolonged mucosal contact with nitrosamines and other carcinogenic compounds. Alcohol acts as both an independent risk factor and a potentiator, enhancing mucosal permeability and synergizing with tobacco-related carcinogenesis. Nutritional deficiencies, low fruit and vegetable intake, poor oral hygiene, chronic inflammation, and other lifestyle-related determinants have also been implicated in oral cancer susceptibility and progression. These risk factors are particularly important in clinical practice because they are identifiable through history-taking and can be targeted through prevention and cessation counseling.⁴ In South Asian populations, areca nut and betel-quid practices—often with added tobacco—have special relevance due to their widespread use and strong carcinogenic potential. The preparation may be consumed multiple times daily, and the quid is frequently kept in the buccal vestibule for extended periods, leading to chronic irritation and high local exposure. Over time, such habits are associated not only with oral cancer but also with oral potentially malignant disorders such as oral submucous fibrosis and leukoplakia, which may precede malignancy. A carcinogenic classification of these exposures has reinforced the need to treat these practices as major drivers of oral cancer burden in regions where chewing habits are common.⁵ Clinically, oral cancer may present as ulcerative, proliferative, or ulceroproliferative lesions, often accompanied by symptoms such as pain or burning sensation, non-healing ulcers, dysphagia, odynophagia, bleeding,

restricted mouth opening, or referred otalgia. Cervical lymph node enlargement can indicate regional spread and has important implications for staging and treatment planning. Since clinical presentation is influenced by tumor site, size, and patient behavior, documenting common presenting complaints and examination findings in hospital-based cohorts offers practical value for frontline clinicians. Moreover, correlating lesion site with habit history can provide insight into exposure patterns (e.g., quid placement) and can support targeted community education and screening strategies. Early detection is critical because prognosis is substantially better for localized disease compared with regional or distant spread. Oral visual inspection is a simple, low-cost method that can be implemented in high-risk populations, and evidence from community-based screening initiatives has demonstrated that structured screening approaches can reduce oral cancer mortality in high-risk groups.^{6,7} However, in routine practice, many patients still reach tertiary care after disease progression, highlighting the need for continuous risk-factor surveillance, public awareness, and systematic referral pathways.

MATERIALS AND METHODS

This hospital-based observational clinical study was conducted at a tertiary care hospital. The study aimed to assess the risk factors and selected clinical parameters in patients diagnosed with oral cancer attending the outpatient and inpatient departments of the tertiary care center. A total of 30 patients were included in the study. The study comprised 30 patients with clinically and histopathologically confirmed oral cancer. Patients of both genders and different age groups attending the tertiary care hospital were included to ensure adequate representation of the study population.

Inclusion and Exclusion Criteria

Patients with a confirmed diagnosis of oral cancer who consented to participate were included in the study. Patients with recurrent oral cancer, those who had received prior treatment such as chemotherapy or radiotherapy, and patients who were unwilling or medically unfit to participate were excluded.

Methodology

Data were collected using a predesigned and structured proforma through patient interviews, clinical examination, and review of hospital records. Information regarding demographic details, personal habits, and clinical findings was recorded systematically for each patient.

The clinical parameters assessed included age, gender, site of the lesion (buccal mucosa, tongue, floor of mouth, gingiva, or palate), size of the lesion, clinical appearance (ulcerative, proliferative, or ulceroproliferative), presence of pain or burning sensation, difficulty in chewing or swallowing,

presence of cervical lymph node enlargement, oral hygiene status, and clinical stage of the disease. These parameters were selected as they are simple, routinely assessed, and relevant for clinical evaluation of oral cancer patients.

Risk factors such as tobacco chewing, smoking, alcohol consumption, and combined habits were recorded. The frequency and type of habits were noted based on patient history to evaluate their association with oral cancer.

Statistical Analysis

All collected data were compiled and entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistical methods including frequencies, percentages, means, and standard deviations were used for data analysis.

RESULTS

Table 1: Distribution of Patients According to Age and Gender

Table 1 illustrates the age and gender distribution of the 30 oral cancer patients included in the study. The highest proportion of patients belonged to the 51–60 years age group, accounting for 10 patients (33.33%), followed by the 41–50 years age group with 9 patients (30.00%). Patients aged 40 years or below constituted 20.00% of the study population, while those above 60 years accounted for 16.67%. This indicates that oral cancer was more commonly observed in middle-aged and older individuals. With regard to gender distribution, males predominated with 21 patients (70.00%), whereas females constituted 9 patients (30.00%), demonstrating a clear male predominance in the occurrence of oral cancer in the present study.

Table 2: Distribution of Patients According to Habit-Related Risk Factors

Table 2 presents the distribution of habit-related risk factors among the study participants. Tobacco chewing alone was the most frequently reported habit, observed in 11 patients (36.67%). Combined habits, including tobacco chewing along with smoking or alcohol consumption, were noted in 9 patients (30.00%), highlighting the additive effect of multiple risk factors. Smoking alone was reported by 5 patients (16.67%), while alcohol consumption alone was

observed in 3 patients (10.00%). Only 2 patients (6.66%) reported no deleterious habits.

Table 3: Distribution of Patients According to Site and Clinical Appearance of Lesion

Table 3 shows the anatomical site and clinical appearance of oral cancer lesions. The buccal mucosa was the most commonly affected site, with 13 cases (43.33%), followed by the tongue in 8 patients (26.67%). Lesions involving the floor of the mouth were observed in 4 patients (13.33%), while gingiva and palate involvement were seen in 3 (10.00%) and 2 patients (6.67%), respectively. Regarding clinical appearance, ulcerative lesions were the most prevalent, noted in 14 patients (46.67%). Ulceroproliferative lesions were observed in 10 patients (33.33%), and proliferative lesions were present in 6 patients (20.00%).

Table 4: Distribution of Patients According to Clinical Symptoms and Findings

Table 4 summarizes the clinical symptoms and findings among the study participants. Pain or burning sensation was the most frequently reported symptom, present in 22 patients (73.33%), indicating advanced or symptomatic disease at presentation. Difficulty in chewing or swallowing was reported by 18 patients (60.00%), reflecting functional impairment due to the lesion. Cervical lymph node enlargement was noted in 17 patients (56.67%), suggesting regional lymphatic involvement in more than half of the cases. Poor oral hygiene was observed in 21 patients (70.00%), which may contribute to disease progression and delayed diagnosis.

Table 5: Association Between Habit History and Site of Lesion

Table 5 demonstrates the association between habit history and the site of oral cancer lesion. Among patients with habits, buccal mucosa involvement was seen in 12 cases (92.31%), compared to only 1 case (7.69%) among those without habits. Tongue lesions were observed in 6 patients (75.00%) with habits and 2 patients (25.00%) without habits. Lesions at other sites showed a similar trend, with 8 patients (88.89%) having habit history. The association between habit history and site of lesion was found to be statistically significant, with a p-value of 0.041.

Table 1: Distribution of Patients According to Age and Gender (n = 30)

Variable	Number of Patients (n)	Percentage (%)
Age Group (years)		
≤40	6	20.00
41–50	9	30.00
51–60	10	33.33
>60	5	16.67
Gender		
Male	21	70.00
Female	9	30.00

Table 2: Distribution of Patients According to Habit-Related Risk Factors (n = 30)

Risk Factor	Number of Patients (n)	Percentage (%)
Tobacco chewing only	11	36.67
Smoking only	5	16.67
Alcohol consumption only	3	10.00
Combined habits (tobacco + smoking/alcohol)	9	30.00
No reported habit	2	6.66

Table 3: Distribution of Patients According to Site and Clinical Appearance of Lesion (n = 30)

Clinical Parameter	Number of Patients (n)	Percentage (%)
Site of lesion		
Buccal mucosa	13	43.33
Tongue	8	26.67
Floor of mouth	4	13.33
Gingiva	3	10.00
Palate	2	6.67
Clinical appearance		
Ulcerative	14	46.67
Proliferative	6	20.00
Ulceroproliferative	10	33.33

Table 4: Distribution of Patients According to Clinical Symptoms and Findings (n = 30)

Clinical Feature	Present n (%)	Absent n (%)
Pain/Burning sensation	22 (73.33)	8 (26.67)
Difficulty in chewing/swallowing	18 (60.00)	12 (40.00)
Cervical lymph node enlargement	17 (56.67)	13 (43.33)
Poor oral hygiene	21 (70.00)	9 (30.00)

Table 5: Association Between Habit History and Site of Lesion (Chi-square Test)

Site of Lesion	Habit Present n (%)	Habit Absent n (%)	p-value
Buccal mucosa	12 (92.31)	1 (7.69)	
Tongue	6 (75.00)	2 (25.00)	
Other sites	8 (88.89)	1 (11.11)	0.041

DISCUSSION

In the present study (n=30), oral cancer was predominantly seen in middle-aged and older adults, with the highest proportion in the 51–60-year group (33.33%), followed by 41–50 years (30.00%). A similar mid-life peak has been reported in large Indian hospital data; Senapati et al (2021) observed a mean age of 50.55±12.56 years in 1753 OSCC patients, with substantial representation in the 50–59-year bracket (25.30%).⁸

Gender distribution in this study showed male predominance (70.00% males vs 30.00% females). Comparable male excess is consistently reported from Indian centers; Singh et al (2015) found 76.00% males among 479 oral cancer patients (male:female 3.1:1), supporting the observation that oral cancer burden often concentrates in males, likely reflecting differential exposure to tobacco-related habits.⁹

Habit history in the current cohort demonstrated a high prevalence of deleterious practices: tobacco chewing alone (36.67%) and combined habits (tobacco with smoking/alcohol) (30.00%) together accounted for two-thirds of cases, while only 6.66% reported no habits. Sharma et al (2019) similarly highlighted habit clustering in tertiary-care

oral/oropharyngeal cancer patients, with smoking (26.51%) and chewing patterns prominent, and also documented meaningful site–habit patterns (e.g., tongue cancers commonly linked with chewing at 26.47% in their dataset), reinforcing the plausibility of the significant habit–site association seen in our study (p=0.041).¹⁰

Regarding lesion site, buccal mucosa was the commonest location in this study (43.33%), followed by tongue (26.67%). However, site patterns can vary by region and habit form; in a tertiary institutional study, Jyoti et al (2020) reported tongue as the leading site (42 cases; 52.50%), with buccal mucosa less frequent (17.50%). This contrast suggests that local chewing practices (quid placement) and referral patterns may shift the dominant subsite, even within “tertiary-care” populations.¹¹

Clinically, ulcerative lesions were most common in our patients (46.67%), followed by ulceroproliferative (33.33%) and proliferative (20.00%). Larger clinicopathological series often report infiltrative/ulceroinfiltrative morphologies as dominant; Senapati et al (2021) noted ulceroinfiltrative lesions in 51.20% and ulceroproliferative in 34.00% of OSCC cases. In the

present study, the high pain/burning burden (73.33%), functional complaints (60.00%), and nodal enlargement (56.67%) together suggest symptomatic and potentially advanced presentations, which aligns with the clinically aggressive morphology patterns described in high-volume cohorts.⁸

Symptomatically, pain/burning was highly prevalent in this study (73.33%). This is consistent with evidence that pain is common even prior to treatment: Khawaja et al (2021) reported pain prevalence of 67.50% among 1067 treatment-naïve oral cancer patients and noted associations with nodal involvement and lesion characteristics. The slightly higher pain frequency in our cohort may reflect later presentation, greater ulceration, or higher proportion of symptomatic subsites.¹²

Poor oral hygiene was observed in 70.00% of our patients, suggesting that adverse oral health status frequently coexists with oral cancer in routine clinical settings. Dholam et al (2016) reported substantial proportions of compromised oral hygiene among OSCC cases (moderate oral hygiene 45% and poor oral hygiene 34%), supporting the clinical impression that suboptimal oral hygiene is common in affected patients and may contribute to chronic inflammation, delayed detection, or worse oral environment in high-risk individuals.¹³

The statistically significant association between habit history and lesion site in our study ($p=0.041$), with buccal mucosa showing a very high proportion of habit-positive cases (92.31%), is biologically consistent with strong epidemiologic evidence for smokeless tobacco exposure. Khan et al (2014) quantified this risk in South Asia, reporting pooled odds ratios of 4.7 (3.1–7.1) for chewing tobacco and 7.1 (4.5–11.1) for paan with tobacco in relation to oral cancer, underscoring that site patterns and lesion burden in hospital cohorts are expected to track with chewing practices.¹⁴

Finally, the high frequency of cervical lymph node enlargement in our cohort (56.67%) highlights the importance of careful neck evaluation and timely management planning at tertiary care level. Evidence from randomized clinical work in early oral cancer has shown meaningful survival impact from proactive neck management; an editorial commentary summarizing the D'Cruz trial reported improved overall survival with elective neck dissection (80% vs 67.5%; $p=0.01$). While our study reports clinical nodal enlargement (not pathologic nodal status), the high proportion of suspected nodal disease reinforces the need for structured staging and appropriate neck-directed treatment strategies in similar hospital populations.¹⁵

CONCLUSION

The present study highlights that oral cancer predominantly affects middle-aged and elderly males, with tobacco-related habits being the most significant risk factors among patients attending a tertiary care

hospital. Buccal mucosa was the most commonly involved site, and ulcerative lesions were the frequent clinical presentation. A high proportion of patients presented with symptoms and cervical lymph node involvement, indicating delayed diagnosis. The significant association between habit history and site of lesion emphasizes the need for effective habit-cessation programs, early screening, and increased public awareness to reduce the burden of oral cancer.

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