

Patterns of Tobacco Consumption among Oral Squamous Cell Carcinoma Cases Attending a Tertiary Care Dental Hospital in Coastal Karnataka of India

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ABSTRACT

Aim: Oral squamous cell carcinoma (OSCC) contributes to 30% of the cancers in India. Harmful use of tobacco and alcohol is implicated in the pathogenesis of oral cancer. This study aimed at describing the tobacco consumption patterns in patients of OSCC visited in a tertiary care dental hospital in coastal Karnataka, India.

Materials and methods: A cross-sectional study of 108 cases of OSCC from 2015 to 2018 was carried out in a tertiary care dental hospital. Demographic details of the patients' sex, age, tobacco habit, and site of cancer were entered into MS Excel. Data were analyzed using SPSS version 20. The tobacco consumption pattern was expressed in percentages and proportions, and the association between the variables was determined by Chi-square (χ^2) test and the Mann-Whitney *U* test.

Results: Of the 108 cases of OSCC, 84 (77.8%) were males. The most common site of the OSCC was the buccal mucosa along the gingivobuccal sulcus, which was seen in 65 (60.20%) cases. In males, the most common type of tobacco consumed was in the smoked form, which was observed in 39 (46.4%) cases, and among females the smokeless tobacco (ST) consumption was found in 15 (62.5%) cases.

Conclusion: The most common site for OSCC was the buccal mucosa along with the gingivobuccal sulcus. The most common types of tobacco consumed in patients with OSCC were smoked form in males and ST in females.

Clinical significance: There is a need to work toward public awareness about the detrimental effects of tobacco practice and oral cancer screening programs, which might prevent the morbidity and mortality of OSCC in this region due to early diagnosis that is achievable.

Keywords: Carcinoma, Habits, Smoke, Squamous cell, Tobacco.

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INTRODUCTION

Oral cancer is ranked as the eighth most common cancer in the world. One-third of oral cancer cases in the world occur in India.¹ Squamous cell carcinoma (SCC) is a significant cause of oral cancer, seen in more than 90% of the instances.²

Etiology of oral squamous cell carcinoma (OSCC) is multifactorial; however, the most common associated factor is the tobacco habits either in smoking or smokeless form with or without alcohol consumption.³ Other predisposing factors for OSCC are low socioeconomic status, poor oral hygiene, poor diet, viral infections, chronic irritation from ill-fitting dentures, rough or fractured teeth, and also potentially malignant lesions.⁴

Tobacco is considered the most important etiologic agent for oral cancer due to many carcinogens. Tobacco use can be broadly classified as smoked form and smokeless tobacco (ST) form. Smoked form of tobacco refers to cigarettes, beedis, cigars, pipes, and sticks, whereas ST refers to the consumption of unburned tobacco, in the form of chewing, dipping, and snuff.⁵

The present study aimed to elucidate the tobacco consumption patterns among cases with OSCC attending a tertiary care dental hospital in coastal Karnataka, India.

MATERIALS AND METHODS

A cross-sectional descriptive study on 108 biopsy-proven OSCC cases was examined during a three-year period (2015–2018) who attended a tertiary care dental hospital in Dakshina Kannada District, Mangaluru. The Institutional Ethics Committee Clearance

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for the study was sought after the approval of the scientific committee of the institution. The current study results are a part of a larger research study conducted on the above-said population. All incident cases of OSCC included were explained the need for the study, and the written informed consent for the study was taken. The details of the patients like sex, age, tobacco consumption

pattern, and oral cancer sites were entered into a pretested semi-structured questionnaire. The principal investigator/first author collected the details from the participants in local language (Kannada/Malayalam) after obtaining the written informed consent.

STATISTICAL ANALYSIS

The data were entered into a computerized Excel spreadsheet analyzed using SPSS version 20. Descriptive statistics were used to summarize the data regarding demographic variables such as sex, site of OSCC, and tobacco consumption patterns in terms of percentages and proportions. Quantitative variables of age and duration of consumption of tobacco products were summarized as mean and SD. The association of sociodemographic variables and the tobacco consumption patterns were assessed using Chi-square tests. The differences in the duration of the consumption of tobacco and the variables were determined using the Mann–Whitney *U* test.

RESULTS

A total of 108 OSCC patients were included in the study of which 84 (77.8%) were males and 24 (22.2%) were females. The age of the male patients varied from 31 years to 75 years with a mean ± SD of 55.75 ± 9.69 years, and the age of female patients ranged from 42 years to 75 years with a mean ± SD of 58.39 ± 8.94 years. The median age of presentation of the oral carcinoma among males patient was 55 (46.5–63.00) years and in females it was 58.25 (51.0–64.75) years. The age groups and sex of the patients with oral cancer did not differ significantly.

The most common site for OSCC was the buccal mucosa along the gingivobuccal sulcus, which was seen in 65 (60.2%) cases as depicted in Table 1. The other areas where oral cancer was seen were tongue (13; 12.04%), palate (5; 4.62%), and other locations (25; 23.14%). Among the 25 cases who are grouped as others, the sites involved are combinations of buccal mucosa and alveolus (3 cases), commissure and buccal mucosa (4 cases), and alveolus and hard palate (2 instances). The combinations of buccal mucosa and palate, tongue and floor of the mouth, alveolus and tongue, and alveolus and vestibule are the sites of OSCC for one case each. The sites of the remaining 12 of the 25 cases were the floor of the mouth (6 cases), lip (2 cases), and mandibular alveolus (4 cases).

The association between the site for oral cancer and gender is reported in Table 2. As shown in Table 2, for 55.9% (47) males and 75% (18) females, the most common site was buccal mucosa and gingivobuccal sulcus.

Among the cases of OSCC of the tongue, 10 (11.9%) were men and 3 (12.5%) were women. Among the cases of OSCC of the palate, only males were seen to be present that comprised 5 cases (6%). Males (22; 26.2%) outnumbered females (3 cases; 12.5%) in all other sites also. The location of oral cancer was comparable among males and females in the study population.

Table 1: Site of OSCC among OSCC patients (*n* = 108)

Site	Frequency <i>n</i> (%)
Buccal mucosa along gingivobuccal sulcus	65 (60.20)
Tongue	13 (12.04)
Palate	5 (4.62)
Others	25 (23.14)
Total	108 (100.0)

All the 108 cases of OSCC reported the use of tobacco products. The sex-wise preference for tobacco products is given in Table 3. Among the males, the most common form of tobacco consumption was in smoked form (39; 46.4%), and among the females, there was a higher usage of ST (15; 62.5%). The smoked form was beedis and cigarettes and the smokeless form was paan and gutka.

The median age of intake of tobacco products, that is duration of consumption of the products, was comparable in both the sexes. The median number of years of tobacco product intake was 25.0 (18.5–30.0) among males and 25.0 (15.0–35.0) years among females too. However, these differences in consumption of tobacco products were not found to differ significantly among both sex groups, as shown in Table 4.

The self-reported use of alcohol in combination with tobacco was discovered in 17 (15.7%) cases of oral cancer, of which 15 (88.2%) were males and 2 (11.8%) were females. However, these differences were not found to be differing statistically among males and females.

As seen in Table 5, there was a statistically significant difference in the pattern of tobacco consumption and the site of the OSCC in the population. The individuals who consumed tobacco in the smoked form were found to have OSCC in buccal and gingivobuccal sulcus than individuals who consumed ST or used both types. Oral squamous cell carcinoma occurring at other sites showed smokeless form of tobacco consumption than smoked form or both.

DISCUSSION

Oral cancer in India forms approximately 30% of all cancers.³ According to Globocan, the 2018 report estimated that new cases

Table 2: Site and gender among OSCC patients

Site	Sex <i>n</i> (%)	
	Males	Females
Buccal mucosa and gingival vestibular mucosa	47 (55.90)	18 (75.0)
Tongue	10 (11.9)	3 (12.5)
Palate	5 (6.0)	0 (0.0)
Others	22 (26.2)	3 (12.5)
Total	84 (100.0)	24 (100.0)

Table 3: Sex-wise self-reported preference for tobacco products

Type of tobacco product consumed	Sex frequency <i>n</i> (%)		
	Male	Female	Total <i>n</i> (%)
Smokeless	34 (40.5)	15 (62.5)	49 (45.4)
Smoked	39 (46.4)	8 (33.3)	47 (43.5)
Both	11 (13.1)	1 (4.2)	12 (11.1)
Total	84 (100.0)	24 (100.0)	108 (100.0)

Table 4: Sex difference in the duration of use of tobacco products

	Sex median (IQR)		<i>T</i> value	<i>p</i> value
	Male	Female		
Median duration of tobacco product use	25.0 (18.5–30.0)	25.0 (15.0–35.0)	–0.18	0.857

Mann–Whitney *U* test, *p* value—0.05

Table 5: Site and habit among OSCC patients

OSCC site	Habit			Total	T value	p value
	Smoked	Smokeless	Both			
Buccal mucosa and gingivobuccal sulcus	37 (56.9%)	23 (35.4%)	5 (7.7%)	65 (60.2%)	9.002	0.011*
Others	12 (27.9%)	24 (55.8%)	7 (16.3%)	43 (39.8%)		
Total	49 (45.4%)	47 (43.5%)	12 (11.1%)	108 (100.0)		

Chi-square test, *p value < 0.05

of oral cancer are estimated to be 1,19,992 and has resulted in 72,616 deaths. In general, men suffer and die more from oral cancer than women.⁵

Cancer epidemic has one of the highest numbers in India, nearly 30% of oral cancer cases in the world.¹ Squamous cell carcinoma is defined as a "malignant epithelial neoplasm exhibiting squamous differentiation as characterized by the formation of keratin and the presence of intercellular bridges."⁶

Tobacco is the major cause of premature death globally. It is reported that there are more than 1.3 billion smokers worldwide. World Health Organization (WHO) reports that 6.4 million deaths and hundreds of billions of dollars of economic damage worldwide each year are reported due to tobacco consumption. By 2030, worldwide tobacco consumption is predicted to kill more than 8 million people each year, most of which will occur in lower-income developing countries.⁷

In the present study, there were more males than females indulged in tobacco habit, and this finding is consistent with other studies by Singh et al.⁸ and Mehrotra et al.⁹ This is because males have greater access to tobacco products due to peer pressure and availability and even the social taboo on the usage of tobacco products is lesser in males compared to females.

Oral cancer is a chronic disease. Our study showed most common presentation in the age group of 51–60 years that comprised 44% of cases, hence our study was consistent with the research done by Nirmala et al.¹⁰ who showed that 39% belonged to the age group of 50–59 years and Tandon et al. also showed that 39.5%¹¹ were patients above 50 years old. However, our study was contradictory to the previous study done by Singh et al.⁸ where the majority of patients were in the age group of 40–49 (25.2%), and Smitha et al. also showed that the majority belonged to 60 years (33.9%).¹² Most of the males and female cases were in fifth to sixth decade of life at the time of diagnosis of carcinoma. However, in Singh et al.⁸ showed that there were more males in the fourth decade, and females were more common in the fifth decade of life.

In our analysis, the most common site was buccal mucosa and gingivobuccal sulcus. A study done by Smitha et al.¹² also showed that the site commonly affected was the gingivobuccal area.

In our study, smoked tobacco was the most commonly used practice among males (46.4%); however, in females, it was ST (62.5%). Our results were not consistent with the findings of Krishna et al.,¹³ who reported ST chewing as the most prevalent habit in North India.

The sex-wise distribution of the patients with OSCC revealed that the most common form of tobacco consumption was smoked in males and smokeless in females. This finding is similar to the results obtained by Singh et al.,⁸ who reported that the smokeless form of tobacco was significantly associated with OSCC in women.

Amount of tobacco consumption is directly proportional to the early occurrence of carcinoma. Buccal mucosa and gingivobuccal sulcus (GBS) were the most affected sites both in males (49%) and females (40%). These findings are consistent with other studies.

Tandon et al. in their study showed that the most common anatomical site was buccal mucosa (31.47% of the population).¹¹ Placement of tobacco quid in the gingivobuccal sulcus region is implicated in the development of carcinoma. This finding was in synchrony with the study done by Smitha et al.¹² A report submitted by India Project Team of the International Cancer Genome Consortium observed that gingivobuccal sulcus tumors were associated with both smokeless and smoked tobacco and also indulgence with alcohol habit.¹⁴

Smokeless tobacco in the oral cavity results in the production of reactive oxygen species (ROS) and free radicals. These free radicals and ROS damage the normal DNA and RNA, leading to genotoxicity and carcinogenic effects eventually causing oral cancer.¹⁵ The limitations of the study is that it is self-reported habits of individuals with OSCC, which could have been prone to recall bias.

CONCLUSION

The present study shows that tobacco consumption was seen among all the cases of OSCC, which was most commonly seen in the buccal mucosa and the gingivobuccal sulcus. Male patients of OSCC most commonly used the smoked form, whereas female patients consumed the smokeless form of tobacco. Health awareness and health education regarding hazards of tobacco consumption to the individuals should be started at an early age so that cancer burden and other tobacco-related health issues could be mitigated in the future.

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