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ORIGINAL RESEARCH

Site and Habit as a Determinant of Grade of Oral Squamous Cell Carcinoma: An Institution-based Study

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ABSTRACT

Introduction: Squamous cell carcinoma is the most common malignant neoplasm of the oral cavity and represents about 90% of all oral malignancies. Oral squamous cell carcinoma (OSCC) is one of the major causes of morbidity and mortality throughout the world and its incidence varies significantly across different geographical regions. Understanding the epidemiology and the risk factors for oral cancer can help in early identification and prompt treatment of patients with oral cancer.

Objectives: The purpose of this study was to investigate site and habit as a determinant of OSCC.

Materials and methods: In this institution-based study, data of about 313 biopsy cases of OSCC from January 2009 to December 2014 with reference to site, habit, and histopathological diagnosis were formulated to chart the trends in the reported population. The data were gathered and analyzed using archives of Krishna Institute of Medical Sciences Deemed University (KIMSDU).

Results: The study revealed that significant association was seen between alcohol consumption and tobacco habit with the histopathological grading of OSCC. Primary site involvement did not show an association based on histopathological grading of OSCC. Based on the primary site of involvement, it was found that buccal mucosa was most frequently involved followed by mandibular alveolus. Histopathological pattern of well-differentiated squamous cell carcinoma was the most frequent finding. Based on personal habits, patients with a habit of chewing tobacco along with smoking constitute the majority of patients.

Conclusion: This study showed that OSCC is widespread in this region. In India, there is an important need to initiate national-level public awareness program against the determinant factors of oral cancer to reduce the incidence of oral cancer.

Keywords: Determinant, Habit, Oral squamous cell carcinoma, Tobacco.

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INTRODUCTION

Oral cancer includes a group of neoplasm affecting any region of the oral cavity, pharyngeal regions, and salivary glands. However, this term tends to be used interchangeably with oral squamous cell carcinoma (OSCC), which represents the most frequent of all neoplasms. It is estimated that more than 90% of all oral neoplasms are OSCCs.[1]

Multiple factors are likely to play a role in the development of oral cancer. Although there is debate with regard to the relative importance of some of these factors, there is widespread agreement that tobacco and alcohol play a significant role in the pathogenesis of carcinoma arising from surface oral epithelium.[2]

A high incidence of oral cancer is observed in the Indian subcontinent, which accounts for one-third of the world burden.[3] In developed countries, for 80% of oral cancers, tobacco smoking and alcohol consumption are the commonest etiological risk factors, whereas in India, in addition to tobacco smoking and alcohol consumption, there also exists high usage of tobacco chewing. This is evident from surveys carried out by the National Family Health Survey (NFHS) and the Global Youth Tobacco Survey (GYTS).[4]

Very few epidemiological studies have been carried out to chart the trends of OSCC in the population of Western Maharashtra. The purpose of this retrospective study was to chart the trends of OSCC in the population of Western Maharashtra, India, and to investigate whether site and habit can be considered as a determinant of grade of OSCC in the population of Western Maharashtra.

MATERIALS AND METHODS

In this retrospective study, data of about 313 biopsy-proven OSCC cases from January 2009 to December 2014 with reference to primary site involved, habits (tobacco and alcohol consumption), and final histopathological diagnosis were formulated. However, it was not possible to analyze alcohol and tobacco use in terms of quantity, quality, and frequency of use.

Data were gathered using the archives of Medical and Dental Institute of Krishna Institute of Medical Sciences Deemed University, located in Western Maharashtra,

Table 1: Comparison of site and grade of oral squamous cell carcinoma

	Histopathological diagnosis			
Primary site	*Well differentiated*	*Moderately differentiated*	*Poorly differentiated*	*Total*
Palate	0	2	1	3
Lips	10	7	0	17
Tongue	22	15	4	41
Buccal mucosa	61	30	4	95
Floor of the mouth	7	3	0	10
Maxillary alveolous	6	4	1	11
Mandibular alveolous	48	18	5	71
Maxillary vestibule	3	0	0	3
Mandibular vestibule	29	17	5	51
Retromolar trigone	8	2	1	11
Total	194	98	21	313

Chi-square: 16.27, p = 0.574

India. All information were descriptively analyzed and statistical analyses were performed.

RESULTS

Statistical Analysis

Chi-square test for independence is used to determine whether there is a significant association between the two variables.

Table 1 shows the most frequently involved primary site to be buccal mucosa (95 cases) and has histopathological diagnosis as well-differentiated squamous cell carcinoma (61 cases). The p-value (0.57) is greater than the significance level (0.05), thus there is no association between primary site and histopathological grading.

Table 2 shows that all the patients (313 cases) in the study having squamous cell carcinoma are addicted tobacco chewers.

Table 3 shows majority of the tobacco chewing and smoking patients (15 cases) had histopathological diagnosis as well-differentiated squamous cell carcinoma. The p-value (0.77) is greater than the significance level (0.05), thus there is no association between habits of tobacco chewing and smoking with histopathological grading.

Table 2: Comparison of histopathological diagnosis and tobacco chewing habit

	Histopathological diagnosis			
Tobacco chewing	*Well differentiated*	*Moderately differentiated*	*Poorly differentiated*	*Total*
Yes	194	98	21	313

Table 3: Comparison of histopathological diagnosis and tobacco chewing + smoking habit

Tobacco chewing + smoking	*Histopathological diagnosis*			
	Well differentiated	*Moderately differentiated*	*Poorly differentiated*	*Total*
No	179	89	20	288
Yes	15	9	1	25
Total	194	98	21	313

Chi-square: 0.505, p = 0.777

Table 4: Comparison of histopathological diagnosis and alcohol + tobacco habit

	Histopathological diagnosis			
Alcohol + tobacco	*Well differentiated*	*Moderately differentiated*	*Poorly differentiated*	*Total*
No	186	90	15	291
Yes	8	8	6	22
Total	194	98	21	313

Chi-square: 17.612, p = 0.0

Table 4 shows that individuals using tobacco and alcohol reported histopathological grading as well-differentiated squamous cell carcinoma (eight cases) and moderately differentiated squamous cell carcinoma (eight cases). The p-value (0.000) is less than the significance level (0.05); therefore, there is a relationship between alcohol consumption and tobacco use with histopathological grading.

DISCUSSION

The incidence of OSCC remains high. Several lifestyle risk factors for the development of oral cancer are well known, which include tobacco products, alcohol, and betel use. In certain cases, genetic influences on OSCC have been found, but the components are not yet entirely clear. Any effect of environmental factors is even less clear.[5]

In the present study, the sex-wise distribution revealed that majority of the patients belonged to male population, which was in accordance with the study conducted by Rahman et al,[1] Sharma et al,[6] and Malhotra et al.[7]

Majority of the patients with OSCC were in the age group of 51 to 60 years, which was similar to the studies conducted by Malhotra et al[7] and Gangane et al.[8] A retrospective study conducted by Manuel et al,[9] in 2003, at the Regional Cancer Center (RCC), Thiruvananthapuram, Kerala, analyzed one of the largest series of young patients under the age of 45 having SCC of the oral tongue.

The high incidence of oral cancer and oral precancerous lesions in India has been linked with the habit of betel quid

chewing incorporating tobacco.[10] India is the second largest producer of tobacco and is also the second largest seller in the world. By present estimates, there are 185 million tobacco consumers in India. The prevalence of tobacco use varies widely by region: From 33 to 80% among men and from 7 to 67% among women. Most of the tobacco produced in India is used within the country.[4]

The anatomic zone and histological differentiation degree are two important characteristics in OSCC; the biological behavior, treatment, and prognosis could be predicted based on both features. The differences in anatomic zone frequency are attributed to differential behaviors in risk factors exposure, such as the use of cigarettes, cigars, and pipes or tobacco chewing. Reports suggest that the aggressiveness of the neoplasm is inversely related to the differentiation degree.[10]

In the present study well differentiated oral squamous cell carcinoma constituted 194 cases, whereas, moderately differentiated and poorly differentiated carcinomas constituted 98 and 21 cases respectively. Studies conducted by Rahman et al[1], Malhotra et al[7], and Iype et al[11] showed well-differentiated carcinoma to be the most common one. In contrast, Effiom et al[12] have shown that 47.6% of their cases were histologically classified as poorly differentiated tumors, while well-differentiated tumors represented only 32.6% of their samples. In our study, it was also shown that histological grade can be possibly associated with the site of the tumors, as OSCCs affecting the buccal mucosa and mandibular alveolus were predominantly well-differentiated carcinomas, but after comparison the differences were not statistically significant.

Oral squamous cell carcinoma may appear in any location, although there are certain areas in which it is more commonly found. The most common locations are the tongue and the floor of the mouth, mainly in Western countries; it occurs in over 50% of cases. Other areas of involvement are the buccal mucosa, retromolar area, gingiva, soft palate, and, less frequently, back of the tongue and hard palate.[13] The anterior two-thirds of the tongue is commonly involved in India, while the posterior lateral border and ventral surfaces are frequently involved in the Unites States.[14] In this study, buccal mucosa was the most commonly involved site followed by mandibular alveolus and tongue.

Whereas in most countries cigarettes and water pipe smoking are the main form of tobacco use, in India, where oral cancer is a striking incidence, only less than one-fifth (19%) of tobacco consumed is in the form of cigarettes. Over half of all tobacco consumed in India is smoked as bidi (Indian-specific nonfiltered cigarette), and about one-fourth of tobacco consumption is in smokeless form, such as chewing tobacco and mishri (tooth cleaner applied tobacco).[15] The investigations in India reveal that tobacco smoking and chewing act synergistically in oral carcinogenesis and that person with mixed habits forms a substantially high-risk population.[16]

A total of 313 cases were associated with the habit of tobacco chewing, alcohol, and smoking. Higher proportion of the reported cases showed tobacco-chewing habit followed by tobacco chewing and smoking habit. In the population of Western Maharashtra, there is high prevalence of use of tobacco in chewing form (tobacco quid and Paan). Sanghvi et al[17] observed that the risk ratio for oral cancers was fourfold in chewers, twofold in smokers, and fourfold in chewers and smokers combined.

The most common form of liquor among lower socioeconomic strata involves two forms of locally brewed liquor in pots: Arrack and toddy. The higher socioeconomic groups drink locally manufactured liquor like beer, wine, whiskey, rum, and gin, which are collectively called "foreign liquors." It is felt that the role of alcohol has to be carefully studied further in the Indian population by stratifying the various intraoral sites to identify any true association.[16] In the present study, few cases (22 cases) were reported having habit of tobacco chewing, smoking, and alcohol together.

Chi-square test between two variables were done: (i) Primary site and histopathological grading; (ii) tobacco chewing+smoking and histopathological grading; and (iii) alcohol+tobacco and histopathological grading. The correlation was found to be statistically nonsignificant except for alcohol+tobacco and histopathological grading. Thus, it helped us to understand that there is a relationship between habit of alcohol consumption and tobacco habit with histopathological grading

CONCLUSION

This comprehensive retrospective study was carried out to chart the trends of OSCC in the population of Western Maharashtra, India, and to investigate whether site and habit can be considered as a determinant of grade of OSCC. Significant association was seen between alcohol consumption and tobacco habit with the histopathological grading of OSCC. Primary site involvement did not show an association based on histopathological grading of OSCC. Fifth decade was the most common presentation of OSCC, indicating that majority of the patients belonged to elderly age group. Male population was predominantly involved. Buccal mucosa was the frequently associated site followed by mandibular alveolus. Majority of the patients reported with well-differentiated squamous cell carcinoma, indicating that patients are reporting at earlier stages. In India, there is an important need to initiate national-level public awareness program against the determinant factors of oral cancer to reduce the incidence of oral cancer.

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