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Clinicodemographic Study of Oral Squamous Cell Carcinoma in a Tertiary Hospital of Western Maharashtra: A Retrospective Study

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Abstract

Objectives: To identify the trends in the age group, gender, sites affected, clinical and histopathological grading in OSCC patients in a tertiary care center in a rural population.

Methods: The clinicodemographic profile of histologically confirmed 600 patients of OSCC was analyzed using descriptive statistics, correlations using the chi-square test and odds ratios between the two variables. The *p*-value less than 0.05 was considered statistically significant.

Results: The largest number of patients [158(26.3%)] were in the age group of 51 to 60 years, the mean age was 52.84 years, and the male: female ratio was 2.4:1. Seventy-four percent of patients had habits of smokeless tobacco and were from low socioeconomic status. The prevalence of oral cancer differed significantly according to habits (OR=5.15, 54.25, and 8.96 for tobacco chewing, smoking, and alcohol, respectively). Gingivobuccal sulcus was the most common site [221(36.83%)], followed by alveolus (21.34%) and tongue (15.0%). The prevalence of oral cancer significantly differed for tongue and alveolus in males and females (OR=2.34, p=0.001 for tongue, p=0.004 for alveolus). Association between buccal mucosa and/GBS and tongue tumor site and males was found to be statistically significant (p=0.001). Alveolus was also significantly associated with men (p=0.002). Morphologically, ulcerative lesion was the most common presentation [250(41.66%)], and most of the patients presented in the advanced stage (stage III and stage IV).

Conclusions: The present study highlights that the majority of OSCC cases present during the 4th to 6th decade of life, and this was due to poor lifestyle patterns, which can be prevented by avoidance of tobacco and alcohol consumption, a healthy diet, good oral and sexual hygiene, active screening, early diagnosis, and public awareness.

Keywords: clinical and histopathological grading, clinicodemographic features, oral cancer, prevention, risk factors

Introduction

Globally, oral cancer is the sixteenth most common type of cancer, with India contributing to almost one-third of the total global burden. In 2022, there were 389,485 incident cases and 188,230 deaths from oral cancer worldwide, while in India, around 143,759 new oral cancer cases and 79,979 deaths were reported.[1]

Considering global patterns and trends, the incidence and mortality rates of oral cancer in South and Southeast Asia are among the highest globally. 52% of total global deaths from oral cancer are reported from this region. The highest age-standardized incidence rates (ASIR) for lip and oral cancer in South and South-East Asia were highest in India (14.67), Sri Lanka (14.04), Bangladesh (13.61) and Pakistan (12.07) in males. The highest age-standardized mortality rates (ASMR) for lip and oral cancer were observed in India (8.17), Bangladesh (8.07) and Pakistan (7.74) for males. For developing countries like India, oral cancer poses a serious health challenge.[1,2]

Oral cancers have a multifaceted etiology with a plethora of lifestyle and environmental factors as the risk factors. Tobacco in any form, either smoking or smokeless tobacco, and alcohol consumption are major preventable risk factors. Human papillomavirus, dietary deficiencies and poor oral hygiene are minor etiological factors of oral cancer.[3] People of lower socio-economic strata of society are more commonly affected because of higher prevalence of lifestyle risk factors.[4] This high proportion is clearly associated with difficulties in accessing the health care system, with most cases eventually diagnosed at advanced clinical stages due to delayed detection and hence the chances of cure are very low. Significant survival disparities were observed among patients with oral cancer based on demographic factors and clinical characteristics. The reported overall 5-year ASRS (Age-standardized relative survival) rate is 37.2% (range, 20.9%-58.4%).[5]

Oral squamous cell carcinoma (OSCC) is the most common malignant neoplasm of the oral cavity and represents about 90% of all oral malignancies. The aim of this retrospective study was to identify the trends in the age group, gender, the different oral sites affected, clinical and the histopathological gradings in OSCC patients in our institution, a tertiary care center.

Materials and Methods

A retrospective study of 600 patients with a histologically confirmed diagnosis of OSCC was carried out. The institutional ethical committee of Pravara Institute of Medical Sciences-Deemed University cleared the protocol (PIMS/RDC/RC/2016/191).

Study settings

This was a record-based retrospective study conducted by reviewing the clinical and treatment records of patients in the Department of Oral Medicine and Radiology in a tertiary care center of Western Maharashtra, India.

Study population

The study included patients who were diagnosed with cases of OSCC from 2009 to 2016. The inclusion criteria were defined as histopathologically confirmed, newly diagnosed cases of OSCC of the oral cavity in all age groups and with no gender differences. Patients with non-squamous histology, metastatic tumor, prior history of treatment for oral cavity malignancies, and those with incomplete data were excluded from the study.

Data pertaining to these patients was collected from the clinical case records of these patients. Data were collected in the context of age, sex, occupation, habits, site of oral cancer, duration and nature of symptoms, TNM staging (according to the 8th edition of the AJCC, 2017) and WHO histopathological grading of OSCC.

Statistical analysis

The data were analyzed using descriptive statistics such as frequency and percentage, correlations using the chi-square test and odds ratios between the two variables using IBM SPSS Statistics version 22 (IBM Corp., Armonk, NY, USA). The obtained values were considered statistically significant if the p value was less than 0.05.

Results

Out of 600 OSCC patients, 422 (70.33 %) were males and 178 (29.67%) were females. The male: female ratio was 2.4:1. The largest number of patients (158 (26.3%)) were seen in the age group of 51 to 60 years, followed by the age group of 61 to 70 (127 (21.2%)). The youngest of all patients affected was 21 years old and the oldest was 90 years. The least number of patients (30 (5.0%)) were in the age group of 21-30 years. The mean age was 52.84 years. The prevalence of oral cancer differed significantly in the all age groups, where males were significantly affected. In

age groups of 51-60 yrs and 61-70 years, the prevalence differed but was not statistically significant (OR=3.56, 3.35 respectively).

Based on education, most of the patients were illiterate 269 (44.83%) and 172 (28.66%) patients were just literate/nongraduate. The prevalence of oral cancer differed significantly in nongraduate females as compared to males (OR=2.05).

The most frequent occupation in the present study was farming (158 (26.33%)), followed by laborers (124(20.66%)). The prevalence of oral cancer differed in female farmers (OR=5.13), laborers (OR=1.62) and self-employed (OR=9.86) as compared to male patients, but it was not statistically significant.

Based on socio-economic status, the majority of oral cancer patients belonged to lower middle and lower socio-economic classes (187 (31.16 %) and 210 (35.0 %) respectively) according to their per capita income of family. The prevalence of oral cancer differed significantly in upper middle class (OR=1.56) and middle class (OR=1.62) patients, where females are affected more frequently than males; it was statistically significant only in the upper middle class (Table 1).

The frequency of oral cancer according to tobacco habits and gender is summarized in Table 2. Most of the patients (444 (74%)) were tobacco chewers, followed by smokers (75 (12.50%)). Twenty-one patients (3.50%) were addicted to alcohol but were not consuming tobacco in any form. Only 5 patients (0.83%) had a habit of smoking, tobacco chewing and alcohol consumption.

In males, the frequency of oral cancer was highest in patients with the habit of tobacco chewing (281 (66.58%)), followed by smokers (74 (17.53%)), together accounting for 84.11%. Similarly, in females, the frequency of oral cancer was highest in tobacco chewers, accounting for a prevalence of 91.57% (163 cases). Thus, the prevalence of oral cancer differed significantly according to habits (OR=5.15, 54.25 and 8.96 for tobacco chewing, smoking and alcohol respectively). A small group of patients (16 (2.67%)) did not have any of these three habits.

The site distribution of oral cancer lesions has been listed in Table 3. The buccal mucosa and/ gingivobuccal sulcus (GBS) were the most frequently involved sites, in both males and females, accounting for 221 (36.83%) cases, (M=158 (37.44%) F=63 (35.39%)) followed by alveolus 128 cases (21.34%) (M=81 (19.19%) F=47 (26.40%)). Tongue was involved in 90 cases (15.0%) (M=78 (18.48%) F=12 (6.74%)) and floor of mouth in 52 (8.66%) patients (M=38 (9.00%) F=14 (7.86%)). Forty-six (7.67%) (M=34 (8.05%) F=12 (6.74%)) patients had involvement of palate, in 34 (5.66%) (M=21 (4.97%) F=13 (7.30%)) patients retromolar trigone, and 29 (4.83%) (M=12 (2.84%) F=17 (9.55%)) patients had lip involvement. The prevalence of oral cancer significantly differed for tongue and alveolus in males and females (OR=2.34, p=0.001 for tongue, p=0.004 for alveolus). For floor of mouth and palate also, the prevalence differed in males and females but was statistically nonsignificant.

The first symptoms noticed by the patients were ulceration (250 (41.66%)) followed by swelling (144 (24%)) and pain (112 (18.66%)). Other symptoms like difficulty with swallowing/dysphagia were experienced in 52 (8.66%) patients while reduced mouth opening was present in 42 (7%) patients (Table 4).

Duration of symptoms varied between 1-3 months in 254 (42.33%) cases, 3-6 months in 154 (25.67 %), less than one month in 112 (18.67%) and more than six months in 80 (13.33%) patients.

The majority of patients, 236 (39.33 %), were in Stage III followed by stage II in 200 (33.33%) patients, 89 (14.83%) patients were in stage IV and 75 (12.5%) patients were in stage I. Histopathologically, 277 (46.17%) cases were well differentiated carcinomas, 236 (39.33 %) were moderately differentiated, 56 (9.33%) were poorly differentiated carcinomas and 31 (5.17%) cases were nothing otherwise specified (Tables 5 and 6).

The association between the various sites of oral cancer and gender of patients is shown in Table 7. Association between buccal mucosa and/GBS and tongue tumor site and males was found to be statistically significant (p=0.001). Alveolus was also significantly associated with men (p=0.002). Lip, palate and retromolar area were more frequently involved in females than in males, but the difference was not statistically significant.

The association between various tumor sites and different age groups is reported in Table 8. The buccal mucosa was the most prevalent site in the age group of 51-60 years, with a statistically significant association between them (p=0.04). Similarly, lip and alveolus as the tumor site were significantly associated with the age group of 31-40 years (p=0.017 and p=0.03 respectively). Involvement of the palate was most prevalent in the age

group of 61-70 years and this association was highly statistically significant (p=0.008). Tongue, floor of mouth and retromolar trigone were most prevalent in the age group of 41-50 years and this association was also statistically significant.

The association between the various sites of oral cancer and habits of patients is shown in Table 9. Tongue cancer in the present study was associated with the habit of

Table 1: Prevalence of oral cancer patients according to demographic variables and gender.

Demographic Variables		Male (n=422) No. (%)	Female (n=178) No. (%)	Total no. (n=600) No. (%)	OR (95% CI)	*p*-value
Age in Years	21-30	27(6.40)	3(1.69)	30(5.0)	1	0.001**
	31-40	92(21.80)	25(14.04)	117(19.5)	3.53(2.36-5.67)	
	41-50	89(21.09)	33(18.54)	122(20.33)	3.79(2.28-6.31)	
	51-60	112(26.54)	46(25.84)	158(26.33)	3.56(1.67-7.85)	
	61-70	73(17.30)	54(30.34)	127(21.27)	3.35(1.63-6.90)	
	71and more	29(6.87)	17(9.55)	46(7.67)	0.33(0.15-11.10)	
Socio Economic Status	Upper	2(0.47)	0	2(0.33)	1	0.004**
	Upper Middle	14(3.32)	3(1.69)	17(2.83)	1.56(0.43-5.66)	
	Middle	141(33.41)	43(24.16)	184(30.67)	1.62(1.08-2.42)	
	Lower Middle	120(28.44)	67(37.64)	187(31.17)	0.63(0.43-0.92)	
	Lower	145(34.37)	65(36.52)	210(35.0)	0.92(0.64-1.33)	
Education	Illiterate	147(34.83)	122(68.54) dse3333	269(44.83)	0.24(0.17-0.36)	0.02*
	Non- Graduate	138(32.70)	34(19.10)	172(28.67)	2.05(1.34-3.14)	
	Graduate	137(32.47)	22(12.36)	159(26.50)	1	
Occupation	Farmers	142(33.65)	16(8.99)	158(26.33)	5.13(2.95-8.91)	0.001**
	Laborers	97(22.99)	27(15.17)	124(20.67)	1.62(1.02-2.57)	
	Self Employed	75(17.77)	3(1.69)	78(13.0)	9.86(3.55-27.38)	
	Home Makers	2(0.47)	113(63.48)	115(19.17)	0.003(0.0-0.11)	
	Service	58(13.74)	8(4.49)	66(11.00)	1	
	Unemployed	48(11.38)	11(6.18)	59(9.83)	1.77(0.91-3.43)	

*Statistically significant, **Highly statistically significant, OR-Odds Ratio

Table 2: Prevalence of habits among the study population.

	Gender				
Tobacco Habits	**Male (n=422) No. (%)**	**Female (n=178) No. (%)**	**Total no. (n=600) No. (%)**	**OR (95% CI)**	***p*-value**
Tobacco Chewing	281(66.59)	163(91.57)	444(74)	5.15(2.80-0.91)	0.03*
Smoking	74(17.54)	1(0.56)	75(12.50)	54.25(7.50-392.27)	0.001**
Alcohol	21(4.98)	0	21(3.50)	8.96(2.14-37.52)	0.001**
Tobacco chewing+ smoking	25(5.92)	0	25(4.17)	0.91(0.88-0.94)	0.001**
Tobacco chewing+ alcohol	14(3.32)	0	14(2.33)	0.99(0.98-1.00)	0.32
Tobacco chewing+ alcohol + smoking	5(1.18)	0	5(0.83)	0.98(0.97-0.99)	0.31
No habits	2(0.47)	14(7.87)	16(2.67)	0.18(0.06-0.49)	0.001**

*Statistically significant, **Highly statistically significant, OR-Odds Ratio

Table 3: Prevalence of sites specificity of oral cancer among the study population.

Site	Gender				
	Male (n=422) No. (%)	Female (n=178) No. (%)	Total no. (n=600) No. (%)	OR (95% CI)	*p*-value
Buccal mucosa/GBS	158(37.44)	63(35.39)	221(36.83)	0.98(0.69-1.40)	0.91
Lip	12(2.84)	17(9.55)	29(4.83)	0.80(0.40-1.56)	0.59
Tongue	78(18.48)	12(6.74)	90(15.0)	2.34(1.36-4.02)	0.001**
Floor of mouth	38(9.00)	14(7.87)	52(8.67)	1.39(0.75-2.56)	0.31
Palate	34(8.06)	12(6.74)	46(7.67)	1.32(0.72-2.44)	0.45
Alveolus	81(19.19)	47(26.40)	128(21.33)	0.55(0.37-0.81)	0.004**
Retromolar area	21(4.98)	13(7.30)	34(5.67)	0.98(0.64-1.51)	0.89

*Statistically significant, **Highly statistically significant,GBS–Gingivo- Buccal Sulcus, OR-Odds Ratio

Table 4: Presentation of symptoms in the study population.

Symptoms	Gender		
	Male No. (%)	Female No. (%)	Total No. (%)
Ulceration	166(39.34)	84(47.19)	250(41.67)
Pain	81(19.20)	31(17.42)	112(18.67)
Swelling	92(21.80)	52(29.21)	144(24)
Dysphagia	44(10.43)	8(4.49)	52(8.67)
Reduced mouth opening	39(9.23)	3(1.69)	42(7)

Table 5: Stages of oral cancer according to gender among the study population.

Stage of Cancer	Gender		
	Male No. (%)	Female No. (%)	Total No. (%)
Stage I	48(11.37)	27(15.17)	75(12.5)
Stage II	154(36.49)	46(25.84)	200(33.33)
Stage III	165(39.10)	71(39.89)	236(39.33)
Stage IV	55(13.04)	34(19.10)	89(14.83)

Table 6: Histopathological diagnosis of oral cancer among the study population.

Histopathological diagnosis	Gender		
	Male No. (%)	Female No. (%)	Total No. (%)
Well differentiated	187(44.23)	90(50.56)	277(46.20)
Moderately differentiated	175(41.38)	61(34.26)	236(39.34)
Poorly differentiated	42(9.93)	14(7.86)	56(9.34)
Not specified	18(4.26)	13(7.30)	31(5.12)

Table 7: Association between site and gender.

Site	Gender	*p*-value
Buccal mucosa and gingivobuccal sulcus	Males	0.001**
Lip	Females	0.32
Tongue	Males	0.001**
Floor of mouth	Males	0.17
Palate	Females	0.23
Alveolus	Males	0.002**
Retromolar area	Females	0.13

*Statistically significant, **Highly statistically significant

Table 8: Association between site and age groups.

Site	Age group	*p*-value
Buccal mucosa and gingivobuccal sulcus	51-60	0.014
Lip	31-40	0.017*
Tongue	41-50	0.046*
Floor of mouth	41-50	0.005**
Palate	61-70	0.008*
Alveolus	31-40	0.03*
Retromolar area	41-50	0.02*

*Statistically significant, **Highly statistically significant

Table 9: Association between site and habits.

Site	Habit	*p*-value
Buccal mucosa and gingivobuccal sulcus	Smoking	0.06
Lip	No habits	0.13
Tongue	Smoking	0.007**
Floor of mouth	Tobacco and Smoking	0.001**
Palate	Smoking and Alcohot	0.06
Alveolus	Tobacco and Smoking	0.03*
Retromolar area	No habits	0.08

*Statistically significant, **Highly -statistically significant

smoking and was statistically highly significant (p=0.007) while floor of the mouth and alveolus were significantly associated with tobacco chewing and smoking habits (p=0.001 and 0.03 respectively).

Discussion

According to the World Health Organization, oral cancer is the first and most common cancer in Indian males, while it is the fourth most common cancer in Indian females and the second most common cancer considering both sexes.[1] Tobacco use in different forms and alcohol are major and preventable etiological factors. Understanding the epidemiology and the risk factors for oral cancers can help with early identification and prompt treatment of these patients. Late detection and treatment is directly proportional to increased morbidity and mortality.

In the present study, male cases outnumbered female cases. M:F ratio was 2.4:1 which is consistent with the study by Wildt J *et al*.,[6] The higher male-to-female ratios were reported by various other studies.[7-13] The prevalence rate of oral cancer has been reported to be 20 per 1,00,000 men in the Indian subcontinent. Higher

male prevalence may be due to the vulnerability and exposure of males to different risk factors such as smoking, tobacco and sunlight.[14] Socio-cultural norms and values favor the easy availability of tobacco products to males. The common habit of consuming tobacco and betelnut as stimulants makes the male population more susceptible to oral cancers. However, in recent times, this difference in gender distribution is decreasing due to changes in modern women's social profiles and ways of life. They are more likely to be exposed to carcinogenic agents like tobacco, alcohol and high-risk HPV subtypes. It may be noted that a reverse trend has been observed in Thailand (M: F 1:1.56).[15]

According to the US National Cancer Institute SEER program, the mean age of diagnosis of oral cancer is 65 years.[16] In the present study, the mean age of the patients was 52.84 years. These findings are in accordance with the results of various previous studies.[10,12,17,18] Sankaranarayan *et al*.,[19] found that the peak-age frequency of occurrence (the fifth decade of life) in India is at least a decade earlier than that described in the western literature. Various studies in India observed an increase in the incidence of oral cancer in the younger (less than 40 years) age group.[17,20,21] In the present study, 147 (24.5%) patients were below 40 years of age. The high prevalence of addiction to tobacco and alcohol among young adult men and women may explain the stable trend in OSCC incidence in this group.

The risk of oral cancer is inversely proportional to an increasing level of education, income and occupation. The majority of oral cancer patients in the present study belonged to lower middle and lower socioeconomic classes (187 (31.16 %) and 210 (35.0 %) patients, respectively). These findings are similar to the findings of other studies.[13,22,23] The lower socioeconomic status may be a risk factor for poor oral hygiene and poor nutrition, thereby further increasing the risk of oral cancer in tobacco consumers. Most of the cases in the present study were illiterate 269 (44.83%) and just literate/nongraduate 172 (28.66%). The difference in the prevalence of oral cancer among different levels of literacy was found significant statistically (OR=2.05 p=0.02). These findings are consistent with studies by Agarwal *et al*., and Madani *et al*.[13,24]

Different occupational categories had a significant increased relative risk of cancer. In this study, the most frequent occupation was farming (158 (26.33%)), followed by laborers (124 (20.66%)), which is in accordance with some previous studies.[11,24,25] Agarwal *et al*.[13] reported laborers/ unskilled persons (68.5%) were affected significantly.This can be explained as farmers are more indulged toward tobacco addiction as it is easily available and at very affordable prices. Antoniades *et al*.,[26] reported that these patients may have SCC of the lip, which may be due to more exposure to sunlight. Thus, low education, certain occupations and low socioeconomic status are significant independent risk factors for oral cancer. Thus, the combination of high tobacco consumption, prolonged sun exposure, socioeconomic factors, and potential dietary deficiencies creates a perfect storm for oral cancer development among farmers in India.

Out of 600 cases, 584 patients were addicted to smokeless tobacco, alcohol, and smoking (single or multiple habits). Only 16 patients did not report any habit. Tobacco use is influenced by various factors, such as individual attitudes, social acceptability, availability, advertising campaigns etc. Tobacco use in India differs from that around the globe, since the dominant form of tobacco used globally is the cigarette. However, in India, chewing of tobacco and betel nut is more prevalent. Tobacco is easily available in India and the current marketing of tobacco and gutkha in small pouches, which are easily accessible at very low cost to all people. These pouches do not show the graphic images illustrating harm to the body as a result of consumption of tobacco, as well as statuary warnings unlike that on cigarette packs worldwide. Various studies in India on the prevalence of tobacco habits and their related products revealed that smokeless tobacco habits are more prevalent than smoking in both males and females.[18,27] A study on reverse smoking and its association with premalignant and malignant lesions of the palate concluded that reverse smoking induced significantly more lesions than conventional smoking, and was a major determinant of subsequent palatal cancer.[28]

Andre *et al*.,[29] observed a deleterious effect of the consumption of alcohol even with nonsmokers or casual smokers. In our study, only 6.66% patients reported habit of alcohol with or without combined habituation with smoking and tobacco. Country liquor, a form of locally brewed alcohol that has low cost and easily available, favorite in laborers and farmers. The effect of consuming tobacco and alcohol leads to a dangerous synergy of

expression of the disease. Warnakulasuriya, in his paper opined that, other than major risk factors like tobacco, alcohol, and betel quid, several emerging risk factors namely HPV infection, immunosupression, diet and nutrition, heredity and familial risk, mate drinking, marijuana (cannabis) smoking, khat chewing, medicinal nicotine use, HIV infection, and alcohol containing mouthwashes are likely to be associated with oral cancer.[3]

Epidemiological studies have shown that the sites of occurrence for oral cancer differ widely. In the present study buccal mucosa and/ gingivobuccal sulcus was the most affected sites both in males (37.44%) and females (35.39%) followed by alveolus & tongue (21.34% and 15.0% respectively). These finding are consistent with various other studies.[10,11,13,30] Most of the patients tend to keep the tobacco in the form of quid in the buccal sulcus with close proximity to gingiva and alveolus. Prolonged retention of tobacco or betel quid in the buccal pouch (to acquire the greatest effect) accelerates the percolation of carcinogens mixed with saliva, causing irritation of the adjacent mucosa and tongue resulting in the evolution of cancer at the site of contact. The findings in our study are not in agreement with the findings in some studies, where tongue and floor of mouth carcinoma are more common in western countries due to consumption of alcohol and / smoking.[31,32] Association between buccal mucosa /GBS and tongue site and males was found to be statistically significant, which was also reported by Fotedar *et al*., Singhania *et al*.,[12,33] while Smitha *et al*.,[30] found statistically significant association between buccal mucosa /GBS and females. In the present study, lip, palate and retromolar area were more frequently involved in females than in males but the association was not statistically significant.

In the present study, buccal mucosa as a site was associated with an age group of 51-60 yrs, which is similar to the findings in studies by Smitha *et al*., and Singhania *et al*.[30,33] Lip carcinoma was significantly associated with the age group of 31-40 yrs, which is not consistent with the findings of various studies where it was significantly associated with more than 60 years of age.[12,30,34,35] Floor of the mouth carcinoma was significantly associated with the age group of 41-50 years, which was also reported by other studies.[12,30,36] Tongue cancer was significantly associated with the patients in the age group of 41–50 years, similar to study by Fotedar *et al*., but is inconsistent with study by Smitha *et al*., and Selvamani *et al*.[30,37]

In India, various studies have reported that buccal mucosa carcinoma has been associated with tobacco chewing and betel nut chewing. The present study also showed this association, but was not statistically significant. The association of OSCC with alveolus and floor of mouth was statistically significant with the habit of tobacco chewing and smoking. In the present study, lip cancer was associated with patients without any habits, but this association was statistically nonsignificant. Tongue tumors in the present study were significantly associated with the habit of smoking.

Regional variations in incidence and the site of occurrence relate to the major causes, which are alcohol and smoking in Western countries, and betel quid and tobacco chewing in South and Southeast Asia.

The most common symptom at the presentation was ulceration in 250 (41.66 %) followed by swelling in 144 (24%) patients, as observed in various studies.[12,13]

The delay in diagnosis of OSCC could be correlated to patient delay, professional delay, or both and probably has some bearing on the size of the tumor presented. The time interval between the onset of symptoms and the start of treatment depends on various factors such as patient behavior, clinical course of the illness and the quality of the health services.[38] A study in Córdoba, Argentina, reported that both patients and professionals were responsible for the delay in diagnosis and indicated that the professional delay was the most associated variable to the stage of tumor.[39] In the present study, most of the patients presented within 6 months of onset of symptoms. This can be attributed to the fact that, because of poverty, illiteracy, and possibly resorting to home remedies, all lead to delays for the patients. Hence, the crux of the oral cancer problem is that many cases report late to the healthcare facility. As evident from the findings of the present study, the majority of patients, i.e. 236 (39.33 %), were in stage III, followed by 200 (33.33%) patients in stage II, 89 (14.83%) patients were in stage IV and 75 (12.5%) patients were in stage I. Similar results were found in some previous studies.[10,12,21] Detecting oral cancer in early stages when these are amenable to single modality therapies, offers the best chance of long term survival. Priorities of particular treatment modality depend on the lesion location and extent, age of patient, cosmetic and

functional outcomes, associated illnesses, and the availability of expertise.[40]

Limitations

Limitation of this study is a smaller sample size and the data is from patients of a single tertiary care center in Western Maharashtra of India and hence, could not be generalized. Hence, multicentric studies with large sample sizes are required. Also, the retrospective nature of the study posed constraints in exploring additional variable associations.

Future directions

All the patients diagnosed with OSCC in this study were either users of tobacco or alcohol or both and are reported to be in advanced stages. Screening for oral cancers in high-risk groups will help us to identify oral precancerous lesions and cancers in the early stages and future studies should recommend exploring the feasibility of cancer screening at the Primary Health Center Level. Strategies to improve public awareness about the prevention and early detection of oral cancers must be in place.

Conclusions

A clinico-demographic profile of oral cancer patients of the rural population in Western Maharashtra of India has been sketched here. The commonest age of presentation was in the 5^{th}-6^{th} decades of life with buccal mucosa and/ GBS, the most commonly affected site with male predominance. Most of the patients had habits of smokeless tobacco and were from low socioeconomic status. The majority of the cases were reported at an advanced stage that depicts the negligence of patients and health care among the population. Regional differences in the prevalence and patterns of risk factors are the main reason for variation in incidence and pattern of oral cancer. The increased prevalence of the oral cancer in the Indian subcontinent is due to the usage of various tobacco and tobacco related products (smokeless or smoking), alcohol consumption, spicy food, high exposure to sunlight due to farming, low socioeconomic status and neglect of overall oral health.

Conflict of Interest

The authors declare no conflict of interest.

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