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# Oral Squamous Cell Carcinoma and Tobacco Use

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### Authors' contributions

This work was carried out in collaboration between all authors. Author RFM designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors FS and SB managed the analyses of the study. Authors MFHQ, ML, IZ, WS and DM collected the samples. All authors read and approved the final manuscript.

### Article Information

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## ABSTRACT

**Aims:** To determine the prevalence of tobacco chewing and smoking in patients diagnosed with OSCC as well as to observe the localization of OSCC, staging and grading of OSCC at the time of diagnosis.

**Study Design:** This is a cross-sectional study.

**Place and Duration of Study:** The study was conducted at Ziauddin dental hospital KDLB and Clifton Campus, Karachi from October 2017 to April 2018.

**Methodology:** Variables like age, gender, ethnicity, and socioeconomic status were noted along with the detail history of different types of tobacco used, oral hygiene habits, and family history of cancer. The stage and grade of oral cancer were interpreted from the biopsy and CT scan reports according to the CAP protocol. Quantitative variables were presented as mean and standard deviation. For categorical data frequency and percentages was calculated.

**Results:** The oral cancer cases comprised of 38(81%) males and 9(19%) females with mean age

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of 49 years. The most common location of oral cancer in this study was the buccal mucosa followed by tongue and lips. The majorly consumed type of tobacco was gutka in 55% of patients followed by pan in 30%, naswar in 15%, betel nut in 11% and smoking in 11% among OSCC cases. Histological reports showed that there were equal number of moderately and poorly differentiated OSCC (n=16; 34%). According to TNM staging, in our study stage II was 34%, followed by stage I that was 32%.

**Conclusion:** It can be concluded that the major etiological factors of OSCC among Pakistani population are chewing tobacco habits including gutka, pan, naswar, betel nut and smoking with male predominance. The incidence of OSCC can be reduced by raising oral cancer awareness among general population about carcinogenic effect of tobacco chewing and smoking and also by encouraging dental and medical professionals to conduct free oral cancer screenings.

*Keywords: Oral squamous cell carcinoma; risk factors; stages of OSCC; grades of OSCC.*

## 1. INTRODUCTION

Oral squamous cell carcinoma (OSCC) is an epithelial lesion and is the most common neoplasm of oral cavity. It is actually the sequel of cellular changes, starting from cellular atypia which is the alterations in the cell epithelium, followed by dysplasia, leading to multiple cell involvement, then carcinoma in situ and finally cell invasion and metastasis [1]. It is the cancer affecting any part of the oral cavity including lips, tongue, upper or lower gingiva, buccal mucosa, floor of mouth, hard palate, vestibule of mouth, retromolar trigone or major salivary glands [2]. The oral cavity is that part of the body which is easily accessible for direct visual examination but still the mortality from oral cancer remains high because in early stages the patient has no symptoms [3].

The global mortality rate due to oral cancer is about 3-10% [4]. In South Asia, Pakistan and India have higher prevalence of OSCC as compared to the western countries, which can be attributed to the same cultural practices and habits. In Pakistan, the prevalence of oral cancer is 10%, standing second to bronchogenic cancer in males and breast carcinoma in females [5]. Oral cancer is the second most common malignancy in Karachi and includes both genders [6].

The risk factors that are significantly associated with oral cancer are tobacco [7], alcohol [8], viral infection such as EBV and HPV [9] and genetic susceptibility [10]. There is a significant geographical variation in the incidence of OSCC due to area specific etiological factors. In the developed world the tobacco smoking and alcohol consumption are the main etiological factors. On the other hand, in developing countries the major etiological factors are betel

quid chewing, bidi, smoking and alcohol [4,11,12]. So the objectives of the current study were to determine the prevalence of tobacco chewing and smoking in patients diagnosed with OSCC as well as to observe the localization of OSCC, staging and grading of OSCC at the time of diagnosis.

## 2. METHODS

A Cross-sectional study was conducted from October 2017 to April 2018. Approval of the Ethics Review Committee (ERC) of Ziauddin University was obtained according to institutional guidelines. The sample size was calculated by using Openepi calculator version 3 using confidence level of 99%. Inclusion criteria was preoperative histopathologically proven OSCC patients of age 18 years and above. Patient who did not give consent or were diagnosed with other type of cancer were excluded from the study. The samples were collected from the outpatient department (OPD) of Ziauddin dental hospital KDLB and Clifton Campus, Karachi. Consecutive sampling technique was used.

Variables like age, gender, ethnicity, socioeconomic status, detail history of different types of tobacco used, oral hygiene habits, and family history of cancer were noted. The stage and grade of oral cancer were interpreted from the biopsy and CT scan reports according to the CAP protocol. OSCC was graded as, well-differentiated when it resembled closely to normal squamous epithelium. Moderately-differentiated if consisting of nuclear pleomorphism, atypical mitosis and with less keratinization and poorly differentiated when consisting predominantly of immature cells, typical or atypical mitosis with very minimal keratinization and rarely necrosis. The criteria

given by American Joint Committee on cancer (AJCC) for staging of oral cavity cancer was used [13].

Data was entered on statistical package of social science (SPSS) version 20. For quantitative data variables, percentage and frequency were calculated whereas the quantitative data was presented as mean and standard deviation.

### 3. RESULTS

There were 47 cases of oral cancer. The histological tumor type of all 47 patients was squamous cell carcinoma. The oral cancer cases comprised of 38(81%) males and 9(19%) females with mean age of 49. The urdu speaking ethnic group was the most common. The most common location of oral cancer in this study was

the buccal mucosa (n=39; 83%) followed by tongue and lips (Table 1).

The frequency and distribution of different types of tobacco consumption among oral cancer patients are shown in Table. In our research, the majorly consumed type of tobacco was gutka (n=26; 55%) followed by pan (n=14; 30%) naswar (n=7; 15%) betel nut (n=5; 11%) and smoking (n=5; 11%).

Grade and stage of OSCC were also evaluated in the oral cancer patients. The histological reports showed that there were equal number of moderately and poorly differentiated OSCC (n=16; 34%). The patients with well differentiated OSCC were 32% (n=15). According to TNM staging, in our study stage I was 15 (32%), stage II was 16 (34%), stage III and stage IV were 12 (26%) and 4 (9%) respectively.

**Table 1. Demographic and Clinicopathological features of OSCC cases**

Variables	Cases		
	n	%	
Gender	Female	9	19%
	Male	38	81%
Ethnicity	Balochi	0	0%
	Others	3	6%
	Pukhtoon	3	6%
	Punjabi	2	4%
	Sindhi	7	15%
	Urdu Speaking	30	64%
	(blank)	2	4%
Tobacco Use	Gutka	26	55%
	Pan	5	11%
	Betel quid	14	30%
	Smoking	5	11%
	Naswar	7	15%
Location of OSCC	Lips	1	2%
	Buccal mucosa	39	83%
	Tongue	6	13%
	Not Available	1	2%
Stages of OSCC	Stage I	15	32%
	Stage II	16	34%
	Stage III	12	26%
	Stage IV	4	9%
Grades of OSCC	Well differentiated	15	32%
	Moderately differentiated	16	34%
	Poorly Differentiated	16	34%

#### 4. DISCUSSION

Different geographic areas host a wide variation in the incidence of oral cancer, this could be due to differences in lifestyles, culture and developmental status [14]. Approximately 77% of 145,000 number of deaths were mostly reported from lesser developed countries [15]. About 30,000 new cases of oral cancer are diagnosed per year and majority of them are at critical stage of III or IV [4]. The literature reports that males are more commonly affected than females [15]. Our present study shows similar results. Males are more likely to be at risk because they are more often exposed to the risk factors including naswar, gutka, areca nut, betel quid and smoking.

The most commonly diagnosed age group is between 50-69 years of age [16] and the current study reported mean age of 49. OSCC can appear in all anatomical sites of oral cavity including lips, tongue, upper or lower gingiva, buccal mucosa, floor of mouth, hard palate, vestibule of mouth, retromolar trigone or major salivary glands [2]. In the current study, the most common location of oral cancer was the buccal mucosa.

According to the literature the risk of OSCC among smokers is 1.4 to 1.7 times higher than non-smokers and it can even further increase with the increase in frequency and duration of smoking [17-19]. Globally 20-30% of OSCC develop due to tobacco use. Looking at alcohol consumption, the risk of developing OSCC rises up to 18% and depends upon the quantity and duration of drinking. Combined tobacco and alcohol consumption multiplies the risk of OSCC to about 40% [20]. The current study also reported incidence of OSCC among smokers but none of the patient histories indicated a history of alcohol consumption. This might be due to a hesitation to admit the consumption of alcohol because alcohol use is banned in Pakistan.

On the other hand, chewing tobacco also shows a strong correlation with the development of OSCC [21]. In our research, the majority consumed type of chewing tobacco was gutka followed by pan, naswar and betel nut among OSCC cases. Dental risk factors including poor oral health like missing or damaged teeth, periodontal diseases, decrease frequency of checkups and chronic dental trauma also significantly increases the risk of OSCC [22] but the current study couldn't assess these dental risk factors.

The global statistics report showed that majority of newly diagnosed cases of OSCC are at critical stage of III or IV [4] while the current study reported that majority of OSCC cases in Pakistan are diagnosed at stage II while very few reached up to the stage IV.

#### 5. CONCLUSION

It can be concluded that the major etiological factors of OSCC among Pakistani population are chewing tobacco habits including gutka, pan, naswar, betel nut and smoking with male predominance. The incidence of OSCC can be reduced by raising oral cancer awareness among general population about carcinogenic effect of tobacco chewing and smoking and also by encouraging dental and medical professionals to conduct free oral cancer screenings.

#### CONSENT

Signed informed consent was taken from preoperatively histopathologically proven OSCC diagnosis patients older than 18 years to participate in the research.

#### ETHICAL APPROVAL

Approval of the Ethics Review Committee (ERC) of Ziauddin University was obtained according to institutional guidelines.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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