

Assessment of the Influence of Risk Factors on the Incidence of Oral Squamous Cell Carcinoma (OSCC) in the Northern Pakistani Population



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Abstract

Background: Oral squamous cell carcinoma (OSCC) is the most common type of oral cancer, accounting for over 94 percent of all cases, with substantial disparities in occurrence among South Asian countries. In Pakistan its occurrence rate rises from last two decade. A combination of risk factor habit, duration and intensity doubles the rate of incidence.

Methods: Fully informed consent was taken. Both genders having age 18-55 years and cases confirmed by biopsy reports were included in the study. A thorough history of the disease and risk factors were taken and labelled (smoking, alcohol consumption, and betel nut chewing) accordingly. Data was analysed using SPSS 20. Gender base stratification was done using chi-square test and significance was defined as a P value of ≤ 0.05 .

Results: In present study 110 (73.3%) male and 40 (26.7%) female patients. Mean \pm SD of age of OSCC patients was 47.00 ± 9.170 years. Among the participants 9 (6.0%) smokers, 39 (26.0%) consumed alcohol, use betel and 24 (16.0%) areca nut pan. Association of smoking with gender was statistically significant ($p=0.013$). Similarly, betel nut chewing also showed statistically significant correlation with gender ($p=0.044$). Both alcohol and snuff did not show any statistically significant correlation with gender.

Conclusion: The public should be aware of the association of the risk factors and development of oral cancer. Public health measures should be taken to prevent smoking and chewing tobacco.

Keywords: Paan chewing, oral cancer, risk factor, public health, pathogenesis

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Introduction

Oral cancer is among most frequent cancers in worldwide. The prevalence of tongue cancer is rising in Asian population, amid a global record of a significant decline in the frequency of oral cancer (1). Oral cancer incidence and death differ considerably on geographic location. Yet, a rise in the number of young patients, particularly those with tongue cancer, has been seen in the recent decades (2). Smoking, alcoholism, DNA oncogenic viruses, and habits like betel nut paan chewing and snuff (Naswar) are all major risk factors for head and neck cancer across the globe (3,4).

In terms of risk factors, Oral squamous cell carcinoma (OSCC) is a very complex condition. Several number of contributing factors have been identified as causative agent in OSCC pathogenesis (5). Oral cancers are caused by a range of factors, none of which can be linked to a specific causation (6). A number of carcinogens have been discovered. Risk factors vary based upon race, culture, and socioeconomic background in different parts of the world (7,8), Pathophysiology of OSCC is dependent on both intrinsic and extrinsic factors. Smoking tobacco (cigarettes, bidis, reverse smoking, cigars,

and pipes), smokeless tobacco, betel nut and leaf chewing, and drinking alcohol are the most frequent risk factors (9,10) Smoking and alcohol tend to have the strongest influence on cancer development and have synergistic effects when used together. Similarly, increased unsafe sexual behaviour, such as oral-genital intercourse, has been linked to the spread of the Human Papilloma Virus (HPV), which can cause oral cancer (11). Cancer is caused by a variety of risk factors in various areas of the oral cavity, and the incidence varies by country.

Approximately 65 percent of OSCC patients (70 percent male and 55 percent female) are related to smoking, whereas 30 percent are linked to alcohol consumption chewing betel nuts were linked to 26% of patients (12). Other studies have shown a correlation between poor nutritional status, persistent viral and fungal infections, pre-existing oral disorders, and poor oral hygiene (13).

OSCC is generally considered to affect men in their sixth or seventh decade of life. OSCC is becoming more common in Europe and the United States Since decades, it is clear that the incidence of OSCC in South and Southeast Asia has dominated the worldwide scenario (14,15). In India, Bangladesh, Pakistan, and Sri Lanka, OSCC accounts for nearly

one third of all malignancies and is also frequently found in young population (16,17,18,19).

Any part of the oral cavity can be affected by oral squamous cell carcinoma. It can appear on any site of mouth buccal mucosal or retromolar trigone, alveolar process, hard palate, floor of mouth (FOM), tongue, and lips could all be affected.²⁰ The ulcerative, exophytic, endophytic or verrucous nature of the lesion can be seen clinically.

To effectively plan and create cancer awareness, prevention and follow-up programmes, it is critical to analyse available information to investigate the trend of various risk factors causing oral cancer in different institutes. The significance for greater demographical cancer surveillance data is to explain cancer prevalence, trends, and outcomes in order to plan and advise cancer prevention, detection, and control initiatives. In northern Pakistan, there is lack of researches about the assessment of OSCC risk factors based on gender. This study will add to existing knowledge on the major cause of a rise in the incidence of OSCC in population of northern Pakistan. The aim of this study was to examine the risk factors of oral squamous cell carcinoma and Comparison of responsible factors in male and female patients.

Methodology

After taking approval from Ethical Review Board a Cross sectional study was conducted in the Outpatients department of oral and maxillofacial surgery, School Of Dentistry Shaheed Zulfiqar Ali Buttho Medical University Islamabad from 1st Jan. 2021 to 30 Jun 2022. A Fully informed written consent was taken from patients who agreed to be part of study. Sample size was calculated using WHO calculator using confidence level(1- α) 95%, anticipated population proportion (P) 0.774 and absolute precision (d) 0.07. sample size n=138 (21). Additional 10% subjects were recruited keeping in mind the non-response or missing data issues, so the final sample size was n=150. Both genders having age 18-60 years and cases confirmed by biopsy reports were included in the study. Patients not willing for consent or under treatment (chemotherapy, radiotherapy, or surgery) and premalignant condition (lichen planus, oral submucous fibrosis) were excluded from study.

The patient's demographic data such as name, age, and gender, were recorded using a structured questionnaire. Patients were included in the study after clinical and histopathological confirmation of malignancy. A thorough history of the disease and risk factors related to as OSCC were taken and labelled (smoking, alcohol consumption, and betel nut chewing) accordingly. The Statistical Package for Social Sciences (SPSS) version 20 was used to analyse the data. The causative factors were compared, and gender base stratification was done using chi-square test and significance was defined as a P value of ≤ 0.05 .

Results

The present study comprised of 150 patients of oral squamous cell carcinoma (OSCC). OSCC patients included 110 (73.3%) male and 40 (26.7%) female patients. Mean

\pm SD of age of OSCC patients was 47.00 ± 9.170 years. 37 (24.7%) participants fall in the age group 20-40 while 113 (75.3%) participants belong to 41-60 age group. 73 (48.7%) participants were smokers, 9 (6.0%) subjects consume alcohol, 39 (26.0%) partakers use betel nut pan, 24 (16.0%) participants use snuff naswar while 5 (3.3%) subjects have no risk factor habits. Frequencies and percentages of socio-demographics are given in the Table 1 Crosstabulation of gender with risk factors of OSCC showed no statistical significance (P=0.317). Similarly no statistical significance was found between age groups and risk factors of OSCC (P=0.119) as shown in Table 2.

However, comparison was also done between individual habits/risk factors of OSCC (smoking, alcohol consumption, betel nut/ pan and snuff/naswar) with gender. Association of smoking with gender was statistically significant (P=0.013). Similarly, betel nut chewing also showed statistically significant correlation with gender (p=0.044). Both alcohol and snuff did not show any statistically significant correlation with gender, as discussed in Table 3.

Crosstabulation of individual risk factors of OSCC (smoking, alcohol consumption, betel nut/ pan and snuff/naswar) with age did not reveal any significant correlation shown in Table 4.

Table 1: Sociodemographic data of participants.

Variables	Frequency	Percentage	
Gender	Male	110	73.3%
	Female	40	26.7%
Age Group	20-40	37	24.7
	41-60	113	75.3
Risk factors/ Habits of Patients	Smoking	73	48.7
	Alcohol	9	6.0
	Beetel Nut Paan	39	26.0
	Snuff Naswar	24	16
	None	5	3.3

Table 2: Crosstabulation of gender and age groups with risk factors of SCC.

Variables		Risk factors					P value
		Smoking	Alcohol	Betel nut	Snuff	Non	
Gender	Male	60	07	24	15	04	0.119
	Female	13	02	15	09	01	
Age groups	20-40	15	02	11	09	00	0.317
	41-60	58	07	28	15	05	

Table 3: Association of Individual Risk Factor Habit with Gender among Oral Cancer Patients.

Habit		Gender		P value
		Male	Female	
Smoking	Yes	60	13	0.013
	No	50	27	
Alcohol	Yes	7	2	0.794
	No	102	38	
Betel Nut/ Paan	Yes	24	15	0.044
	No	86	25	
Snuff/ Naswar	Yes	16	8	0.284
	No	94	32	

Table 4: Association of Individual Risk Factor Habits with age groups among Oral Cancer Patients.

Habit		Age groups		P value
		20-40	41-60	
Smoking	Yes	15	58	0.255
	No	22	55	
Alcohol	Yes	02	07	0.861
	No	35	106	
Betel Nut/ Paan	Yes	12	27	0.304
	No	25	86	
Snuff/ Naswar	Yes	08	16	0.284
	No	29	97	

Discussion

Oral squamous cell carcinoma (OSCC) is the most common type of oral cancer, accounting for over 94 percent of all cases. It is the 11th most prevalent cancer in the world, with substantial disparities in occurrence among South Asian countries (6). In Pakistan its occurrence rate is about 10-15 per 100,000 5. Risk factors play important role in oral cancer. A combination of risk factor habit, duration and intensity doubles the rate of incidence (20). Given the impact of habit duration and intensity, it's not unexpected that this region has a high rate of oral cancer.

The average age of OSCC patients in the current research was 47.00 years. These findings revealed that the OSCC patients in the current research were in their late fifth or early sixth decade of life. Similar findings, have previously been published by Sabir et al. (2022) where cancerous lesions were observed in the age range 51-60 years, followed by the age group 41-50 years (22). However, some researchers have found that persons under the age of 40 account for the majority of instances, which may be because a significantly younger population was included in those studies. The reported age discrepancies may also be explained by regional and sample size variances. Other Asian studies corroborated these findings but these findings did not correspond to the demographics of North America and the United States (23,24). The most likely cause of the inconsistent results is early introduction of chewing betel nut/ paan habits to Asian cultures.

In the current study, 48.7% of OSCC patients were smokers, and we found significant correlation of tobacco smoking and gender has been linked to an increased risk of oral squamous cell cancer (P 0.013). A local study conducted in Peshawar showed Smoking was more prevalent among the patients compared to the controls (p<0.0001). these results correlates findings of our study in terms of frequency of OSCC(48%) (25).The results of this study are also comparable to the study of Iype et al (26). When we sorted out literature of smokers individually, we found similar effects associated to smoking as in our research. Prior studies depicted decreasing risk of SCC with longer periods of smoking cessation (27).

In current study betel nut/ Paan chewing showed statistically significant correlation with gender (P=0.044). Patients who chew tobacco have a higher incidence of squamous cell carcinomas of the oral cavity and throat. Sawyer et al. (1992) similarly found that as the frequency and duration of the behaviour rose, so did the risk.14Chewing tobacco has a higher carcinogenicity than tobacco smoking because of it's prolong contact with oral

mucosa. Saliva rapidly extracts tobacco-specific N-nitrosamines, which are found in larger amounts in smokeless tobacco also its absorption is boosted by in alkaline surroundings 12,15These factors are known to affect the production in tobacco chewers and smokers. Chewing tobacco includes N-nitroso compounds, well-known carcinogens that play a vital part in the oral cavity's malignant change (28).

Alcohol use was shown to be positive in 5.4 percent of OSCC patients in the present study. The results of our study differed with Ogden GR. (2005), which revealed a 72 percent link between alcohol consumption and OSCC (29). Our recent findings did not show any clinical significant correlation between alcohol consumption and cancer prevalence in genders (P=0.794). However previous studies in US and UK demonstrating that alcohol consumption is a key factor in distinguishing occurrences of oral cancer especially at higher consumption levels. (30). These disparities of results are strongly linked to cultural and religious values of the region.

Snuff/ Naswar and non-smoke tobacco user in current study were 16% of study sample and slightly more prevalent in male compared to female 2:1 as shown in table 1. There is no significant correlation between gender and smokeless tobacco (P0.284). The outcomes of the current study were analysed and compared between male and female participants. In the current study, OSCC was shown to be more common in males (73.3%) than females (26.7%). The current study's findings were consistent with those of earlier subcontinent studies of Bhattacharjee T et al. (31). In this study, risk variables were examined between genders and found more smoking and alcohol use in male patients. Although there was no significant difference in male Paan chewing habit was statistically significant in both genders (p=0.044), and it was more prevalent in female patients.

Conclusion

Our findings highlights the importance of public health measures aimed at preventing smoking and chewing tobacco, and snuff. The general public should be aware of association of the risk factors and development of oral cancer. So an early detection of dysplasia or premalignant or invasive cancer be prevented and managed with high prognosis and less deformity, relapse, and mortality.

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