

Prevalence, Pattern and Risk Factors of Oral Cancer -A single institute-based study from Nepal

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ABSTRACT

Background

Cancer of lip and oral cavity is the most common type of cancer in male population in South East Asia. Although it is a multifactorial disease, tobacco and alcohol use are the most common risk factors involved. Oral cancer has a direct relationship with deleterious habits. Inadequate knowledge about the disease and lack of awareness about its risk factors play vital role in increasing incidence of oral cancer.

Objective

To determine the prevalence and pattern of oral cancer as well as to find out the risk factors associated with development of oral cancer.

Method

The hospital records of the patients with histo-pathologically confirmed oral cancer between November 2011 to December 2021 were studied. Data regarding age, sex, associated risk factors and pattern of oral cancer were recorded. Descriptive statistics were obtained and recorded in tabulated form.

Result

Total of 312 (53.6%) cases out of 582 biopsies turned out to be histo-pathologically confirmed oral cancer. Out of 312 cases of oral cancer, 294 (94.27%) were squamous cell carcinoma. Total number of males were 196 (66.7%) and females were 116 (37.1%). The mean age was 56.2±13.4 years. Smoking (34.7%) was the most common risk factor and gingiva (42.6%) was the most common site of involvement.

Conclusion

Squamous cell carcinoma is the most common type of oral cancer and gingiva is the most common site of involvement. Tobacco smoking is the major risk factor for developing oral cancer.

KEY WORDS

Oral cancer, Risk factors, Smoking, Tobacco

INTRODUCTION

International classification of diseases defines oral cancer as “any malignant lesion of lip and oral cavity”.¹ Oral cavity extends from the vermillion of lip to circumvallate papillae of tongue inferiorly and to the junction of hard and soft palate superiorly.² The subsites of oral cavity include lip, oral tongue, floor of mouth, buccal mucosa, upper and lower gingiva, retromolar trigone and hard palate.²

According to global cancer observatory (GLOBOCAN) 2020, total number of new cases of Lip and oral cancer worldwide were 3,77,713 and total number of deaths were 1,77,757.³ Both the incidence (2,48,360) and mortality (1,31,610) were highest in Asian population.³ In South central Asian population, cancer of lip and oral cavity were the most common type of cancer in male population and 1,74,448 new cases have been reported in 2020.⁴ The scenario in Nepal is not different. According to GLOBOCAN 2020, it is the sixth most common type of cancer in Nepal.⁵

Various etiologies and risk factors such as tobacco, alcohol and betel quid consumption, trauma from teeth or denture, human papilloma virus (HPV), dietary deficiencies etc. have been attributed to the development of oral cancer.⁶

There are few studies reporting the pattern of oral cancer in Nepal.^{7,8} It is important to have an idea about the prevalence, pattern and risk factors of oral cancer in particular population so that a proper plan for its prevention and management can be formulated and implemented.

The hospital receives and treats patients with oral lesions and condition from nearby districts as well as patients from all over Nepal. Thus, we carried out a retrospective study using hospital and departmental records of patients with oral lesions and conditions to determine the prevalence, pattern and risk factors of oral cancer in patients presenting to us with oral lesions and conditions.

METHODS

The present retrospective study was conducted after ethical approval from the institutional review board. The records of patients attending to the Department of Oral and Maxillofacial Surgery between November 2011 to December 2021 were included in the study. The histopathological records were obtained from the hospital records. The inclusion criteria were lesions involving the oral cavity and its subsites (anatomical sites of oral cavity based on AJCC and UICC staging system) which were histopathologically confirmed oral squamous cell carcinoma. The patient's whose histopathological records were not found, were not included in the study. Similarly, oral premalignant lesions and conditions were excluded from the study. The oral cavity sites were divided as mucosal lip (upper and lower), gingiva, floor of mouth, oral tongue, buccal mucosa, retro-molar trigone and hard palate. The

records were studied to obtain age and sex of the patient. Risk factors for development of oral cancer such as habit of smoking, tobacco, beetle nut or gutkha chewing, alcohol consumption, sharp tooth or any other dental trauma were recorded from the patient's records. The involved oral cavity site and histopathological grading were also noted. The data were recorded in the tabulated form. Descriptive statistics were obtained using Statistical package for social sciences version 20 software (IBM® SPSS).

RESULTS

Total of 582 biopsies were performed on suspected malignancy of oral cavity and its subsites over past ten years. Out of 582 biopsies, 312 (53.6%) were histopathologically confirmed malignancy. Out of 312 confirmed oral malignancy, 294 (94.27%) were squamous cell carcinoma, 10 (3.2%) were mucoepidermoid carcinoma, 4 (1.3%) were adenoid cystic carcinoma, 2 (1%) were adenocarcinoma and 2 (1%) were rhabdomyosarcomas. The mean age was 56.2 ± 13.4 years. Age wise distribution of oral cancer is shown in figure 1. The total number of males were 196 (66.7%) and total number of females were 116 (37.1%). Gingiva 42.6% was the most common site involved followed by anterior 2/3rd of tongue (16.02%). Site wise distribution is shown in figure 2. Out of 294 cases of squamous cell carcinoma, 156 (53%) were well differentiated, 101 (34.3%) were moderately differentiated and 37 (12.6%) were poorly differentiated.

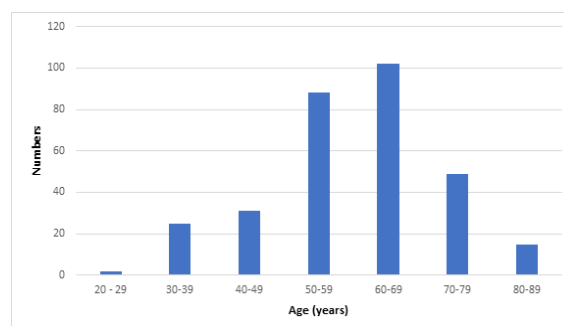


Figure 1. Age wise distribution of oral cancer

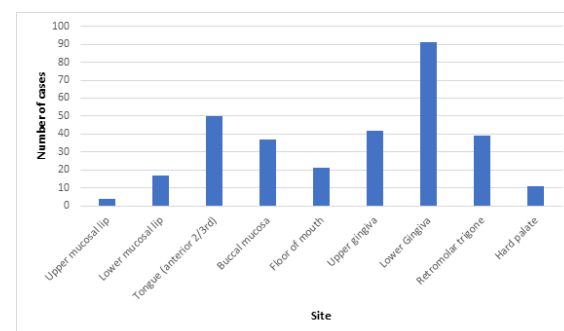


Figure 2. Site wise distribution of oral cancer

The most common risk factor involved was smoking (34.7%) followed by alcohol consumption (31%). Distribution of risk factors is shown in figure 3.

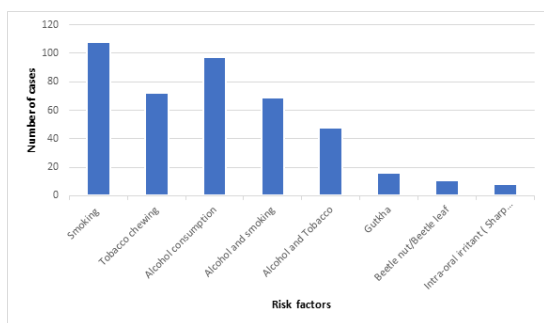


Figure 3. Distribution of risk factors associated with oral cancer

DISCUSSION

Cancer related mortality rates are high in low- and middle-income countries like Nepal. The epidemiological studies analyzing the various aspects of cancer such as its incidence, pattern, and risk factors help us to formulate a plan to reduce its incidence and mortality.

Squamous cell carcinoma is the most common type of malignancy involving lip and oral cavity. Various studies carried out have found that almost 90% of cases of oral cavity cancers turn out to be squamous cell carcinoma.⁹⁻¹² The result of the present study is similar to those study carried around the globe.

Most common age of presentation is the fifth to sixth decade of life. It could be attributed to the fact that these group of patients are more exposed to the risk factors associated with oral cancer. The result from the present study regarding the age of occurrence is similar to other studies carried worldwide.¹²⁻¹⁴ However, some studies have reported higher incidence of tongue cancer in age less than 45 years old. Although debatable and lack of enough evidence, Human papilloma virus has been attributed as main etiological factors in the young group.¹⁵ In contrast, Decastro et al. have reported genetic predisposition and mutation to be a primary reason for occurrence in young age.¹⁵

The present study showed that cancer of oral cavity is more common in males than females. This is in accordance with previous studies in Nepal and worldwide.^{7,16,17} According to the GLOBOCON 2020 also, lip and oral cavity cancers are more common in males.³ The reason behind males being more commonly affected could be that habits such as use of tobacco either smoked or smokeless, alcohol and others which are considered to be a risk factors of oral cancer, are more common in males.⁶ However, some studies have found that in younger age group (< 40 years), females are more commonly affected.^{12,18} Genetic susceptibility, Viral infection, hormonal and immunological modulations and systemic diseases in absence of other risk factors as tobacco and alcohol use have been suggested to play an important role in development of oral cancer in female patients.^{15,16}

In the present study, gingiva was the most common site for oral cavity cancer followed by anterior two-third of tongue.

This is in contrast to several other domestic and international studies. A study conducted by Sahu et al in North India and Anwar et al in Pakistan found buccal mucosa to be the commonest site.^{19,20} Similarly other studies carried out in different part of Asia have found tongue to be the common site of involvement.^{21,22} Gajurel et al. carried out a study in year 2019 in a cancer hospital in Nepal and have also found the tongue to be the commonest site of involvement.¹³

Our results showed that most of the oral cancer were well differentiated on histological grading. Histopathologically, oral cavity cancer can be graded as well differentiated (grade 1), moderately differentiated (grade 2) and poorly differentiated (grade 3). Histologic grading along with other pathological parameters such as vascular and perineural invasion play an important role in determining the prognosis of oral cavity cancer and can act as a supplemental factor in clinical practice and decision making.²³ It is believed that higher the degree of differentiation, lesser is the risk of metastasis.^{9,23} Hence well differentiated tumors have lesser risk of metastasis. Our results are similar to study conducted by Maleki et al. where as in contrast to the study conducted by Roi et al.^{9,22} Roi et al. in their study found that almost 55% of the oral cancer were poorly differentiated and were associated with tobacco use.⁹

Tobacco and alcohol are considered to major risk factors for development of oral cavity cancers. Tobacco can be used either in chewable or smoked form. It has been estimated that 75% of oral cavity cancers are due to alcohol and tobacco consumption.²⁴ Similarly, use of tobacco along with alcohol can have a synergistic effect and play a greater role in development of oral cavity cancer. Tobacco contains various carcinogens such as N-nitroso compounds, polycyclic aromatic hydrocarbons (PAH) and 4-(methylnitrosoamino)-1-(3-pyridyl)-1 butanone (NNK). These carcinogens can cause genomic instability and development of carcinoma.²⁵ Use of alcohol increases the permeability of oral mucosa, causes epithelial atrophy and interferes with deoxy ribonucleic acid (DNA) synthesis and repair.²⁶ It also decreases the clearance of carcinogens by interfering with the function of liver.²⁷ Alcohol serves as a solvent to carcinogens present in the tobacco and increases its absorption by increasing the permeability of oral mucosa. Hence, use of tobacco along with the alcohol has synergistic effect on development of oral cancer.²⁴

The results from present study showed that the major risk factors associated with the oral cavity cancer was smoking followed by alcohol and tobacco chewing.

Tobacco itself can be used in the form of smoking or it can be chewed, sniffed or sucked, also known as Smokeless tobacco form (SLT). Smoked tobacco contains around 70 known carcinogens which can induce genetic changes in cell of oral cavity.²⁸ SLT products also contain variety of carcinogens including tobacco specific N nitrosamines, nitrite, nitrate and heavy metals.²⁹ The level of these

carcinogens varies among SLT product used worldwide.²⁹ It has already been reported that SLT can be an independent risk factors for developing oral cancer.³⁰ The risk of developing oral cancer is not considered to be substantial in United states or Europe whereas it is a major risk factor for developing oral cancer in Asia.³¹ This difference has been attributed to tobacco species, fermentation and ageing.^{17,29} Almost 20% of population smoke tobacco in Nepal.³² Almost 2.7 million people in Nepal consume tobacco in SLT form.³³ People in Mountainous and hilly region tend to smoke more whereas people in Terai region tend to consume tobacco in SLT form.^{34,35} This could be the reason that majority of patients in our study had a habit of tobacco smoking rather than chewing. Our results are different from studies carried out in neighboring countries. A recent study from Srilanka reported that 72.3% of their patients with oral cancer were smokers and 78.3% were using SLT form.³⁶ They concluded that risk of developing oral cancer significantly increases if both the smoked and SLT form are used together.³⁶ Similarly various studies conducted in India have also found strong association of SLT form with oral cancer.^{37,38} This could be due to majority of people using tobacco in chewed form rather than smoked form.^{39,40}

Alcohol consumption is also relatively common in population of this region which makes it a second most common risk factor in our study. The result also showed that large number of people used alcohol in combination with tobacco either in smoked or chewable form. The result of present study also showed that betel nut chewing and gutkha chewing rates are relatively lower. Higher prevalence of these habits among people of Terai region and majority of people visiting our hospital, being from hilly and mountainous region of Nepal could be the reason that number of patients with these habits were relatively low in our study.

Single institute based retrospective study, limited population group and limited number of cases of oral cancers are some of the limitations of the study.

CONCLUSION

The findings of present study shows that squamous cell carcinoma is the most common type of oral cancer. In oral cavity, gingiva is the most common site of occurrence of oral cancer and tobacco smoking is the major risk factor for developing oral cancer.

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