

Understanding Oral Oncology and its Changes in Dynamics in Nepal

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ABSTRACT

With the increase in smoking habits, oral cancer is turning into a threat among smokers. It is also due to a lack of awareness among people, oral cancer is increasing rapidly. The increased rate of illiterate people in Nepal has been a reason for a change in dynamics. Due to a lack of awareness, people are diagnosed late with cancer which leads to an increased mortality rate. So, awareness is a must for the reduction of oral cancer. In most cases, surgery is the best chance. Since people in Nepal are mostly from middle-class families, it highly impacts their life. The article primarily addresses the incidence of oral cancer in Nepal. It also emphasizes the risk factors and causes of oral cancer along with its diagnosis and surgery.

Keywords: awareness; dental oncology; oral squamous cell carcinoma; tobacco; treatment



INTRODUCTION

Introduction: Cancer may be defined as a malignant tumor either sarcoma or carcinoma. Whereas, abnormal malignant swelling in any part of the oral cavity (i.e. head and neck region) is called oral cancer [Figure 1]. If a person has oral cancer, not only will the person feel discomfort in the facial region but also the digestive system will become affected. One common sign of oral cancer is an oral ulcer that may be painful. If the ulcer persists for more than 2 weeks one has to visit a dentist for early diagnosis and treatment. Oral cancer is predominantly oral squamous cell carcinoma (OSCC) and is mainly caused in the oropharynx by

human papilloma virus (HPV). It is believed that the rate of HPV cancer will increase in the following years based on the habits of the surrounding population.¹

EPIDEMIOLOGY

Oral cancer is a non-communicable disease that holds the sixth position in the world.² In 1990, there were more than 84,000 deaths due to oral cancer. Similarly, 135,000 deaths in 2013 whereas in 2018, 355,000 people were victims and 177,000 were dead worldwide. It occurs that almost one-fourth of all new cases of cancer are oral.³

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Compared to developed countries, developing countries appear to be more victimized.⁴ Oral cancer is also rising in Nepal. Oral cancer death in Nepal had been 1,341 in 2017, according to the World Health Organization (WHO). Hence Nepal was named 25th in the world.⁵ It is the third most common type of cancer in Nepal.⁶ The most recurrent oral cancer site was found as tongue (42.5%) followed by buccal mucosa (27.2%) based on the survey done in 2010. But when analyzed on the basis of the geographic location, buccal mucosa in the Terai sector was the most common site for OSCC (63.9%) and notably the Madhesi ethnic group (34.2%).⁷

In recent times, there has been some change in dynamics. The reason for the change in the dynamics of oral cancer is mainly due to people's lifestyles and lack of knowledge among the people about the harmful and adverse effects of tobacco and other related items.⁸ Due to greater access to these products with no supply restriction and lack of awareness of oral cancer risk factors such as tobacco, people with low socioeconomic status are at higher risk. It mostly occurs to those who drink and smoke often. It is important to note that

people who do not smoke and only drink alcohol occasionally are victims of oral cancers. According to data, over 25% of all population belongs to this group.

Oral cancer is mostly seen in people over the age of 40; especially men possibly because of differences in risk habits. But in the case of Nepal, it seems that there is a change in dynamics. Females are more likely to suffer from oral cancer mainly due to the use of tobacco. The main concern arises among pregnant women.⁹ The state of cancer affects not only the mother but also the child. Babies from such mothers are usually born with fetal disorders.¹⁰

RISK FACTORS AND CAUSES

Tens and thousands of microorganisms exist as a part of oral flora in the mouth [Table 2]. They usually benefit the body by preventing infection. Nevertheless, if a patient is immunocompromised, the normal flora can overgrow and become pathogenic and may contribute to the development of a tumor. Based on the evidence, chronic inflammatory disease (periodontitis, poor oral hygiene) can also cause oral oncogenesis. But this might be a possibility as no evidence has been proven yet.¹¹

Oral potentially malignant disorders (OPMDs) like leukoplakia (white or grayish patches) erythroplakia (bright red velvety patch) [Figure 1], and oral submucous fibrosis are also considered responsible for OSCC. It is an aggressive tumor. The cases are usually advanced and require multimodality therapy. Therefore, in case of low and middle-income countries like Nepal, the 5-year survival of OSCC patient's is 23–57%.¹²

Another cause of mortality in OSCC is due to metastasis to the lymph node. The neoplasm may also be derived from connective tissues, lymphoid tissues, minor salivary glands, melanocytes, and or metastasis from distant tumors.¹²

Risk factors include the use of different forms of tobacco, cigarette, cigar, gutkha, pan-masala, betel nuts. Others include illiteracy, lack of awareness; reverse end smoking, HPV virus, mouthwashes with high alcohol content, trauma in the mouth, etc. Alcohol promotes the activation of procarcinogens and acts as a solvent for the introduction of harmful carcinogens into the body cells.¹³ While tobacco smoke comprises >4000 chemical compounds and 60 of them are considered to be toxic to humans.¹⁴ 90% of the cases reported for oral cancer are due to the intake of tobacco in various forms.¹⁵ However, the survival rate also depends on factors including

epidemiology and therapeutic development.¹⁶

DISTRIBUTION OF CANCER IN ORAL CAVITY

Signals from the connective tissue surrounding a tumor are believed to play a vital role in the spread of oral cancer.¹⁷ An invasive squamous cell carcinoma means that cancer has entered to deeper parts of the oral cavity.¹⁸ [Figure 2]

SIGNS AND SYMPTOMS

People usually know that they have cancer after they experience some abnormal swelling, ulcer, or difficulty in the oral cavity. Unfortunately, patients are diagnosed after the development of symptoms in an advanced stage (such as discomfort, dysphagia, reduced tongue movement, and ability to open the mouth, weight loss, and loss of sensory function).¹⁹

Nevertheless, cancer may be asymptomatic so during a professional career, a dentist might not experience an average of more than 5-10 patients with oral cancer. This leads to a late diagnosis of cancer.²⁰

TNM CLASSIFICATION AND STAGING

TNM classification and staging of oral cancer are presented in Table no. 3 and Table no. 4 respectively.

DIAGNOSIS

Some tests for diagnosis of oral cancer include Physical examination, Endoscopy, Biopsy, Oral brush biopsy, HPV testing, X-ray, Computed tomography (CT or CAT) scan, MRI, Barium swallow, PET scan, Panorex film.²¹ These diagnosis and early detection of oral cancer is encouraged by different aspects. Salivary biomarkers namely L-phenylalanine, Cluster of differentiation factor 34 (CD34), Genomic biomarkers namely integrin $\alpha 3$ and $\beta 4$, proteomic biomarker aid evaluate and distinguish oral cancer monitoring and differentiation.²²

TREATMENT

Cancer treatment differs from person to person based on the location, extension, stage, age, side effects from the treatment, patient's mental and economic status as well as patient's preference and specialist's advice.²³

- **Surgery:** Surgery is the first choice in most cases. It may vary as per tumor size and location. Surgery may either be to eliminate cancer or to repair a function damaged by cancer. If the cancer is in an advanced stage removing the tumor might be straight forward but might leave a void. To repair this, the surgeon will perform a skin graft for reconstruction that

came from the thigh and upper arm.²⁴ The surgery can be complicated and can take more than 6 hours in some cases

- **Radiation therapy:** radiation beams are aimed every once, twice, and sometimes even five to eight times a week. It is given to suppress cancer symptoms or prevent them from spreading.
- **Chemotherapy:** It is given by an oral or parenteral route.
- **Others include:** Combined therapy, Targeted therapy, Immune therapy, Gene therapy, Hormone therapy
- Favorable chemo preventive agents for oral cancer include β -carotene, retinoid, N-acetyl cysteine, NSAIDs, vitamin-E.²⁵
- Lastly, mouth should be kept healthy during oral cancer.
- Patients in stage I or II do well after surgery and therapy. If cancer is in the last stage, surgery followed by chemotherapy and radiotherapy is done. It is more expensive and aggressive than in an early stage.²⁶

COST-EFFECTIVE TREATMENT

1. Our body has a defense system for foreign particles. Similarly, for cancer, our body secretes melatonin which is known for its antioxidant activity. This protects us from cancer.²⁷ It is secreted mostly during night time so a healthy and sound sleep is necessary.
2. Tulsi (*Ocimum sanctum*) acts as a cytotoxic substance mainly due to apoptosis. Its constituents help to reduce early cancer.²⁸
3. Besides therapy, one must also take care of their diet. During the treatment, a person might experience difficulty in swallowing and a poor appetite. So, a proper meal is essential which will give the right nutrients like green leafy vegetables, sweet potatoes, carrots, lemon, oranges, papaya, tomatoes, grapes, avocado, green tea, etc. Evidence also proves that drinking raspberry juice regularly can cure oral oncogenesis.²⁹

AWARENESS AND ALERTNESS

"Prevention is better than cure". "Cancer" itself sounds threatening and when it comes to a less educated population like Nepal people usually have misconceptions about it. It is most likely due to a lack of health education in a particular population. Although several dental health camps are placed every year in different provinces of Nepal, this is

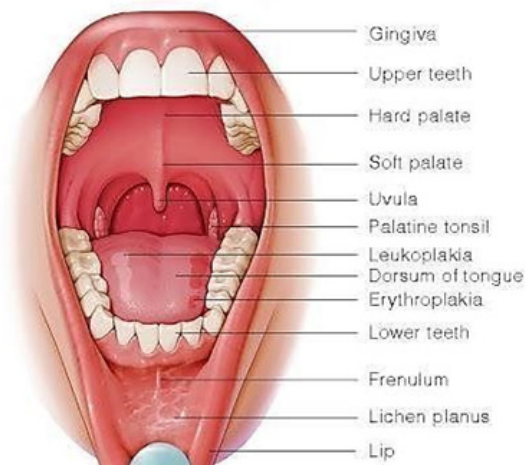


Figure 1: Parts of the oral cavity with precancerous conditions

still not enough for the vast population living around. Cancer begins with dysplasia in the body and risk factors and preventive measures play a greater role in this.²² For oral cancer to decline at a larger scale people must be made aware of the importance of oral hygiene and the Minister of Health and Population (MoHP) should make rules of regular dental checkups and programs like National Strategic Plan for Oral Health for Nepal

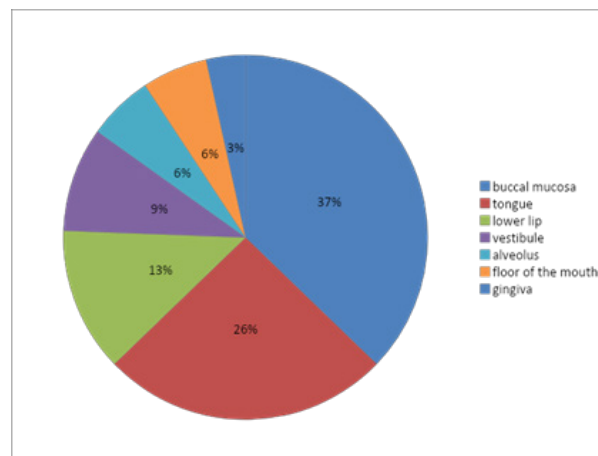


Figure 2: Chances of oral cancer in different parts of oral cavity

(2001-2002) [WHO].³⁰ Dental checkups must of course include screening tests. It is a test used by the dentist or dental assistant to check possible signs of cancer or precancerous condition in the oral cavity. The main objective is to identify oral cancer at an early stage for a better cure. Oral-based questionnaires can help us to be sure about the oral health condition. Evidence shows that visual evaluation is useful in reducing oral cancer mortality in patients at risk. Mass media campaigns like broadcasting in television, radio, and public campaigns are also helpful. But till the

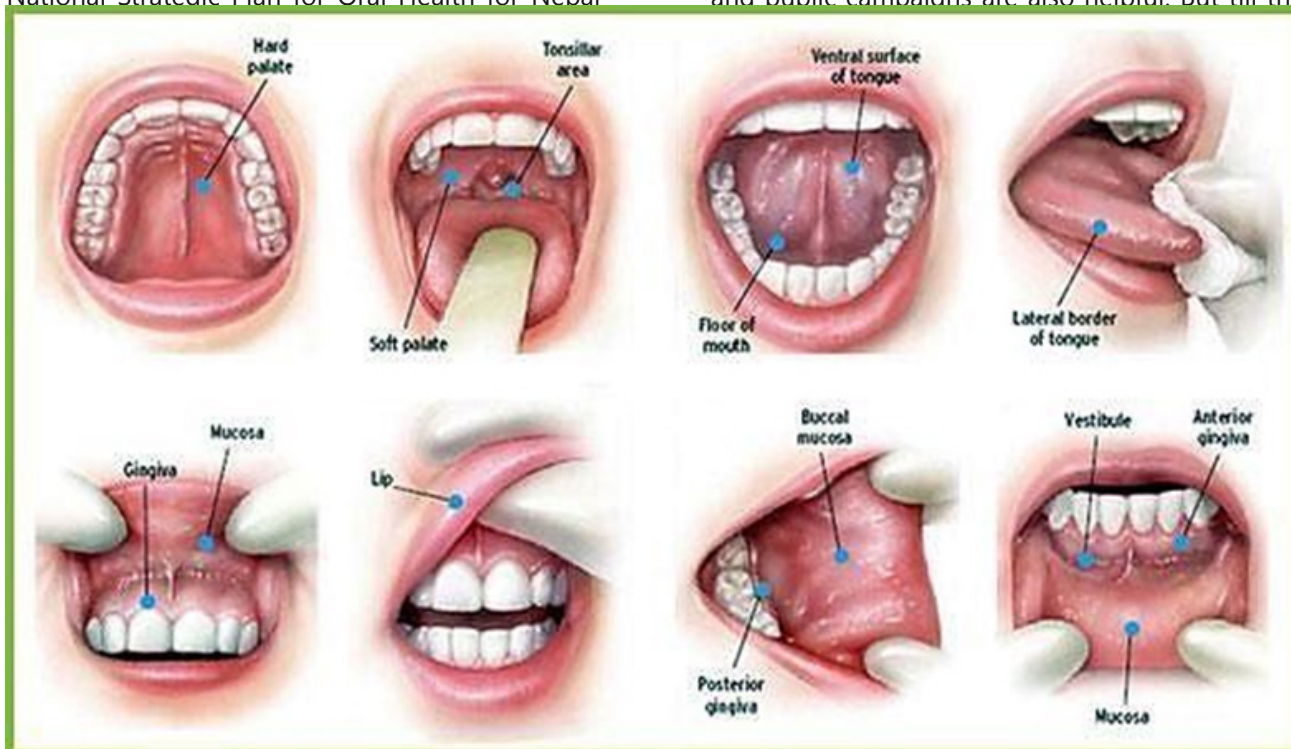


Figure 3: A screening test for oral cancer³⁸

Table 1: Risk factors of oral cancer³⁹

Environmental factor	Emergency risk factors	Genetic factor	Not modifiable	Infective viruses
Lifestyle(drinking alcohol, smoking, poor oral hygiene)	Immunosuppression (like candidiasis)	Plummer-vinson syndrome	Age	HPV (Human Papilloma Virus)
Low socio- economic status	HPV (Human Papilloma Virus)	Fanconi's anemia	Family history of cancer	Ebv(Epstein Barr Virus)
Exposure to radiation		Diabetes	Ethnicity	HSV (Herpes Simplex Virus)
Improper diet		Dyskeratosis dysgenesis	Gender	HCV (Hepatitis C Virus)

Table 2: Virus associated with Oral Cancer⁴⁰

Virus	Event
HSV 1	It is a strongly associative factor. Causes oral infections. The virus acts as a mutagen and results in malignancy.
HCV	Causes risk of genetic instability in the cells. From saliva and serum, squamous cells of the oral cavity are exposed to HCV in the affected patient resulting in the development of OSSC.
EBV	The virus might not have a direct effect but is associated with immunodeficiency.
HPV	It is also a strongly associative factor. It is a sexually transmitted disease. The oral lesion is the major cause of cancer. They are :vulgar wart (HPV-4), papilloma's (HPV-11), leukoplakia (HPV-6)

Table 3: TNM classification⁴¹

TX	Primary tumor cannot be assessed.
TO	No evidence of a primary tumor.
Tis	Carcinoma in situ. It is the early stage of cancer that has not been spread to deeper tissues or metastasized. It gives you the idea about cancer without any invasion.
T1	Tumor ≤ 2 cm
T2	Tumor 2 - 4 cm.
T3	Tumor ≥4 cm.
T4	Tumor invades adjacent structures such cortical bone, base of the skull, inferior alveolar nerve, floor of mouth, skin of face , chin or nose, maxillary sinus etc.
NX	Nearby lymph nodes cannot be assessed.
N0	No involvement of lymph node
N1	One lymph node involved on the same side as the primary tumor. This lymph node is smaller than 3 cm across.
N2a	Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension
N2b	Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
N2c	Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N3	The cancer has spread to a lymph node that measures more than 6 cm across.
M0	No spread of cancer to other parts of the body
M1	Metastasis occurred.

Table 4: Oral Cancer Staging⁴¹

Stages	T	N	M
0	Tis	N0	M0
I	T1	N0	M0
II	T2	N0	M0
III	T1	N1	M0
	T2	N1	M0
	T3	N0, N1	M0
IV	T4	N0, N1	M0
	Any T	N2, N3	M0
	Any T	Any N	M1

government does not emphasize these rules, we as our caretaker can visit the dentist and do a regular dental checkup. The willingness of individual health practitioners and medical centers to engage in pre-cancer screening and oral health promotion needs to be strengthened. Since the screening test is simple one can self-examine at home from time to time via the internet [Figure 3].

If a patient is found with OPMDs, they can then be referred for verification, confirmation, and case management with necessary counseling. The main drawback is that the people remain unaware of the condition as it might not show any symptoms. Some of them are of low evidence so research must include therapeutic strategies and prognostic markers.

RECOVERY, RECONSTRUCTION, AND REHABILITATION FROM ORAL CANCER TREATMENT

Cancer has a huge effect on the economy as well as on the mental health of an individual. In a country like Nepal where people are mostly middle class and about 66% being farmers, it is hardly possible for them to pay their medical bills.

Surgery in the head and neck region may have a psychological effect. It can affect the appearance of people. With intense reconstructive surgery, there is a high chance of injury.³²⁻³⁵ Surgery may include graft transplant, dental implants, and artificial palates to replace any missing tissue or teeth.³¹ Maxillofacial trauma is another reason for death in people even after the successful removal of cancer. The lengthy recovery time causes depression, frustration, and or Post Traumatic Stress Disorder (PTSD).³²⁻³⁵ Radiation can lead to pancytopenia so after cancer treatment patients are advised for CBC.

Recovery from oral cancer may rely on both tumor and surgery. If the huge tumor has been removed from the tongue, palate, or gum and replaced

it by a skin graft, the graft might not be able to perform the normal function. Usually, people need rehabilitation with eating and speaking during recovery. Speech therapy is necessary post-surgery for optimal improvement.³⁶⁻³⁷

CONCLUSION

Oral cancer is a widespread disease and Nepal has been a victim of it for the past few years. There has been a change in the dynamics of oral oncology where females have been more victimized than the male. It can be easily prevented by avoiding cancer-responsible factors such as maintaining a better lifestyle and oral hygiene. Treatment of cancer can cost a fortune. So, the best solution would be to take preventive measures and reduce the chance of oral cancer for better. "Why cure cancer when we can prevent it from happening".

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