

# A multicenter study of oral malignant tumors from Thailand

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## Abstract

**Background:** Oral malignant tumors in Thailand have not been extensively studied. Hence the following study was conducted.

**Aims:** To determine the prevalence and clinicopathologic data of the oral malignant tumors from Thailand.

**Subjects and Methods:** Biopsy records of the Oral Pathology Department, Chulalongkorn University; Department of Oral Biology and Diagnostic Sciences, Chiang Mai University; Department of Oral Diagnosis, Khon Kaen University and Department of Stomatology, Prince of Songkla University, were reviewed for lesions diagnosed in the category of oral malignant tumors from 2005–2014. Demographic data and site of the lesions were collected.

**Statistical Analysis Used:** Data were analyzed by descriptive statistics using SPSS software version 17.0.

**Results:** Of the 22,639 accessioned cases, 1411 cases (6.23%) were diagnosed as oral malignant tumors. The mean age of the patients was  $59.13 \pm 17.32$  years. A total of 651 cases (46.14%) were diagnosed in males, whereas 759 cases (53.79%) were diagnosed in females. The male-to-female ratio was 0.86:1. The sites of predilection for oral malignant tumors were the gingiva, followed by tongue and alveolar mucosa. The three most common oral malignant tumors in the descending order of frequency were squamous cell carcinoma, non-Hodgkin lymphoma and mucoepidermoid carcinoma.

**Conclusions:** This study provides extensive data on the oral malignant tumors from several university biopsy services located in virtually all parts of Thailand. The data from the present study show some similarities with previous studies; however, differences such as gender and site of predilection still exist.

**Key Words:** Oral malignant tumors, retrospective study, Thailand

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## INTRODUCTION

Oral cancer is the sixth most common cancer in the world.<sup>[1]</sup> There were estimated 45,780 new cases of cancer in the oral cavity and pharynx in the United States in 2015. Of these, 8650 were expected to pass away from cancer.<sup>[2]</sup> The most important risk factors for oral cancer, especially squamous

cell carcinoma, are tobacco use and alcohol abuse, which have synergistic effect.<sup>[3,4]</sup> Previous studies have shown that alcohol consumption is an independent risk factor for the development of cancer in a dose-dependent manner.<sup>[5-7]</sup>

Apart from tobacco use and alcohol abuse, human papillomavirus (HPV) has recently received special attention. HPV-16, in

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particular, has been indicated as an etiological agent for the development of subset of squamous cell carcinoma, especially at the base of the tongue and the tonsillar area in the younger individuals compared to the HPV-negative counterpart.<sup>[8,9]</sup> Although there are wide arrays of malignancies that can arise in the oral cavity, squamous cell carcinoma, by far, is the most prevalent one accounting for more than 90% of all oropharyngeal cancers.<sup>[1]</sup>

There is a wide variation in the prevalence of oral cancer in different regions of the world or even within the same countries from the minorities or subpopulations. For example, oral cancer in China, the USA and Spain accounts for 1.36%, 2.3% and 3% of all cancers, respectively,<sup>[10-12]</sup> while in India, it constitutes 30%–40% of all cancers.<sup>[13,14]</sup> Within the United States, there have been disparities between Appalachian states and non-Appalachian states with respect to oral cancer prevalence.<sup>[11]</sup> The aim of this research was to determine the prevalence and clinicopathologic data of the oral malignant tumors from Thailand.

## SUBJECTS AND METHODS

The biopsy records of the Department of Oral Pathology, Chulalongkorn University; Department of Oral Biology and Diagnostic Sciences, Chiang Mai University; Department of Oral Diagnosis, Khon Kaen University and Department of Stomatology, Prince of Songkla University, were reviewed for malignant tumors within the oral cavity diagnosed from 2005 to 2014. This study was approved by the Human Ethics Committee of the Faculty of Dentistry, Chulalongkorn University (No. 090/2015).

Demographic data and site of the lesion were also collected. Sites of the lesion were subdivided into lip, tongue, floor of the mouth, gingiva, alveolar mucosa, palate, buccal/labial mucosa, tonsil, maxilla and mandible and others. Histopathological diagnoses were classified according to the WHO classification of head and neck tumors<sup>[15]</sup> and tumors of soft tissue and bone.<sup>[16]</sup> Histopathological diagnoses were classified into epithelial tumors, salivary gland tumors, hematologic tumors, bone tumors, mesenchymal tumors, odontogenic tumors and others. Data were analyzed by appropriate statistics using SPSS Statistics for Windows, Version 17.0. Chicago: SPSS Inc. A  $P < 0.05$  was considered statistically significant.

## RESULTS

Of the 22,639 accessioned cases, 1411 cases (6.23%) were diagnosed in the category of oral malignant tumors. The prevalence ranged from 4.79% from Chulalongkorn University to 11.50% from Khon Kaen University. The age of the

patients in the present study ranged from 3 to 101 years, with a mean  $\pm$  standard deviation =  $59.13 \pm 17.32$  years. Patients in the seventh and eighth decades of life constituted 43.30% of all the patients [Figure 1].

Regarding gender, most institutions showed a female predilection, except Chulalongkorn University. Overall, the male-to-female ratio of the patients in the present study was 0.86:1 [Table 1].

Regarding the anatomical location, the majority of the oral lesions (84.46%) were extraosseous. The lesions had intrabony locations in 15.54% of the cases. The five most common anatomical locations in the descending order of frequency were gingiva (18.53%), tongue (14.97%), alveolar mucosa (12.83%), labial/buccal mucosa (12.05%) and palate (11.48%). The majority of the malignant epithelial tumors were encountered at the gingiva followed by the tongue while most of the malignant salivary gland tumors were found on the palate. The site of predilection for malignant hematologic tumors was the mandible. Malignant bone tumors occurred in the mandible much more than in the maxilla. The sites of predilection for malignant mesenchymal tumors were the alveolar mucosa and the gingiva. Malignant odontogenic tumors were encountered in the mandible more than in the maxilla and other sites combined. Several sites such as lung, thyroid gland, breast, kidney liver, colon, pancreas and bile duct were the primary sites for the metastatic tumors to the oral cavity in the present study, but the most common ones were the thyroid gland and the lung.

Most of the oral malignant tumors (1023 cases, 72.50%) fell in the epithelial tumor category, followed by salivary gland tumor category (164 cases, 11.62%), hematologic tumor category (117 cases, 8.29%), bone tumor category (41 cases, 2.91%), mesenchymal tumor category (31 cases, 2.20%), others category (20 cases, 1.42%) and odontogenic tumor category (15 cases, 1.06%) [Table 2]. The most common

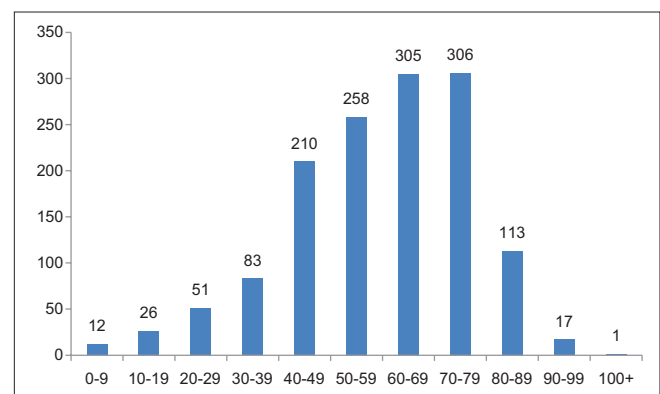


Figure 1: Age distribution of oral malignant tumor patients

**Table 1: Gender distribution from participating institutions**

Institution	Male	Female	Male:female ratio
Chiang Mai University	103	127	0.81:1
Chulalongkorn University	190	186	1.02:1
Khon Kaen University	208	288	0.72:1
Prince of Songkla University	149	158	0.94:1
Total	650	759	0.86:1

**Table 2: Histopathological diagnosis of oral malignant tumors**

Tumors	n (%)
Epithelial tumors	1023 (72.50)
Squamous cell carcinoma	951 (67.40)
Verrucous carcinoma	38 (2.69)
Metastatic carcinoma	23 (1.63)
Undifferentiated carcinoma	6 (0.43)
Others	5 (0.35)
Salivary gland tumors	164 (11.62)
Mucoepidermoid carcinoma	85 (6.02)
Adenoid cystic carcinoma	48 (3.40)
Adenocarcinoma	12 (0.85)
Carcinoma ex pleomorphic adenoma	5 (0.35)
Polymorphous low-grade adenocarcinoma	5 (0.35)
Others	9 (0.64)
Hematologic tumors	117 (8.29)
Lymphoma	101 (7.16)
Myeloma	14 (0.99)
Leukemia	2 (0.14)
Bone tumors	41 (2.91)
Osteosarcoma	27 (1.91)
Ewing's sarcoma	8 (0.57)
Chondrosarcoma	6 (0.43)
Mesenchymal tumors	31 (2.20)
Fibrosarcoma	5 (0.35)
Rhabdomyosarcoma	5 (0.35)
Leiomyosarcoma	4 (0.28)
Kaposi's sarcoma	4 (0.28)
Others	13 (0.92)
Odontogenic tumors	15 (1.06)
Clear cell odontogenic carcinoma	7 (0.50)
Ameloblastic carcinoma	3 (0.21)
Others	5 (0.35)
Others	20 (1.42)

oral malignant tumor was squamous cell carcinoma which constituted 92.96% of all epithelial tumors and 67.40% of all oral malignant tumor cases. The second most prevalent oral malignant tumor was lymphoma which accounted for 86.32% of the hematologic tumors and 7.16% of all oral malignant tumor cases. Within the lymphoma group, diffuse large B-cell lymphoma was the predominant subtype. The third most prevalent oral malignant tumor was mucoepidermoid carcinoma which constituted 51.83% of all salivary gland tumors and 6.02% of all oral malignant tumor cases.

## DISCUSSION

The prevalence of oral malignant tumors from the present study was 6.23% which was comparable to the prevalence of 8.0% and 8.2% from Libya<sup>[17,18]</sup> but was higher than the prevalence (of 0.15%) from Australia<sup>[19]</sup> and lower than the prevalence (of 14.82%) from the UAE,<sup>[20]</sup> from Nigeria (18.0%)<sup>[21]</sup> and

from Zimbabwe (24.8%).<sup>[22]</sup> The disparity in the prevalence might be attributable to the difference in the distribution of risk factors in each geographical area.<sup>[20,21]</sup> This study is based on the results of the histopathological diagnoses, so it cannot be compared with most published population-based cancer registered data. The mean age of the patients with oral malignant tumors in this study was 59.13 years, which is similar to the findings in the UAE (54.9 years),<sup>[20]</sup> Iran (61.2 years),<sup>[23]</sup> Malaysia (61.2 years),<sup>[24]</sup> Jordan (62.5 years)<sup>[25]</sup> and Japan (65.2 years)<sup>[26]</sup> but higher than the findings in Nigeria (42.2 years)<sup>[21]</sup> and Libya (46.0 years).<sup>[17,18]</sup> Many patients with oral malignant tumors from this study were females with the male-to-female ratio of 0.86:1 which was comparable to the neighboring country, Malaysia (0.92:1)<sup>[24]</sup> but contrary to most previous reports which consistently showed a male predominance.<sup>[13,17,18,22,23,25-29]</sup> The plausible explanation for this may due to the fact that more female patients attend dental clinics, hospitals and universities than male patients and females have longer life longevity than males since the prevalence of oral malignant tumors in the present study peaks in the seventh and eighth decades of life.

Most of the oral malignant tumors in the present study were encountered at the gingiva which was not in accordance with most previous reports which revealed that tongue was the most common site for oral malignant tumors.<sup>[13,20,23,26,28]</sup> However, Chidzonga<sup>[22]</sup> also reported that gingiva was the most common site for oral malignant tumors, followed by the tongue. Khan *et al.*<sup>[24]</sup> revealed that oral mucosa was the most common site for oral malignant tumors, followed by the tongue. The reasons why the tongue and the cheek are the predilection sites for oral malignant tumors are that the carcinogen in the oral cavity that is mixed with saliva has the tendency to pool at the bottom of the mouth, and these sites are covered by thin and nonkeratinized mucosa. As a consequence, they provide less protection against the carcinogen.<sup>[30]</sup> The most prevalent oral tumor at the gingiva was squamous cell carcinoma. The practice of betel quid/tobacco chewing in Southeast Asia might contribute to the high prevalence of oral malignant tumors, especially squamous cell carcinoma, at the gingiva and buccal mucosa due to the contact with the carcinogens in those areas for a long period.

Epithelial tumor category constituted the largest category of all the oral malignant tumors, followed by the salivary gland tumor category. This finding was in accordance with previous studies.<sup>[13,17,18,20-24]</sup> Nonetheless, the studies by Ajayi *et al.*<sup>[21]</sup> and Rawashdeh and Matalka<sup>[25]</sup> revealed that sarcoma was the second most common category. Within the epithelial tumor category, squamous cell carcinoma was the most common tumor and the most common oral malignant tumor as in previous studies.<sup>[13,17,18,20-27,29]</sup> Within the salivary gland tumor category,

the most prevalent tumor was mucoepidermoid carcinoma. Mucoepidermoid carcinoma was consistently ranked as the most common intraoral salivary gland tumor.<sup>[18,20,24]</sup> However, some studies showed that adenoid cystic carcinoma was the most prevalent intraoral malignant salivary gland tumor.<sup>[21,23]</sup>

In the present study, there were 416 cases (1.84%) of nonsquamous cell oral malignant tumors which was comparable to 1.68% reported by Mohtasham *et al.*<sup>[31]</sup> from Iran but lower than 8.70% by Khan *et al.*<sup>[24]</sup> from Malaysia, 13.97% by Ariyoshi *et al.*<sup>[26]</sup> from Japan, 15.20% by Rawashdeh and Matalaka<sup>[25]</sup> from Jordan, 24.49% by Anis and Gaballah<sup>[20]</sup> from the UAE, 26.2% by Chidzonga<sup>[22]</sup> from Zimbabwe and 36.72% by Ajayi *et al.*<sup>[21]</sup> from Nigeria.

## CONCLUSIONS

Although the prevalence of oral malignant tumors in Thailand is not high compared to others, oral malignant tumors pose significant mortality and morbidity in the patients, especially when discovered late in the course of the disease. This study highlights some anatomical locations such as the tongue and the gingiva where oral malignant tumors are frequently encountered. As a result, clinicians should pay attention to not only teeth but also oral mucosa, especially in the high prevalence area as well since early detection of precancerous lesions or cancers in the early stage increases the chance of patient being cured and greatly reduces the mortality and morbidity. This study provides extensive data on the oral malignant tumors from several university biopsy services locating in virtually all parts of Thailand. The data from the present study show some similarities with previous studies; however, differences such as gender and site of predilection still exist.

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## Conflicts of interest

There are no conflicts of interest.

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