

## Prevalence Study of Squamous Cell Carcinoma in the Tongue

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### ABSTRACT

SCC of the tongue accounts for 20-25% of all malignant oral carcinomas. It typically affects older men in their 50-90s. Patients typically present with painless indurated or ulcerated lesions in the lateral aspect of anterior two thirds of tongue. Known etiologies include tobacco use, alcohol, and exposure to UV light. Other etiologies include trauma, nutritional deficiency, syphilis, and/or poor oral hygiene. SCC of the tongue initially metastasizes to the ipsilateral subdiaphragmatic lymph nodes.

**Aim:** The aim was to determine the frequency and distribution of oral squamous cell carcinoma (OTSCC) involving tongue among patients by studying biopsy specimens during the period (2008-2020) years.

**Results:** Of total cases of the tongue lesion (1451), 999 cases of squamous cell carcinoma in tongue region, The patient were affected over a wide range of 9-98 years with mean age of (54.98) years. The most age group effected (448, 44.80 %) in (60+). (514, 51.45 %) of male gender and (485, 48.55%) of female gender. The ratio of male to female is (1.05:1). Lateral border of the tongue was most commonly involved (451, 45.1%), followed by base of tongue and dorsal surface of tongue. Histopathological Grading, grade II (47.9%) had the highest percentage of the total number of cases (999) while grade IV were reported with the lowest percentage (3.1%). Baghdad governorate preponderance for the other governorates (646). 2020 year is the lowest value (28) cases as compared to the other years.

**Key words:** Squamous cell carcinoma, Epidemiological study, Tongue

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### INTRODUCTION

Oral cancer is the sixth most common cancer worldwide [1,2]. More than 90% of all oral cancers are squamous cell carcinoma (SCC) [3]. Tongue squamous cell carcinoma (SCC) is the most common type of malignant tumor of the oral cavity, and usually occurs following the fifth decade of life [4]. Most cases occurring on the lateral border of the tongue. SCC of the tongue dorsum is very rare, especially at the midline [5]. The reasons why the lateral border of the tongue is the predilection sites for SCC because the carcinogens in the oral cavity mixing with saliva have the tendency to pool at the bottom of the mouth and these site are covered by thin and non-keratinized mucosa. As a consequence, they

provide less protection against the carcinogen [6]. Epidemiological data shows that carcinoma of the tongue constituted 0.8% of all cancers in men and .04% of all cancers in women in United States.

Carcinoma of the tongue clinically presents as ulceration, fumigation (an exophytic mass), and infiltration with varying degree of induration. Patients rarely present with dysphagia or difficulty in speech. There is often a leukoplakic (white patch) or erythroplakic (red patch) component to the lesion and a small size does not exclude invasion [7,8].

The prognosis is strongly correlated with the stage of the disease at diagnosis. Survival of patients with stage I disease exceeds 80% [9]. For patients with locally advanced disease at the time of diagnosis (i.e., stage III and IV), survival drops below 40% [10]. The development of metastases in lymph nodes reduces the survival

of a patient with a small primary tumor by 50%. Most patients with head and neck cancers at the time of diagnosis are found to be stage III or IV [11].

SCC of the tongue is usually graded by the histopathologists on its degree of differentiation into well, moderate, poor and undifferentiated squamous cell carcinoma. This is of use for oral oncologists and surgeons because there has been a correlation between histopathology and prognosis. This finding has got a great bearing on prognosis and 5 year survival because the prognosis for poorly differentiated and undifferentiated tumours is poor as compared to well differentiated tumours [12] (Figures 1 and Figure 2).

## METHODOLOGY

### Study design

The related cases are collected from different hospitals of Iraq during the period 2008 to 2020 in the following confirmed centers:

- ✓ Department of oral and maxillofacial pathology, college of dentistry, university of Baghdad.
- ✓ Cancer registry center at Ministry of health/ Iraq.
- ✓ Major hospitals in Baghdad and governorates.

## Methods

### Data collection tools

The data collection for this study were collected from the filing procedure and archives of previously mentioned above during the period 2008 to 2020 using data collection sheet (case sheet) organized and generated for the purpose of this study. The processed case sheet collected data comprising:

Demographic characteristics of the cases (Patients numbers, age, gender and private information).



Figure 1: Clinical features of oral SCC in young patient presence of white plaque and ulceration at the right lateral surface of the mobile tongue of a 35-year-old patient.



Figure 2: A 73-year-old woman presented with a 1-year history of a persistent ulcer and white patch on the right margin of the tongue and soreness while eating.

Tumor associated information:

Anatomical site and clinical behavior:

Reviewing of the patient recorders in different hospitals that are available.

Data were converted into a computerized database format. The database was checked for errors utilizing range and logical data cleaning techniques, and inconsistencies were remedied. An expert statistical advice was sought for statistical analyses were done using statistical package for social sciences (SPSS) version 21-computer software in association with Microsoft Excel 2013. Frequency distribution and percentages for selected variables describing the recorded cases with squamous cell carcinoma were done.

Male to female ratio has been used as indices for magnitude of gender difference. Thus, the Relative Risk (RR or risk ratio) is another index of effect size similar to its interpretation to standardized ratio.

RR = IR of risk group / IR of reference category.

**Statistical analysis**

Statistical analyses were performed using SPSS statistical package for Social Sciences (version 20.0 for windows, SPSS, Chicago, IL, USA).

Qualitative data are represented as count and percentage. Chi-square test was used to test the relation of qualitative data. Quantitative data are represented as mean and standard deviation. P value of <0.05 was considered statistically significant. P>0.05 is the probability that the null hypothesis is true. A statistically significant test result (P ≤ 0.05) means that the test hypothesis is false or should be rejected. A P value greater than 0.05 means that no effect was observed.

**RESULTS**

**Age and gender**

514 cases (51.5%) of tongue SCC were observed in men and 485cases (48.5%) were seen in women, with a male: female ratio of (1.05:0.94). The mean age in male was years, (9–97) while in female it was 55.64 years (9–98). Overall mean age was 54.98 years (range: 9–98 years), it can be clearly observed that the maximum value (448) was reported in (60+ age group) while the minimum value (15) was reported in (<15 age group) shown in Tables 1 and Figure 3.

From Tables 1 and Figure 3, it can be observed that the maximum percentage (44.80 %) was found in age group (60+), while the minimum percentage (1.50 %) was found in age group (<15). 514 cases (51.5%) of tongue OSCC

Table 1: Gender distribution of OSCC cases in relation to age group.

Age group	Gender		Total	M:F Ratio
	Male	Female		
<15	9(0.9)	6(0.6)	15(1.5)	1.5:1
(15-30)	14(1.4)	8(0.8)	22(2.2)	1.75:1
(30-45)	57(5.7)	53(5.3)	110(11.0)	1.07:1
(45-59)	208(20.8)	196(19.6)	404(40.4)	1.06:1
60+	226(22.6)	222(22.2)	448(44.8)	1.01:1
Total	514(51.5%)	485(48.5%)	999(100%)	1.05:1
Mean	54.53	55.64	54.98	
SD	16.63119	15.933	16.294	

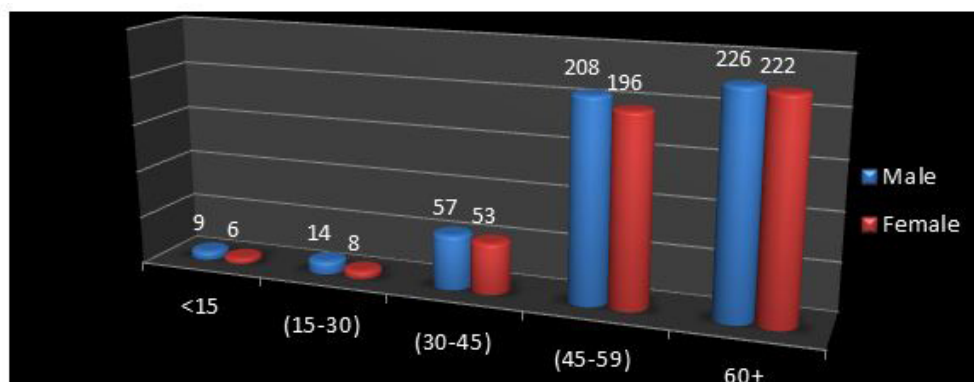


Figure 3: Gender distribution of oral tongue SCC cases in relation to age.

were observed in men and 485cases (48.5%) were seen in women, with a male: female ratio of (1.05:1). There was no significant relation between gender and age group (P=0.111575).

**Prevalence and site anatomical**

When anatomical sites were analyzed, the most commonly affected site was the lateral border the tongue (541 cases, 45.1%), followed base of the tongue (172 cases, 17.2%), dorsal surface of the tongue(69 cases, 6.9%),tip of tongue (46 cases, 4.6%), while 30 case was observed in the ventral surface of the tongue (30 case, 3.0%) ,It must be mentioned that (231 cases, 23.1%)

cases were reported with tongue-NOS , it can be observed that the maximum percentage (45.1%) was found in Lateral border, while the minimum percentage (3.0%) was found in Ventral surface (Table 2 and Figure 4).

**The relative frequency of diagnostic categories of squamous cell carcinoma by annual patients**

The data collection were gathered (999) cases, as squamous cell carcinoma that were recorded in (13) years in Iraqi governorates during the period 2008-2020: 2008 (53), 2009 (66), 2010 (78), 2011 (59), 2012 (84), 2013 (77), 2014 (108), 2015 (111), 2016 (104), 2017 (100), 2018

Table 2: Anatomical Site distribution for the tongue SCC cases.

	ICD Code	N	%	
Body of tongue	base	172	17.2	
	Dorsal surface	69	6.9	
	Lateral border	451	45.1	
	Ventral surface	30	3	
	Tip	46	4.6	
	tongue -NOS	C02.9	231	23.1
	Total		999	100

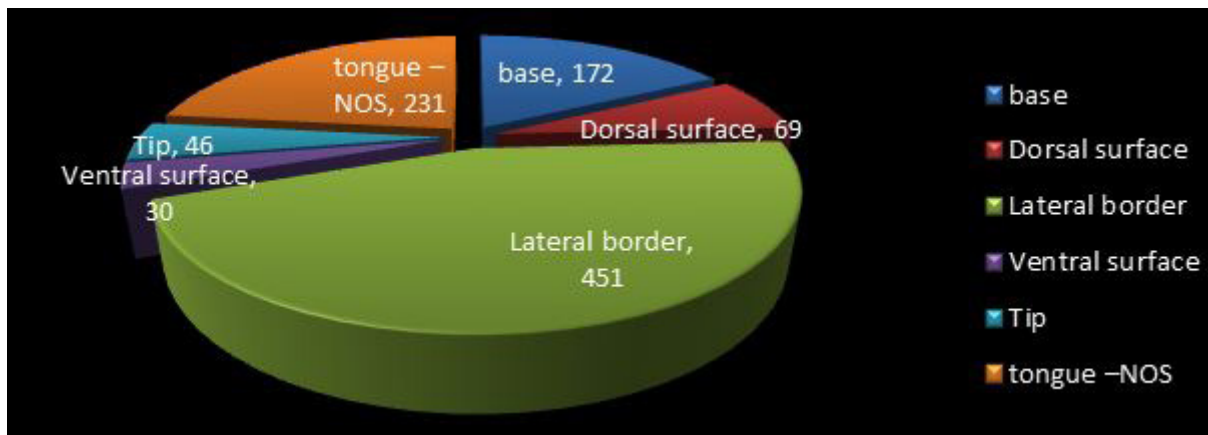


Figure 4: anatomical Site distribution for the tongue SCC cases.

Table 3: The annual number of new cases of OTSCC from 2008 to 2020.

	Year	N	(%)
1	2008	53	5.3
2	2009	66	6.6
3	2010	78	7.8
4	2011	59	5.9
5	2012	84	8.4
6	2013	77	7.7
7	2014	108	10.8
8	2015	111	11.1
9	2016	104	10.4
10	2017	100	10
11	2018	99	9.9
12	2019	32	3.2
13	2020	28	2.8
	Total	999	100

(99), 2019 (32), 2020 (28), as shown in Table 3. From Table 3, it can be clearly observed that the maximum value (111) was reported in 2015 year while the minimum value (28) was reported in 2020 year (Table 3 and Figure 5).

**Histopathological grading**

The histopathological diagnosis of the OSCC indicated that, grade II represented by (47.9%) had the highest percentage of the total number of cases (999) then grade I (30.3%), grade III (4.7%) and the cases with grade IV were reported with the lowest percentage (3.1%). It must be mentioned that (139, 13.9%) cases were

reported with unstated (missing) differentiation, as in table 4, Moderately differentiated OTSCC was the most common (47.9%) among all histopathological grades while Undifferentiated, anaplastic(3.1%) was last percentage (Table 4 and Figure 6).

**Iraq governorates**

The data collection was collected (999) cases, as squamous cell carcinoma that were recorded in (10) Iraqi governorates: Baghdad (646), Basrah (69), Babil (56), Thiqar (50), Al-Najaf (40), Maysan (36), Al-Diwanyia (34), Karbala (28), Wasit (26) and Al-Muthanna (14), as shown

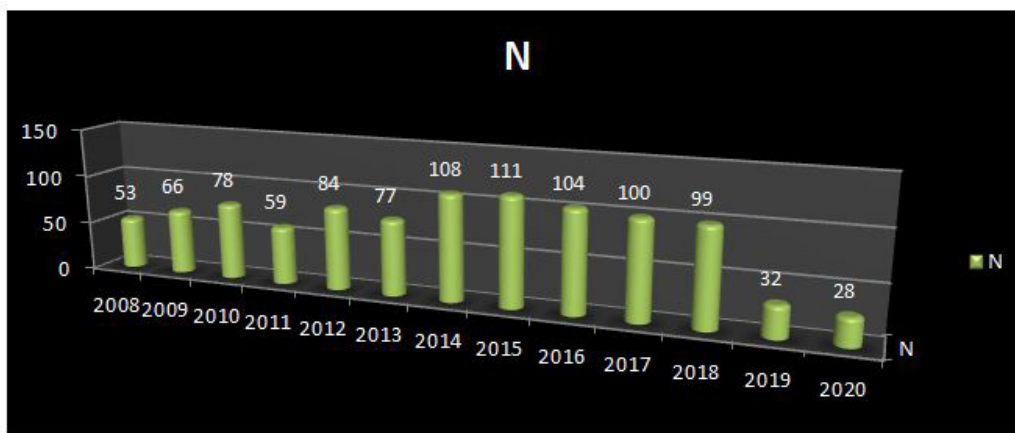


Figure 5: The annual number of new cases of OTSCC from 2008 to 2020.

Table 4: Distribution of histopathological grading for oral tongue SCC.

WHO Grading	N	%	Histopathological Grading
1 Grade I	303	30.3	Well differentiated, differentiated, NOS
2 Grade II	479	47.9	Moderately differentiated, Moderately well differentiated, intermediate differentiated
3 Grade III	47	4.7	Poorly differentiated
4 Grade IV	31	3.1	Undifferentiated , anaplastic
9 Not stated (missing)	139	13.9	Grade not determined, not stated or not applicable
Total	999	100	

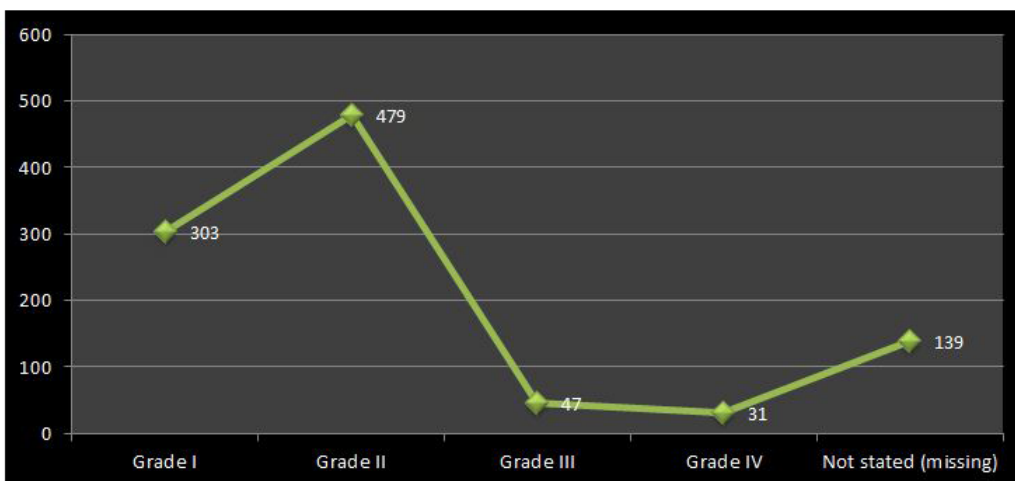


Figure 6: Distribution of histopathological grading for oral tongue SCC.

Table 7: Iraqi governorates distribution for oral tongue SCC cases.

No.	Governorate	Cases	Percentage (%)
1.	Baghdad	646	64.7
2.	Basrah	69	6.9
3.	Babil	56	5.6
4.	Thi qar	50	5
5.	Al-Najaf	40	4
6.	Maysan	36	3.6
7.	Al-Diwanyia	34	3.4
8.	Karbala	28	2.8
9.	Wasit	26	2.6
10.	Al-Muthanna	14	1.4
Total		999	100

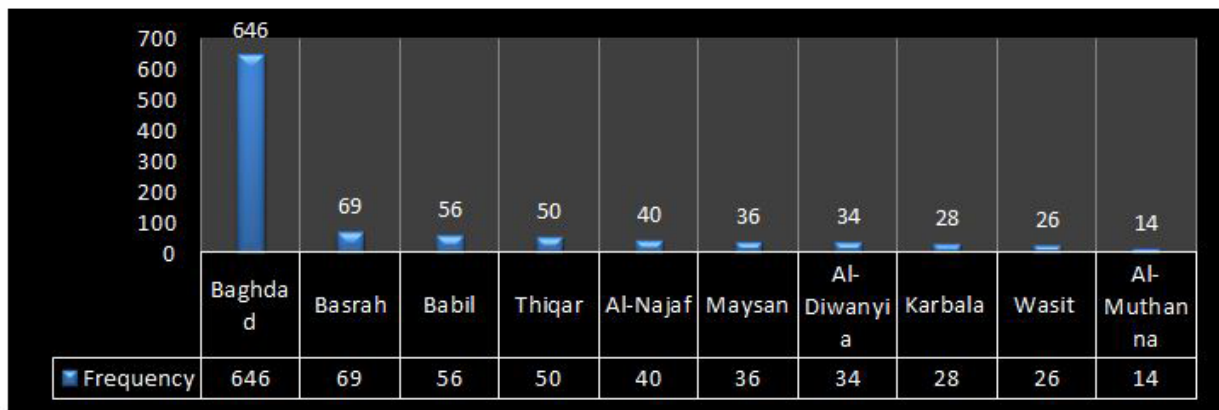


Figure 7: Distribution of squamous cell carcinoma (999) cases across ten governorates in Iraq from 2008 to 2020.

in Table 7. From Table 7, it can be showed that the highest percentage (64.7%) was reported in Baghdad governorate while the lowest percentage (1.4%) was reported in Al-Muthanna governorate. The distribution of squamous cell carcinoma that it gathered for 10 governorates in Iraq from 2008 to 2020 is shown in Figure 7.

**DISCUSSION**

**Age**

Among the collected 999 OTSCC cases, the most affected age group was (60+yrs) (44.80%) which showed the highest percentage during the whole period from 2008-2020 in comparison to other age groups. This is in agreement with many of Iraqi studies [13,14] (56.6%); [15] (54.3%) ; Talabani et al. [16] (61.6%) and compatible with Khudier, 2012 and Museedi and Younis, 2014 . Also agreed with many international studies Shenoi et.al. [17] (42.7%); (88.3%) and consistent with [18,19].

**Gender**

OTSCC affects more frequently men than women. In a study conducted in UAE the M:F

ratio was found to be (4:1.3) [19]. In USA, men were 2–4 times those among women [20]. Warnakulasuriya [21] in 2009 found that M:F is 1.5:1 which is most probably because more men than women face the high-risk habits. In Iran, male to female ratio is (2:1) [22]. Also in Canada the overall ratio of males to females with OC is (2:1) [23] and in India the male to female ratio is (2.2:1) [24,] and (4.18:1) according to [25]. In Germany, M: F (3 :1) by [26]. Our result were compatible with the previously mentioned international studies in that the overall male to female ratio was (1.4 : 1). Also this is in agreement with many Iraqi studies in reporting that male was more than female with different ratios (1.35:1, 1.2:1, 2:1, 1.2:1, 1.5:1,1.2:1, 1.3:1) according to [13,16,25,27,28] respectively. In Nigeria found a male to female ratio (3:4) that may be attributed to the increasing exposure of females to carcinogens such as tobacco and alcohol [29]. The difference in OC between men and women can be attributed to an increase in exposure of men to exogenous carcinogens. The variations in the contributions of smoking and alcohol were the possible causes of differences

in OC between both genders.

#### Anatomical site

Out of the total cases (999) with OTSCC of the tongue our result showed that the lateral border of tongue was reported with the highest percentage (45.1%). These results were in consistence with (Hassan , 2008) who reported that the lateral border of tongue was the most common affected subsite (16.1%) and disagreed with Al-Reyahi et al. [13] tongue -NOS (64.9%).

#### Histopathological grading

Our results reported that the grade II represented by (47.9%) had the highest percentage out of the total number of cases (999). These results were in agreement with Hassan, 2008 and consistent with Hernández-Guerrero [20,29] (68.8%). This disagreed with [13,19,30-34] who reported that grade I was the most common grade. Also disagreed with [35,36] who reported that grade III was the most common grade. In addition to that, the determination of the grade of OTSCC is a subjective point and depend on the opinion of the histopathologist in his diagnosis and interpretation of the slide and this is may be an additional underlying cause for the high percentage of grade II.

It must be mentioned that (13.9%) cases were reported with unstated (missing) differentiation. Lack of information concerning the grade of OTSCC in a considerable number of cases in this study can be attributed to bad archiving of patients files and under registration in the providing centers of data. On the other side, some histopathological reports did not mention the differentiation. Also the histopathological slides for diagnosis were missed and not available specially the slides of the older years. The prognosis and treatment depends on the histological grade of the lesion as well as the clinical staging (TNM classification), and the age of the patient. Treatment typically involves surgical resection with radiation therapy. 5-year survival rate is about 20-30 ("Squamous cell carcinoma of tongue | Pathology Residency and Fellowship Program | Brown University", n.d.).

#### Geographical distribution

The geographical distribution of the reported cases showed that the highest value of frequency distribution and percentage of cases was reported in Baghdad governorate (64.7%)

during the study period (2008-2020). This is in agreement with all Iraqi researches that studied the geographical distribution of OC [13].

The high number of population can explain the underlying cause behind the highest percentages of OTSCC in Baghdad among other Iraqi governorates. Also the presence of many centers and hospitals, the location of the institute and hospital of radiotherapy and nuclear medicine center in Baghdad which made the referral cases reach the institute easier.

The lowest percentage was present in Al Muthanna and Karbala that is in agreement with [37]. This can be explained by the low number of population in these governorates in comparison to the high number of population in Baghdad .Also may be due to under registration of cases or loss of patient's files and reports.

#### CONCLUSIONS

- ✓ The maximum percentage (44.80 %) was found in age group (60+), while the minimum percentage (1.50 %) was found in age group (<15).
- ✓ The males were more affected by OTSCC than females with overall male to female ratio (1.05:0.94).
- ✓ The most commonly affected site was the lateral border the tongue (541 cases, 45.1%) whereas the least affected site was the ventral surface of the tongue (30 cases, 3.0%).
- ✓ Moderately differentiated OTSCC was the most common (47.9%) among all histopathological grades followed by well differentiated OSCC (30.3%).
- ✓ The highest percentage (64.7%) was reported in Baghdad governorate while the lowest percentage (1.4%) was reported in Al-Muthanna governorate.
- ✓ The maximum cases (111) were reported in 2015 year while the minimum cases (28) were reported in 2020 year.

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