

# Pattern of Head and Neck Cancers in Karbala Province of Iraq: Data from Developing Country

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## Abstract

**Background:** Head and neck cancers (HNCs) patterns vary worldwide in relation to demographic and environmental factors. **Objective:** The aim of our study was to investigate the pattern of HNCs in Karbala province of Iraq, compare and identify possible changes with other populations. **Methods:** A retrospective descriptive study was carried out at Al-Hussein Cancer Center in Karbala, Iraq, on 302 patients diagnosed with HNCs between January 2012 and December 2021 with evaluation of age, gender distribution and sites of cancers. **Results:** Among total 302 patients, median age was 58 years. Males accounted for a higher proportion of patients, (67.55%) were males and (32.45%) were females, with an M:F ratio of 2.08:1. Larynx was the most affected site among our patients contributing (28.48%) followed by nasopharynx (28.14%), lip & oral cavity (14.57%), salivary glands (11.59%), oropharynx (8.28%), paranasal sinuses (5.30%) and hypopharynx (3.64%). The most frequent site of HNCs in males was larynx, while the most frequent site in females was nasopharynx. **Conclusion:** This is the first statistical study of HNCs in Karbala province of Iraq. It can be used as basic information to investigate epidemiological characteristics, to evaluate progress in recent years and to develop treatment strategies.

**Keywords:** Head and neck- Cancers- Pattern- Karbala- Iraq

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## Introduction

Head and neck cancers (HNCs) are categorized amongst the top ten malignancies globally accounts for approximately 900,000 cases and over 400,000 deaths annually [1]. In Karbala province, they represent only 2.66% from all registered cancers [2]. This variation in incidence between our country and the other parts of the world may be explained by significant variation in the regional risk factors [3]. The difference in the prevalence of known risk factors including tobacco use, alcohol drinking and human papilloma virus (HPV) positivity may lead to different trends in the incidence rates across countries [4]. The incidence of the cancers has reported from different

countries in the world revealed that South Asia and parts of Southern Europe had the highest incidence [5]. HNCs occurs in various subsites, including (the lip, oral cavity, pharynx, larynx, paranasal sinuses and salivary glands). Indeed, the most common sites of incidence among HNCs cases vary by geographic region [6].

However, most of these data about HNCs are from developed countries, and little knowledge exists about the pattern of these cancers in Iraq. The present study aimed to investigate the pattern of HNCs in Karbala province of Iraq.

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**Materials and Methods**

*Study design and participants*

This is a retrospective descriptive study conducted at Al-Hussein Cancer Centre in Karbala, Iraq. It covers not only Karbala area, but other patients from the Middle Euphrates Region in Iraq are referred to this centre for solid and haematological malignancy management [7-9]. This study included 302 patients diagnosed as HNCs between January 2012 and December 2021.

The HNCs cancer in this study were defined as the cancer sites of the International Classification of Diseases for Oncology (ICD-O) codes as shown in Table 1.

*Inclusion/exclusion criteria*

Included in this study were patients diagnosed with HNCs between January 2012 and December 2021. Thyroid carcinoma and lymphoma were excluded from the study.

*Ethical considerations*

Ethical approval was obtained from the Ethics Committee of Karbala Teaching Hospital in Karbala, Iraq.

*Statistical analysis*

Data of all patients were entered and managed using the Statistical Package for Social Sciences software (SPSS 25, IBM, Armonk, NY, United State of America). Descriptive statistics of the variables were expressed as percentage, median, and ratio.

**Results**

In the period between 2012-2021, 302 patients of HNCs were diagnosed in Karbala. An obvious male predominance was seen as 204 patients were males (67.55%) and 98 patients were females (32.45%), with an M:F ratio of 2.08:1.

The median age of diagnosis was 58 years for all cases, patients ages were between 6 years and 90 years, among

Table 1. Classification of HNCs (ICD-10) by Anatomical Site.

Organ/site	ICD-O code
Oral cavity	C00-06
Lip	C00
Tongue	C01-02
Mouth	C03-06
Salivary glands	C07-C08
Oropharynx	C09-10
Tonsil	C09
Another oropharynx	C10
Nasopharynx	C11
Hypopharynx	C12-13
Nasal cavity and middle ear	C30-C31
Paranasal sinus	
Larynx	C32

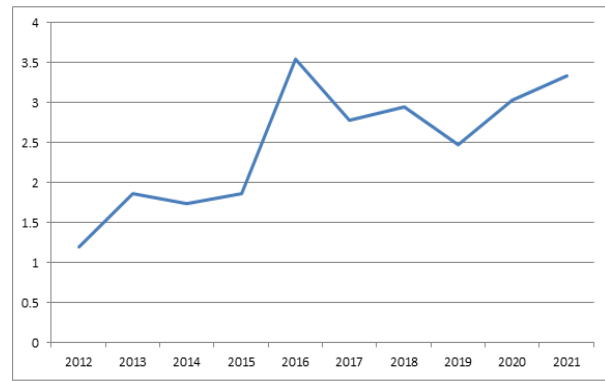


Figure 1. Age-standardized Incidence Rates of HNCs per 100,000 Person-years in Karbala, 2012-2021.

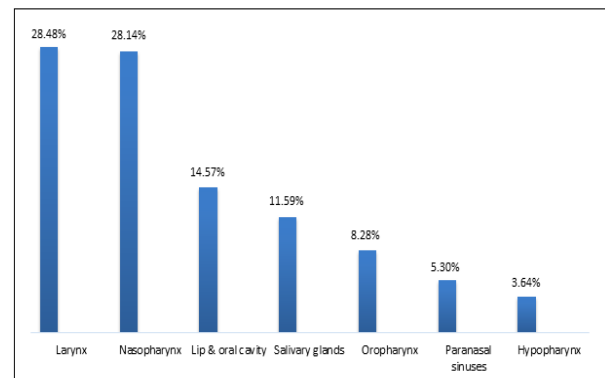


Figure 2. Distribution of HNCs sites among 302 Patients

all cases, 238 patients (78.81%) were > 40 years while 64 patients (21.19%) were ≤ 40 years. The most affected age group was (61-70) years in 76 patients (25.17%) followed by (51-60) years in 71 patients (23.51%) as shown in (Table 2).

The incidence rate of HNCs in Karbala province of Iraq increased during the study period from 1.19 per 100,000 in 2012 to 3.34 per 100,000 in 2021 as shown in (Figure 1).

Larynx was the most affected site among our patients in 86 patients (28.48%) followed by nasopharynx in 85 patients (28.14%), lip & oral cavity in 44 patients (14.57%), salivary glands in 35 patients (11.59%), oropharynx in 25 patients (8.28%), paranasal sinuses in 16 patients (5.30%) and hypopharynx in 11 patients (3.64%) as shown in (Figure 2).

Among females, nasopharynx was the most common affected site in 30 patients (30.61%), followed by lip & oral cavity in 18 patients (18.37%), larynx in 16 patients (16.33%), salivary glands in 13 patients (13.27%), oropharynx in 8 patients (8.16%), paranasal sinuses in 8 patients (8.16%) and hypopharynx in 5 patients (5.10%) as shown in (Table 3).

Among males, larynx was the most common affected site in 70 patients (34.31%) followed by nasopharynx in 55 patients (26.96%), lip & oral cavity in 26 patients (12.75%), salivary glands in 22 patients (10.78%), oropharynx in 17 patients (8.33%), paranasal sinuses in 8 patients (3.92%) and hypopharynx in 6 patients (2.94%) as shown in (Table 3).

Table 2. Age Distribution of 302 Patients

Age (year)	N (%)
≤10	4 (1.32)
20-Nov	15 (4.97)
21-30	16 (5.30)
31-40	29 (9.60)
41-50	49 (16.22)
51-60	71 (23.51)
61-70	76 (25.17)
71-80	33 (10.93)
>80	9 (2.98)
Total	302 (100)

Regarding laryngeal cancer, there was male predominance with M:F ratio 4.37:1. Median age was 65 years, only 2.33% of laryngeal cancer patients were ≤ 40 years while 97.67% of patients were > 40 years (Tables 4 and 5).

The median age of the patients with nasopharyngeal tumour was 48 years, and the M:F ratio was 1.83:1. In terms of age, 40% of patients were ≤ 40 years and 60% of patients were > 40 years (Tables 4 and 5).

Lip & oral cavity cancer was presented with median age 60 years, M: F ratio was 1.44:1. About 13.64% of patients were ≤ 40 years and 86.36% of patients were > 40 years (Tables 4 and 5).

The median age of the patients with salivary glands tumour was 51 years, and M:F ratio was 1.69:1. Around 31.43% of patients were ≤ 40 years, and 68.57% of patients were > 40 years (Tables 4 and 5).

The median age of the patients with oropharyngeal

tumour was 55 years, and the M:F ratio was 2.12:1. Twenty percent of patients with oropharyngeal tumour were ≤ 40 years, and 80% of patients were > 40 years (Tables 4 and 5).

The median age of the patients with paranasal sinuses tumours was 53 years, M:F ratio was 1:1. One quarter of cases were ≤ 40 years while 75% of cases were > 40 years (Tables 4 and 5).

The median age of the patients with hypopharyngeal tumour was 63 years, M:F ratio was 1.2:1. About 18.18% of cases were ≤ 40 years, at the same time 81.82% of cases were > 40 years (Table 4 and 5).

## Discussion

The overall incidence of HNCs continues to rise, with a predicted 30% increase annually by 2030. This increase has been recorded across both developed and developing countries [10]. This making HNCs as a significant public health burden worldwide, causing significant mortality and morbidity despite significant clinical advances enabling their early diagnosis and treatment. The current and future estimated burden of HNCs is shifting to less developed regions which may be ill equipped to deal with this increasing burden [11]. This study assessed the pattern of HNCs in Karbala province of Iraq between January 2012 and December 2021, with regards to age, gender and subtypes to a draw urgent attention of policy makers through effective cancer control policy implementation with population-based interventions.

Worldwide, HNCs significantly affected males more than females with a ratio ranging from 2:1 to 4:1 which is consistent with our results with M:F ratio of 2.08:1 [12].

Table 3. Distribution of HNCs Sites by Gender

	Male n (%)	Female n (%)
1	Larynx 70 (34.31)	Nasopharynx 30 (30.61)
2	Nasopharynx 55 (26.96)	Lip & oral cavity 18 (18.37)
3	Lip & oral cavity 26 (12.75)	Larynx 16 (16.33)
4	Salivary glands 22 (10.78)	Salivary glands 13 (13.27)
5	Oropharynx 17 (8.33)	Oropharynx 8 (8.16)
6	Paranasal sinuses 8 (3.92)	Paranasal sinuses 8 (8.16)
7	Hypopharynx 6 (2.94)	Hypopharynx 5 (5.10)
Total	204 (100)	98 (100)

Table 4. Distribution of HNCs Sites by Median Age and Gender

Site	N (%)	Median age (years)	Gender		
			Male	Female	M:F ratio
Larynx	86 (28.48)	65	70	16	4.37:1
Nasopharynx	85 (28.14)	48	55	30	1.83:1
Lip & oral cavity	44 (14.57)	60	26	18	1.44:1
Salivary glands	35 (11.59)	51	22	13	1.69:1
Oropharynx	25 (8.28)	55	17	8	2.12:1
Paranasal sinuses	16 (5.30)	53	8	8	1:01
Hypopharynx	11 (3.64)	63	6	5	1.2:1
Total	302 (100)	58	204	98	2.08:1

Table 5. Distribution of HNCs Sites by Age Groups

Age (years)	Larynx N (%)	Nasopharynx N (%)	Lip & oral cavity N (%)	Salivary glands N (%)	Oropharynx N (%)	Paranasal sinuses N (%)	Hypopharynx N (%)
≤10	0 (0.00)	3 (75.00)	0 (0.00)	0 (0.00)	1 (25.00)	0 (0.00)	0 (0.00)
11-20	0 (0.00)	12 (80.00)	1 (6.67)	0 (0.00)	0 (0.00)	2 (13.33)	0 (0.00)
21-30	1 (6.25)	8 (50.00)	0 (0.00)	5 (31.25)	1 (6.25)	0 (0.00)	1 (6.25)
31-40	1 (3.45)	11 (37.93)	5 (17.24)	6 (20.69)	3 (10.34)	2 (6.90)	1 (3.45)
41-50	9 (18.37)	17 (34.69)	6 (12.25)	6 (12.25)	5 (10.20)	4 (8.16)	2 (4.08)
51-60	19 (26.76)	17 (23.94)	14 (19.72)	7 (9.86)	9 (12.68)	4 (5.63)	1 (1.41)
61-70	39 (51.32)	14 (18.42)	9 (11.84)	6 (7.89)	5 (6.58)	2 (2.63)	1 (1.32)
71-80	15 (45.46)	1 (3.03)	7 (21.21)	3 (9.09)	1 (3.03)	1 (3.03)	5 (15.15)
>80	2 (22.22)	2 (22.22)	2 (22.22)	2 (22.22)	0 (0.00)	1 (11.12)	0 (0.00)

For all sites there was a male predominance, this was the same as European and Asian findings [11,13]. These findings may be explained by sex-specific patterns of tobacco and alcohol consumption [10].

The risk of HNCs increases with age across populations, with the majority of cases diagnosed in those over 50 years [10,14,15]. This was consistent with our findings where the median age of our patients was 58 years & more than 60% of our patients were older than 50 years.

As the worldwide data, the incidence rate of HNCs in Karbala province of Iraq increased from 1.19 per 100,000 in 2012 to 3.34 per 100,000 in 2021. This trend is partly attributed to changes in lifestyle factors, such as increased alcohol consumption and tobacco use in developing nations, as well as the growing prevalence of human papillomavirus (HPV)-related cancer [10,16].

The commonest affected sites in our study were larynx, nasopharynx and lip & oral cavity, this was consistent with previous study in Iran, while in Europe oral cavity was most common site followed by larynx [11,17]. On the other hand in Asia, oral cancer was the most common site followed by hypopharynx and larynx [18].

Our findings were compatible with the worldwide epidemiologic measures of laryngeal malignancy. This malignancy is substantially higher in men and all epidemiological measurements show a steady rise after the age of 35 in both sexes, with the incidence peaking at the age of 65 years [19].

The median age of a nasopharyngeal tumour patients in our province was 48 years which is younger than previous international studies where the incidence peaks around 50 to 59 years of age, at the same time the male predominance among our cases was the same as the international findings [20].

The current study showed that more than 86% of patients with lips & oral cancer were older than 40 years with median age 60 years old which is similar to what was reported in previous studies [21]. Similar to our study, international studies showed that the males were more affected than females [21].

Our results showed that the median age of the salivary glands tumour patients was 51 years, which slightly younger than the international average age with 56 years and the same as international findings our results showed slight male predominance [22,23].

Oropharyngeal tumour was presented with median age 55 years which is significantly younger than United States (60 years) [24]. Being Iraqi has a high percent of young population (> 58% of population under 25 years old) so it was not unusual to find that most of patients present with younger age group [25]. On the other hand, the male predominance in our study was the same as in United States [24].

In the current study, paranasal sinuses tumours were presented with median age 53 years, this was consistent with previous studies where the majority of cases occurred in the fifth decade of life [26-28]. In our province, male and female were equally affected while the predominance of men was obvious in previous works [26,29,30]. This may be explained by small sample size in our study.

Our study showed that hypopharyngeal tumour was presented with median age 63 years, which is close to median age in Korea (63 years) United States (61 years) but our median age was older than that registered in India (57 years) [31-33]. On the other hand as in our study, male predominance was observed in previous studies [31-33].

This study can be evaluated in terms of its strengths and limitations. A strength of our study is that it can help to provide basic information about HNCs in Iraq, comparing it to neighbouring countries and the world. Moreover, to the best of our knowledge, this study is the first one to be carried out in the Karbala province of Iraq. A limitation of our study is that it covered only Karbala province and not other regions of Iraq.

In conclusion, in our study, laryngeal and nasopharyngeal tumours represented the majority of cases. larynx was the most frequent site of HNCs among males, while nasopharynx was the most common site of HNCs among females. The incidence of HNCs increased in the last years in Karbala, and the disease tend to increase with age & male predominance was observed in all subtypes. Our study highlights the need for future studies in other parts of Iraq with a larger number of patients to understand the HNCs dissemination and pattern in this country.

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#### Conflicts of interest

There are no conflicts of interest.

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