

# Epidemiological Characteristics of Head and Neck Cancers in Southeast of Iran

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## Abstract

**Background:** The aim of this study was to investigate the epidemiological aspects of malignant tumors of head and neck in southeast of Iran, with a view toward analyzing the age, gender and site distribution and histological types.

**Methods:** All cases with malignant tumor of the head and neck region from 1999 to 2009 were retrieved from the records of cancer registry center of Kerman University of medical sciences and all pathology laboratories of Kerman province.

**Results:** A total of 1604 cases were recruited during the study period. The mean age of patients was 53.03 years (standard deviation: 17.18, range: 2 to 95 years). Patients with a diagnosis of carcinoma were older than those with sarcoma and lymphoma ( $p < 0.01$ ). 18.4% of patients were below the age of 41 years. The overall male to female ratio was 2.74:1. Larynx was the most commonly affected site (46.76%) followed by oral cavity (15.9%). Squamous cell carcinoma was the most common diagnoses (77.5%), followed by lymphoma (9.4%).

**Conclusion:** The higher incidence of laryngeal cancer in the head and neck region in southeast of Iran is in agreement with findings of the other parts of Iran. Also, occurrence of head and neck cancer under 41 year olds is greater than what is reported for some countries.

**Keywords:** Epidemiology; Head and Neck; Cancer; Squamous cell carcinoma

**Please cite this article as:** Larizadeh MH, Damghani MA, Shabani M. Epidemiological Characteristics of Head and Neck Cancers in Southeast of Iran. *Iran J Cancer Prev.* 2014; 7(2):80-6.

## Introduction

Head and Neck Cancers (HNC) are the sixth most common malignancy globally. Annually, more than 500000 cases are diagnosed worldwide [1]. Laryngeal cancer is the most common cancer of the head and neck region among Iranian population [2]. The incidence of HNC differs by subtype, country and sex [3-7]. An incidence rate of 5%- 50% has been reported in various countries [8]. This global variation may be due to various sociocultural characteristics, major differences in risk factors and data collection [9]. The highest incidence of HNC is found in south Asia and south part of Europe. Tobacco and alcohol use are the most important risk factors associated with HNC. Other risk factors associated with tongue, tonsil and oropharyngeal cancer are poor oral hygiene and the Human Papilloma Virus (HPV) 16. Chewing tobacco, betel quid and areca-nut increases the risk of certain sub sites of the head and neck cancer in south Asian

countries [10-12]. Oral cavity cancer incidence rates have increased in many countries along with tobacco epidemics that are currently peaking and declined in areas where tobacco use has peaked in the past. In contrast, incidence of oropharyngeal cancer has been increased in a number of countries whereas the tobacco use has declined; perhaps due to the emerging importance of human papilloma virus infection [4].

Continuous monitoring of trends in incidence rate is required to help global cancer control strategies. There is limited evidence with regard to the epidemiology of head and neck cancer in Iran. The aim of this study was to present epidemiological aspects of malignant tumor of head and neck in Kerman province located in Southeast of Iran. This area has an estimated population of about 2.7 million. The distribution of sex, age range and tumor patterns (histopathology, location) were described.

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Received: 27 Nov. 2013  
Accepted: 26 Apr. 2014

**Iran J Cancer Prev. 2014; 2:80-6**

**Table 1.** Age distribution of Head and Neck cancers

Age group	Number	Percent
0-10	9	0.6
11-20	35	2.2
21-30	93	5.8
31-40	157	9.8
41-50	360	22.4
51-60	405	25.2
61-70	285	17.8
71-80	205	12.8
>80	55	3.4

### Materials and Methods

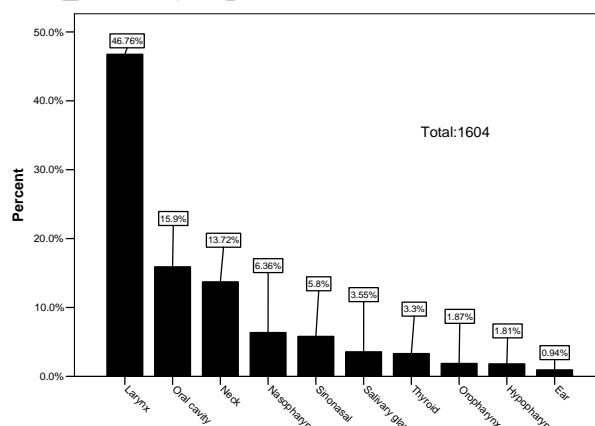
Our data was collected from pathology records registered in all pathology laboratories of Kerman province and Cancer Registry Center of Kerman University of medical sciences from 1999 to 2009. These records contained information on virtually all newly diagnosed cases, including topography, morphology, date of diagnosis and birth date of each patient. Through an active registration process, data on cancer cases are collected from various sources in the province. Data obtained from hospitals and laboratories were entered in a manner that ensured strict quality control checks and avoided repetition of cases. The following were exclusion criteria: reports with doubtful or controversial diagnosis, benign tumors, skin cancers, cervical esophageal cancers, central nervous system and eye tumors and reports of non-Kermanian residence. To identify cases of HNC we extracted categories C00–C14 and C30–C32 of the International Classification of Diseases, 10th edition (ICD-10). All of the cases were subjected to analysis of age, gender, tumor location and histological type. Anatomical origin was classified as follow: Larynx, oral cavity (lip, tongue, floor of mouth, hard palate, buccal mucosa, and gingiva), oropharynx (base of tongue, palatine tonsil, tonsillar fossa, tonsillar pillars, retromolar trigone, soft palate, and oropharyngeal wall), nasopharynx, hypopharynx, sinonasal (nasal cavity

and paranasal sinuses), ear (ear canal and middle ear), neck, major salivary gland and thyroid.

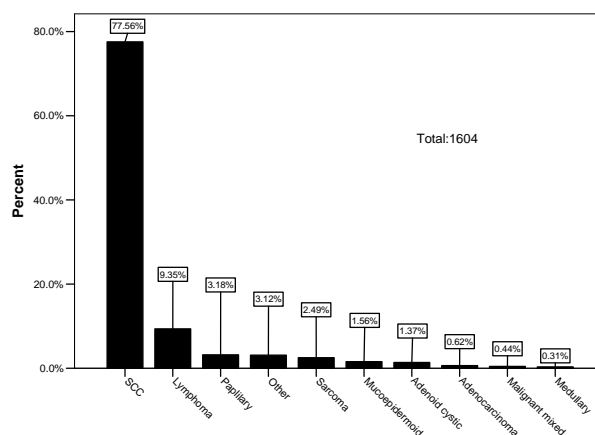
The results obtained are expressed as mean±SD. One-way ANOVA was performed on age of cancer diagnosis. Individual comparisons were performed by Tukey’s test where appropriate. Statistical significance was defined at  $p < 0.05$ . All computations were made using the SPSS software package (version 16.0).

### Results

Overall, 18 articles included according to during this 10-year period a total of 20050 malignant biopsy specimens were recorded. Of these specimens 1604 (8%) were diagnosed as malignant head and neck cancer. Age distribution percentage of all cases has been shown in Table 1. The mean age of all patients was 53.03 years (standard deviation: 17.18, range: 2 to 95 years, Table 2). The



**Figure 1.** Site distribution of Head and Neck Cancers



**Figure 2.** Histological distribution of Head and Neck cancers

**Table 2.** Age distribution of cancers types

Type of cancer	Mean ± SD	Range of age
Carcinoma	55.9±15.07	12-95
Sarcoma	**36.5±23.42	3-67
Lymphoma	**39.2±19.16	2-76
All patients	53.03±17.18	2-95

Patients with a diagnosis of sarcoma and lymphoma were younger than those with carcinoma, \*\*: p<0.01 compared to carcinoma type

**Table 3.** Gender distribution and male to female ratio according to tumor location

Site	Sex		
	M (%)	F (%)	M/F
Larynx	658 (87.7)	92 (12.3)	7.15
Oral cavity	152 (59.6)	103 (40.4)	1.47
Oropharynx	22 (73.3)	8 (26.7)	2.75
Nasopharynx	50 (49)	52 (51)	0.96
Sinonasal	60 (64.5)	33 (35.5)	1.8
Hypopharynx	4 (13.8)	25 (86.2)	0.16
Salivary	35 (61.4)	22 (38.6)	1.59
Neck	165 (75)	55 (25)	3
Thyroid	20 (37.7)	33 (62.3)	0.60
Ear	10 (66.7)	5 (33.3)	2
Total	1176 (73.3)	428 (26.7)	2.74

mean age of patients with carcinoma was 55.93 years (standard deviation: 15.07, range: 12 to 95 years). The mean age of patients with soft tissue sarcoma was 36.5 years (standard deviation: 23.42, range: 3 to 67 years) and of those with lymphoma was 39.2 years (standard deviation 19.16, range: 2 to 76 years). Patients with a diagnosis of carcinoma were older than those with sarcoma and lymphoma (p<0.01, Table 2).

Figure 1 shows the distribution of these cases by site. The most common site of involvement was larynx (46.76%) followed by oral cavity (15.9%) and neck (13.72%). 73.3% of the patients were male and male to female ratio was 2.74:1. Gender distribution by site is shown in Table 3. Histological distribution of cases by site is shown in Table 4. The following rare diagnoses were determined as other

type: plasmacytoma, transitional cell carcinoma, melanoma, estesioneuoblastoma, germ cell tumor, and acinic cell carcinoma. Squamous cell carcinoma (SCC) was the most common histological type comprising of 77.5% cases (Figure 2). The next highest rate one was lymphoma (9.4%, Hodgkin and Non Hodgkin). The most common soft tissue sarcoma was rhabdomyosarcoma (17 patients, 42.5%) followed by fibrosarcoma (11patients, 27.5%), malignant fibrous histiocytoma (6 patients, 15%) and no definite subtype (6 patients, 15%).

In oral cavity the most affected site was tongue (35%) followed by lip (31%) and gingiva (17%).

**Table 4.** Histological distribution according to tumor location

Site	SCC	Sarc	Lym	Adeno	ACC	MEP	MMT	PAP	MED	Other
<b>Larynx</b> (n=750)	745 (99.3)	-	2 (0.3)	-	-	-	-	-	-	3 (0.4)
<b>Oral cavity</b> (n=255)	232 (91)	-	3 (1.2)	-	7 (2.7)	3 (1.2)	-	-	-	10 (3.9)
<b>Oropharynx</b> (n=30)	5 (16.6)	-	17 (56.7)	-	-	2 (6.7)	-	-	-	6 (20)
<b>Nasopharynx</b> (n=102)	92 (90.2)	5 (4.9)	5 (4.9)	-	-	-	-	-	-	-
<b>Sino-nasal</b> (n=93)	43 (41.2)	15 (16.1)	3 (3.2)	1 (1.1)	5 (5.4)	-	-	-	-	26 (28)
<b>Hypopharynx</b> (n=29)	29 (100)	-	-	-	-	-	-	-	-	-
<b>Salivary gland</b> (n=57)	5 (8.8)	3 (5.3)	10 (17.5)	-	10 (17.4)	20 (35.1)	7 (12.3)	-	-	2 (3.5)
<b>Neck</b> (n=220)	85 (38.7)	10 (4.6)	110 (50)	9 (4.1)	-	-	-	3 (1.3)	-	3 (1.3)
<b>Thyroid</b> (n=53)	-	-	-	-	-	-	-	48 (90.5)	5 (9.5)	-
<b>Ear</b> (n=15)	8 (53.3)	7 (46.7)	-	-	-	-	-	-	-	-
<b>Total</b> (n=1604)	1244 (77.5)	40 (2.5)	150 (9.4)	10 (0.6)	22 (1.4)	25 (1.6)	7 (0.4)	51 (3.2)	5 (0.3)	50 (3.1)

(SCC: Squamous cell carcinoma, Sarc: soft tissue sarcoma, Lym: Lymphoma, Adeno: Adenocarcinoma, ACC: Adenoid cystic carcinoma, MEP: Mucoepidermoid carcinoma, PAP: papillary carcinoma, MED: Medullary carcinoma).

## Discussion

HNC occurs more frequently in old patients [5, 8, 9, and 12]. The incidence of these tumors is low among the persons younger than 40 years. Most of the patients (65.4%) in our study were aged between 41 and 70 years. In another study 71.9% of these tumors were reported in this age group [13]. 18.4% of our patients were under 41 years old. This rate is more than that was seen in other studies around the world [12-15] but approximates the findings of a previous study in Iran [16], involvement of young patients is also high for African regions. The incidence of 17.3% to 40% has been reported for

oral cancers in patients less than 40 years [5, 9, 17-20]. This may be due to the higher percentage of people below 40 years, lower life expectancy and early exposure to risk factors in Africans [8].

Consistent with another report, our patients with biopsy proven diagnosis of carcinoma were older than those with sarcoma and lymphoma ( $p < 0.01$ ) [8].

Most patients (73.3%) in current study were male. Similar observation was reported in literature [21, 22]. It seems that higher rate of smoking and alcohol consumption among men is not the only explanation for this finding. Sex-hormone

differences between the two genders may also have a role [23].

The male to female ratio reported by large scale epidemiological studies and national cancer registries varies from 2:1 to 15:1 depending on the site of disease [24]. Recently the incidence of HNC in women has been increased significantly, probably due to changes in environmental exposure [12]. For example, in Argentina man/woman ratio for oral cancer has been decreased from 7.1:1 (1950-1970 period) [18] to 1.24: 1 (1992-2000 period) [14]. In the USA, 5% of the male and 2% of the female population is affected by oral cancer with a sex ratio of male to female of 2:1. Hormone replacement therapy in postmenopausal women has increased in some countries and it is suggested as a factor for increasing head and neck cancer incidence in women [23, 25-27].

In this study, male to female ratio had a wide range among the head and neck sub sites (from 7.15: 1 for larynx to 0.16:1 for hypopharynx). Regarding the larynx, our finding was similar to previous reports in Iran and other parts of the world [28, 29]. In oral cancer, worldwide estimation of male: female ratio is 2:1 [29]. This ratio for our series was 1.47:1. In nasopharynx and hypopharynx, female patients were more frequently involved which is not consistent with other reports [13, 29]. For thyroid cancer, male: female ratio was 0.33 globally [29]; this ratio was 0.6 in our study.

In the present study, the most common involved site was larynx (46.76%). This finding is in agreement with another report in Iran (44%) [30]. Globally, oral cavity is the most common site of orofacial malignancy [8, 12, 30]. Oral cancer is most common in India, Bangladesh, Srilanka and Pakistan [13]. The reason for this high incidence is the habit of tobacco, betel and nut chewing in these countries [29]. A study showed the role of Kola nut in promoting the cigarette smoking-induced keratinization of palatal mucosa [31]. In another small study Kola nut-chewing habit observed commonly in oral cancer [5]. According to our non-published information, this habit is less common than tobacco smoking in Iran. The higher incidence of laryngeal cancer compared to oral and oropharyngeal cancer may be due to this different habit, but further study is needed to confirm it.

The tongue was the most frequent involved site of oral cavity in this study (35%) that was consistent with other reports [14].

SCC was the most frequent histologic type in the present study. This is a common finding in other studies [3, 8, 13, 32].

In agreement with another report, lymphoma was the second most common malignancies in our patients [32]. Although, in several studies sarcomas (of bone and soft tissue) were more frequent than lymphomas [8, 32]. Excluding bone arising tumors in the present study is the reason for this difference. Lymphoma was the most frequent pathological diagnosis in oropharynx.

Soft tissue sarcomas are rare in the head and neck region. Fewer than 10% of all soft tissue sarcomas occur in the head and neck and less than 1% of all neoplasms in this region are soft tissue sarcoma [33, 34]. In this study these neoplasms account for 2.5% of all cases. Usual subtypes of soft tissue sarcomas are rare in the head and neck region. The most common soft tissue sarcoma in this region is rhabdomyosarcoma, followed by malignant fibrous histiocytoma and fibrosarcoma [35]. The same result was seen in this study.

Salivary gland tumors are rare and account for less than 2% of all cancers and 3% to 4% of head and neck neoplasms [36, 37]. In this study, major salivary gland neoplasms accounted for 3.35% of all cases. The percentage of histological subtypes varies from series to series [37-40]. In the present study the most common type was mucoepidermoid (35.1%) followed by adenoid cystic carcinoma (17.4%).

In accordance with other studies in neck region, the most common malignant mass was lymphoma and the most metastatic mass was SCC [8, 13].

In conclusion, the higher incidence of laryngeal cancer in the head and neck region in south east of Iran is in agreement with findings of the other parts of Iran. Occurrence of head and neck cancer in Iranian population under 41 year olds is greater than reported for some countries. This represents a great potential for etiological studies.

## Acknowledgment

The present manuscript is the product of a research project that was approved by the Kerman University of Medical Science.

## Conflict of Interest

The authors declare no conflict of interest.



## Authors' Contribution

Mohammad Hasan Larizadeh and Mohammad shabani designed and wrote this article, Mohammad Hasan Larizadeh and Mohammad Ali Damghani collected and analyzed the data. All authors read and approved the final manuscript.

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