

# Epidemiological Aspects of Head and Neck Cancers in a Group of Iranian Population

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## KEY WORDS

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## ABSTRACT

**Statement of Problem:** Head and neck cancers occur in a wide variety of tissue types and sites, resulting in a complex range of malignancies cared by physicians in multiple specialties. Epidemiologic aspects of head and neck cancer in Iran have not been studied adequately.

**Purpose:** The aim of this study was to represent epidemiological aspects of head and neck cancers in Kerman province in Iran.

**Materials and Method:** In this retrospective epidemiological study, a total of 2211 cases of head and neck cancers were diagnosed in period 11-year. Data on all malignant head and neck cancers were included in this study. Information was obtained from the records of the 18 departments of histopathology in Kerman province.

**Results:** The five most common sites were skin of the head and neck (46.81%), lymph nodes of head and neck (13.98%), larynx (13.48%), oral cavity and pharynx (12.21%), and thyroid (6.20%). Paranasal sinuses were the least common. The incidence rate of head and neck cancers was 10.12/100000 cases.

**Conclusion:** Geographical or regional variations in the prevalence of head and neck cancer indicate that the socio-cultural lifestyles of a population play an important role in head and neck carcinogenesis. This study showed that the incidence rate of head and neck cancers was lower than that in many other countries. However, comparison between our findings with some other studies shows a relation consistency.

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## Introduction

"Head and neck cancers" include a number of different types of cancer arising from a variety of sites in the upper aerodigestive tract [1]. Therefore, these cancers are considered to include all lesions of every tissue type in the head and neck, from bony sinuses, salivary gland, oropharyngeal epithelium, laryngeal synovial joints and smooth muscle to lymphoid tonsil, but bra

in cancer is not considered a head and neck cancer [2].

Worldwide, head and neck cancers account for 15% of the male cancers, or approximately 600.000 cases annually in men and 270000 in women [3]. These cancers are a major cause of morbidity and mortality [4], responsible for many deaths worldwide, and they are the sixth cause of death by cancer [5]. The number of new cases of head and neck cancers in

**Table 1** Definitions of sites in the head and neck

Site	Structures or locations	ICD-0-3 codes
Oral cavity	Lip (Vermillion, mucosal surfaces, both commissure), tongue, floor of mouth, gum, hard palate, mouth, buccal mucosa, vestibule	0-9, 20-29, 30-39, 40-50, 60-69, 142
Oropharyngeal mucosa	Base of tongue, tonsil (palatine tonsil, tonsillar fossa, tonsillar pillars), retromolar trigone, soft palate, oropharynx, pharynx, pharyngoepiglottic folds, glossoepiglottic folds, vallecula, lingual surface of the epiglottis, hypopharynx, overlapping lesions of mouth	19, 90-99, 51-59, 100109, 140, 148, 129-139
Nose	Nasal cavity, nasopharynx	110-119, 300
Paranasal sinuses	Maxillary, frontal, ethmoid, sphenoid sinuses	310-319
Larynx	Laryngeal cartilage, supraglottis, glottis, subglottis, trachea above bifurcation	320-329, 339
Thyroid	Thyroid gland	739
Lymph node	Head and neck lymph nodes	770
Soft tissue	Connective/subcutaneous tissue of the head and neck, peripheral nerves, autonomic nerves	470, 490, 754
Salivary	Parotid gland, submandibular gland, sublingual gland, other minor salivary gland, overlapping lesions of salivary gland	79-89
Bone	Clavarium, temporal bone, facial bones, temporomandibular joints, mandible	410-411
Skin	Skin lip, eyelid, external ear, face, scalp, neck	440-444

the United States was 40,490 in 2006, accounting for about 3% of adult malignancies, and 11,170 patients died of their disease in 2006 [6].

Squamous cell carcinomas are the most common head and neck cancers, originating from the surface squamous cells. The primary etiologic agents in these cancers are, tobacco and alcohol, suggesting that prevention should be a primary public health goal in this field [1-2].

Cancer patterns show a large worldwide variation. In the developing world, cancer patterns vary from those of the developed world and differ from one region to another [7]. In North America and Europe, head and neck tumors usually arise from the oral cavity, oropharynx, or larynx, whereas nasopharyngeal cancer is more common in the Mediterranean countries and Far East. In Southeast China and Taiwan, these cancers, specifically nasopharyngeal cancers, are the most common cause of death in young men [8].

The review of the literature shows few data about the head and neck cancer patterns in Iran. The purpose of this study was to represent epidemiological aspects of head and neck cancers in Kerman province in Iran.

### Materials and Method

The data used in this retrospective epidemiologic study was collected from pathology records registered

in all pathology laboratories of Kerman province from March 1991 to March 2002. During these eleven years, 154016 pathologic samples were referred to the mentioned diagnostic centers. A total number of 10571 new cases of malignancy were diagnosed histologically among the samples. In this study, we evaluated all malignant cancers of the head and neck, outside the central nervous system and the eye. Central nervous system and the eye cancers are not considered a head and neck cancer, because they present in a clinically distinct fashion [2]. Some clinical information such as sex, age, site of involvement, type of cancer (carcinoma, sarcoma, melanoma, metastatic, or primary) were recorded. Cases with grossly incomplete information and repeatedly biopsied or doubly registered ones were excluded from the study. Estimated resident population for Kerman province was used in the denominators to calculate the incidence rates of head and neck cancers. We classified head and neck cancer into 10 anatomic sites shown in Table 1 [2].

### Result

During 1991-2002, there were approximately 2211 (20.9%) new cases of head and neck cancers. Table 2 shows the distribution and incidence rates of these new cases by site. The five most common sites of involvement were the skin of the head and neck (46.81%),

**Table 2** Frequency and incidence rate of malignant head and neck cancers by site

Site	Count	Percent	Incidence rate (cases/100000)		
			M	F	T
Skin	1035	46.81	5.12	4.20	4.47
Lymph nodes	309	13.98	1.72	1.07	1.41
Larynx	298	13.48	2.27	0.40	1.36
Oral cavity & pharynx	270	12.21	1.64	0.40	1.24
Thyroid	137	6.20	0.24	1.03	0.63
Salivary gland	70	3.16	0.36	0.27	0.32
Nose and nasopharynx	53	2.40	0.28	0.20	0.24
Soft tissue	26	1.17	0.11	0.13	0.12
Bone	10	0.45	0.045	0.047	0.046
Paranasal sinuses	3	0.14	0.02		
Total	2211	100.00	11.85	8.13	10.12

M, male; F, female; T, total.

lymph nodes of the head and neck (13.98%), larynx (13.48%), oropharynx (12.21%), thyroid (6.20%), and paranasal sinuses were the least common. In our study, the most common site of oral and oropharynx cancers was the lip. Lip cancer occurred in 113 patients (5.11 % of head and neck cancers and 41.85% of oral and pharynx cancers).

Male to female ratio was 4.64. Squamous cell carcinoma (SCC) accounted for 95.5% of cases, and lower lip was the most commonly affected site (71.68 %).

Table 3 shows the mean age and male to female ratio of these cancers. Mean age in most head and neck cancers was over age 40. Of the new cases of head and neck cancers, 1326 (59.97%) were male and 866 (39.16%) female. The sex of 19 cases was not determined. The overall male to female ratio was 1.53. In all head and neck cancers excluding thyroid and soft tissue, men's involvement was more prevalent than women's.

Table 4 shows distribution of head and neck cancers histopathology. In four sites, squamous cell carcinoma was the most common cancer, which accounts for greater than 80% of the cancers at the oral cavity, pharynx and larynx. The dominant histopathologic diagnosis for thyroid cancer was papillary carcinoma (65.3%) and for the skin it was basal cell carcinoma (77%).

**Table 3** Mean age and male to female ratio of cancers of head and neck. Totals may not equal 100 due to the fact that the sex of 19 cases was not determined.

Site	Mean age			M/F ratio
	M	F	T	
Skin	60.27	56.69	58.76	1.28/1
Lymph node	43.05	39.26	41.55	1.70/1
Larynx	61.00	55.00	58.36	5.90/1
Oral and pharynx	56.17	58.94	57.0	2.10/1
Thyroid	52.16	39.99	42.36	0.24/1
Salivary gland	49.86	50.72	50.16	1.6/1
Nose and nasopharynx	50.52	42.50	46.73	1.52/1
Soft tissue	41.91	37.75	39.83	0.86/1
Bone	62.25	32.75	78.89	1/1
Paranasal sinuses	55.66			M=1
Total	56.10	51.10	54.29	1.53/1

M, male; F, female; T, total.

### Discussion

Worldwide, cancers of the head and neck are a major cause of morbidity and mortality, accounting for 15% of male cancers [3]. In this study, 20.9% (2211/10571) of the cancers occurred in the head and neck region. The incidence rate of head and neck cancers was 10.12/ 100000. In a study in the United States, the overall incidence rate has been reported 27 cases/100000 [2], being higher than our study. Generally, head and neck cancers occur in various types and regions. In this study we evaluated salivary glands, thyroid, lymph nodes, mucosal surfaces and skin of head and neck. In this paper we discussed the five most common cancers of head and neck (skin, lymph nodes, larynx, oral cavity and pharynx, and thyroid). Cancers of all of the remaining sites were rare.

Skin cancers are the most common malignancies. The head and neck region is exposed to considerably higher actinic exposure compared with the other skin surfaces, a factor that accounts for the higher incidence of skin cancer in that region (80% of skin cancers) [9]. In our study, out of 1970 skin cancers, 1035 cases (52.54% of skin cancers) occurred in the head and neck region. This finding is lower than the results of another study in Nigeria. In Nigeria from 1978 to 1989, 174 out of 271 cancer patients had skin cancer in the head and neck region (64.20 %) [10]. But in a

**Table 4** Distribution of malignant head and neck cancer histologies: 1991-2002. The mean percentages are based on the five most common histologies for each sites.

Site	Most common (percent)			Least common	
skin	Ba.cell.Ca 78.32	Sq.cell.Ca. 20.29	Undiff.Ca. 0.70	Sebaceous.Ca. 0.40	Ba.Sq.Ca 0.20
Lymph node	Lymphoma 68.25	Sq.cell.Ca. 9.85	Carcinoma 9.85	Papillary 7.66	Undiff.Ca. 4.38
Larynx	Sq.cell.Ca. 95.53	Undiff.Ca. 1.72	Adeno Ca. 1.03	Ca.in situ. 1.03	Melanoma 0.7
Oral & pharynx	Sq.cell.Ca. 85.17	Lymphoma 8.79	Melanoma 3.42	Sarcomas 1.52	Verrucous Ca. 1.14
Thyroid	Papillary 76.56	Follicular 14.06	Medullary 5.97	Adeno Ca. 2.34	Carcinoma 1.56
Salivary glands	Mucoepi.Ca. 32.81	Adeno Ca. 28.12	Adenoid Cy 23.44	Sq.cell.Ca. 7.81	Lymphoma 7.81
Nose	Carcinoma 58.82	Sq.cell.Ca. 19.60	Lymphoma 15.68	Trasitional 3.92	Melanoma 1.96
Soft tissue	Dermato Fi S. 40.00	Leiomyo.S 20.00	Round cell. 13.35	Spindle cell 13.33	Rhabdo S. 13.33
Bone	Sq.cell.Ca 50.00	Osteo Sa 20.00	Lieomyo.S 10.00	Adeno Ca. 10.00	Metastatic 10.00
Paranasal sinuses	Sq.cell.Ca 33.3	Trasitional 33.3	Signet ring 33.3		

Sq.cell.Ca, squamous cell carcinoma; Ba.cell,Ca, basal cell carcinoma; Undiff Ca, undifferentiated carcinoma, Leiomyo S, leiomyosarcoma; Dermato Fi S, dermatofibro sarcoma; Rhabdo S, rhabdomyosarcoma; Osteo SA, osteomyosarcoma; Round cell, round blue cell tumor; Adenoid Cy, adenoid cystic carcinoma;Trasitional, transitional cell carcinoma; Mucoepi.Ca,mucoepidermoid carcinoma; Ca.in situ, carcinoma in situ; Spindle cell, spindle cell sarcoma.

study in Shiraz, Iran, skin cancers accounted for 7% of the total cases, and were the third most common cancers in head and neck region [11]. In a study in Swiss, head and neck were by far the commonest for non-melanomatous neoplasms (69 to 81% of all cases) [12]. This is in agreement with our study.

During an eleven year period, 309 new cases of malignancies of lymph nodes in the head and neck region were diagnosed. In our study, 63.8% of these malignancies were primary cancers. The two most common types of these cancers were lymphoma (60.7%) and carcinoma (37.21%). Out of 309 cases, 27 (8.7%) were diagnosed as SCC. In another study, 10% of the cervical lymph node cancers were also SCCs during 25 years [13] which is similar with our findings.

In the preset study, after excluding skin and lymph node malignancies, the most common cancers of the head and neck area were laryngeal (13.48%), oral cavity and oropharyngeal (12.21%), and thyroid

cancers (6.20 %). This is approximately similar to another study [2]. In a study in the United States, the five most common sites of head and neck cancers excluding the skin were thyroid (29%), larynx (15%), oropharyngeal mucosa (12%), tongue (10%), and soft tissue (including lymph nodes (9%)) [2]. But this finding is lower as compared with the results of the study in Shiraz. In Shiraz, larynx cancers were the most common malignancies in the head and neck region (44%) [11]. Larynx cancer is the second most common respiratory malignancy after lung cancer. Its incidence is increasing over time in many parts of the world. The increasing incidence rate is generally accepted to be related to changes in tobacco and alcohol consumption [14]. The overall worldwide incidence of all of the new malignancies diagnosed annually is approximately 1.7%. [15].

In the present study, 298 (13.48%) of the head and neck cancers occurred in the larynx. Most cases (85.2%) were men and the mean age of the cancer

patients was  $58.36 \pm 11.79$  years. In France, during 1978–2000, the number of laryngeal cancers was 3865 (91.45%) in males and 361 (8.55%) in females. More than 95% of all primary laryngeal malignancies were SCCs [16]. In our study, 97% of the cases of larynx cancers were primary and 90.6% of these cancers were SCCs. Therefore, worldwide data which vary considerably among countries consistently reflect the smoking and drinking habits of the individual country.

Cancers of the oral cavity and pharynx include lip, tongue, gingiva (gums), floor of the mouth, soft and hard palate, tonsils, oropharynx, hypopharynx, and other less frequent sites [17]. Oral and pharyngeal cancers are estimated to be the sixth most common malignancy worldwide [18]. Annually, cancers of the oral cavity and pharynx are responsible for nearly 200,000 deaths throughout the world, and have an incidence rate of 12.1 per 100,000 in males and 4.3 per 100,000 in females. The incidence of oropharyngeal cancers varies throughout the world. The majority of cases (75%) of oral and pharyngeal cancers occur in developing world [19]. Patients with a history of tobacco or alcohol use are at increased risk for these tumors [20]. In our study, 270 (12.21%) cancers of the head and neck region occurred in the oral cavity and pharynx. The incidence rate was 2.21 cases per 100,000 population per year. The incidence of oral cancer shows considerable geographical, cultural and ethnic variations. This variation ranges from a low incidence of 1-2% of all malignant tumors in Japan to over 40% in Sri Lanka and 50% in India [18].

In our study, the most common site of oral and oropharynx cancers was the lip. Lip cancer occurred in 113 patients (5.11 % of head and neck cancers and 41.85% of oral and pharynx cancers). Male to female ratio was 4.64. SCC, accounting for 95.5% of cases, and the lower lip was the most commonly affected site (71.68%). In Shiraz, Iran, similar with our finding, SCC was the most common malignant orofacial tumor, but the tongue was the most common affected site [21-22]. In a study in Mexico during 11 years, out

of 113 patients with lip cancer, 74 patients (65.5%) were men and 39 (34.5%) were women. There were 96 cases (84.9%) of SCC and the lower lip was affected in 61 cases (62.2%) [23]. In another study in Australia during 1982 and 2006, lip cancer occurred in 2270 patients (74.4% male) The most frequent location was the lower lip [24]. The results of these studies are approximately similar to those of our study. However, the incidence of lip cancers shows a large geographic variation, and chronic exposure to solar radiation is commonly cited as the key mentioned as an etiologic factor [25].

Although thyroid cancer accounts for only 1% of all cancers, it is the most common endocrine malignancy. In 1999, about 18,100 new cases of thyroid cancers, and 1400 death due to thyroid cancers, which is 60% of the total death due to endocrine malignancies, were reported [26]. Thyroid cancer incidence has been increasing in many countries. During 1973-2002, there were significant increases in the incidence in the United States [27]. In Scotland, Thyroid cancer incidence has increased over the past 40 years. This is accompanied by a change in the distribution of histological type with a particular increase in papillary carcinoma [28]. In our study, 137 patients had thyroid cancer (6.19%). Thyroid cancers occurred in 110 women (80.3%) and 27 men (19.7%). The female-male ratio was 4.07. The most common type of malignancy was papillary carcinoma. These findings are similar to those of other studies [27-28].

## Conclusion

Geographical or regional variations in the prevalence of head and neck cancers indicate that the socio-cultural lifestyles of the population play an important role in the head and neck carcinogenesis. In Iran, the incidence of the cancers of head and neck region has not yet been thoroughly analyzed. This study shows that the incidence rate of head and neck cancers (10.12/-100000) in comparison with other countries is low. However, comparison between our findings with

other studies shows a relative consistency.

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