






## Original Article

## The evaluation of head and neck neoplasm in young and old adults

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**Accepted for publication:** 3 April 2019

## Abstract

**Background:** Head and neck neoplasm (HNN) is one of the most common neoplasms in 6th and 7th of life. Its incidence rate is different in various human societies. Some neoplasms have an increasing trend in the young population, and some have a decreasing trend. According to the limited evidence in Iran, we decided to investigate the types and basic characteristics of HNN in young patients with less than 40 years and old patients more than 40 years of age.

**Methods:** In this cross sectional study, we assessed the medical records of 695 patients in the department of Ear Nose and Throat (ENT) of Loghman Hakim Hospital during 2007-2017 to compare the fundamental characteristics and types of HNN in young and old adults. Chi-square test and Mann-Whitney U test were used and interpreted with a significant level of less than 0.05.

**Results:** The average age of our patients was 51.80±17.39 years old. The majority of the patients were more than 40 years old (n=514, 73.95%) and the rest were younger (n=181, 26.05%). Significantly, the percentage of male patients, diabetic patients, positive history of smoking were more predominant in old adults as compared to young adults (72.76% vs. 49.18%, 10.31% vs. 2.20%, 66.99% vs. 25.44%; all P<0.001). However the neoplasms of salivary glands, thyroid, and paranasal sinus had a significantly higher frequency in young adults (41.98%(n=76); P<0.001, 21.55%(n=39);P<0.001, 6.10%(n=11); P=0.033 respectively).

There was a high percentage of larynx neoplasm in old adults as compared to young adults (42.22 %(n=217) vs. 4.41%(n=8); P=0.001).

**Conclusion:** Larynx neoplasm was common among old smokers. The percentage of salivary glands and thyroid neoplasms were higher than other HNN in young adults (≤40 years old), especially female patients and non-smokers. Therefore, HNN is not rare in young people and the physicians must consider it while cancer screening young adults.

**Keywords:** Head and Neck; Neoplasm; Young adults

**Cite this article as:** Oroei M, Peyvandi A-A, Peyvandi H, Khoshsirat S, Motamedi N. The evaluation of head and neck neoplasm in young and old adults. SDH. 2019;5(2):117-125. DOI: <https://doi.org/10.22037/sdh.v5i2.28749>

## Introduction

Head and neck neoplasm (HNN) is one of the most typical neoplasms in the 6th-7th of life. The most important of known risk factors

include tobacco consumption and alcohol drinking (1). Its incidence rate depends on the lifestyle and healthy behaviors of population and geographical regions (2). The laryngeal neoplasm has a

high incidence in the majority of world regions, and the oral cavity and oropharynx neoplasm is common in Southeast Asia (3). HNN is different in young people. The western world has an increasing trend of some HNN due to the dramatic rise of tobacco, alcohol consumption, and high-risk sexual behaviors in young people (4). There is evidence about the neoplasm of the oral cavity and oropharynx as the most common of HNN in young adults (5-7).

To the best of our knowledge, there is little evidence about the study of HNN in young adult patients and the special neoplasms have been investigated merely in one age group (3,7). A study in the Iranian population reported larynx as the most common site of HNN for both old and young patients (8). That study investigated the patients with primary squamous cell carcinoma and there were no reports from other neoplasms of head and neck. Therefore, we decided to investigate all neoplasms of the head and neck in our center and compare clinical findings between young and old patients.

## Methods

This cross-sectional study was conducted in the department of ENT of Loghman Hakim Hospital, Tehran. We extracted the data from medical records of the patients affecting HNN that were admitted from 2007 to 2017.

According to the clinical routine data, all the patients with a diagnosis of head and neck neoplasm based on ICD-10 oncology (C00-14, C30-32, C38, C73, D00, 02, D10, D11, D14, D34, and D38)

were included in the study and those with any other neoplasm were excluded which left us with 695 patients from 921 data.

To achieve validity to estimate the parameter of study, we calculated at least 457 samples based on the formula of population proportion (prevalence of 5% (8), the precision of 0.02 and 95% confidence level).

The demographic data, site of neoplasm, type of blood group, and history of diabetes mellitus were collected in an excel and then transported to SPSS version 18 (SPSS Inc., Chicago, IL). The chi-square test was applied to determine the comparison proportions. Mann-Whitney U test was used for a quantitative variable.

The patients were categorized into aged group  $\leq 40$  years (young adults) and group  $> 40$  years (old adults). The various neoplasms of the head and neck were classified into the larynx, thyroid, salivary glands, nasopharynx, oral cavity and oropharynx, paranasal sinuses, and ear. This study was approved by the medical ethics committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.REC.1396.94).

## Results

The present study investigated 695 patients of both sexes with HNN from Loghman Hakim hospital for 10 years that included 463 (66.62%) men and 232 (33.38%) women. The mean age of the patients was  $51.80 \pm 17.39$  years old. There was a significant difference between men and women in terms of age ( $54.10 \pm 16.89$ ,  $47.20 \pm 17.51$  respectively,  $P < 0.001$ ). The common sites of HNN were larynx ( $n=225$ , 32.37%), salivary glands ( $n=196$ , 28.20%), oral cavity and oropharynx ( $n=109$ , 15.68%), and thyroid ( $n=86$ , 12.37%) respectively. Neoplasm of nasopharynx ( $n=51$ , 7.33%), paranasal sinuses ( $n=24$ , 3.45%) and ear ( $n=4$ , 0.57%) were uncommon.

The majority of our patients were found in the group with  $>40$  years ( $n=514$ , 73.95%) and 181 patients (26.05%) were young adults. From all patients of the young adults, the women were significantly more than men (50.82% vs. 49.18% respectively,  $P < 0.001$ ). Table 1 shows the characteristics of our patients in two age groups. Most of the young adults referred to Tehran were single and from other provinces of Iran.

Table 1. Demographic characteristics of the patients based on age group

variable	≤40 years' age group (n=181)	>40 years' age group (n=514)	P
Gender			
Male	89(49.18)	374(72.76)	<0.001
Female	92(50.82)	140(27.24)	
Marital condition			
Married	71(48.29)	437(94.38)	<0.001
Non-married	76(51.71)	26(5.62)	
Smoking status			
Yes	29(25.44)	272(66.99)	<0.001
No	85(74.56)	134(33.01)	
ABO blood group			
A	40(34.48)	99(31.23)	0.564
B	24(20.68)	77(24.29)	
AB	10(8.63)	18(5.67)	
O	42(36.21)	123(38.80)	
RH+	102(87.93)	288(90.85)	0.269
RH-	14(12.07)	29(9.15)	
Residency			
Tehran province	72(41.14)	279(55.58)	0.001
Other provinces	103(58.86)	223(44.42)	
Health insurance coverage			
Yes	157(9.35)	437(87.93)	0.119
No	13(7.65)	60(12.07)	
Diabetes mellitus			
Yes	4(2.20)	53(10.31)	<0.001
No	177(97.80)	461(89.69)	
First symptoms to diagnosis (Month)*	12(1- 240)	6(1-300)	0.002

Data except the last case reported based on number and percentage and the P was determined by the Chi-square test.

\* This data is median (range) and the P was calculated with Mann-Whitney U test.

Diabetes and smoking rates were more common among old adults than the young (both  $P < 0.01$ ). Since the onset of the symptoms, the diagnosis was 12 months (ranged: 1-240) in the young

adults and 6 months (ranged: 1-300) in old adults. There were no significant relationships between the age group and the blood group. However, there existed significant relationships between the age

group and some sites of neoplasm (Figure-1).

In the young adult group, the common sites of neoplasm were salivary glands (n=76, 41.98%) and thyroid (n=39, 21.54%). The most abundant blood group

in the thyroid, the neoplasm was B type (30.30%), and A blood group was for the neoplasms of paranasal sinuses and oral cavity and oropharynx, and the rest were O type (Table-2).

Table 2. Site of head and neck neoplasm in  $\leq 40$  years' age group (young adults)

Site	Larynx	Thyroid	Salivary glands	Nasopharynx	Paranasal Sinuses	Oral cavity and Oropharynx	Ear
Female	1(12.50)	29(74.35)	41(53.94)	2(11.11)	4(36.36)	14(50.00)	1(100.0)
Male	7(87.50)	10(25.65)	35(46.06)	16(88.89)	7(63.64)	14(50.00)	0(0.0)
Total	8(4.41)	39(21.55)	76(41.98)	18(9.95)	11(6.10)	28(15.46)	1(0.55)
P	N.A	0.001	0.547	<0.001	0.366	1.000	N.A
Blood group							
A	0(0.0)	9(27.27)	21(38.18)	1(33.30)	3(50.0)	6(40.00)	0(0.0)
B	0(0.0)	10(30.30)	10(18.20)	0(0.0)	2(33.30)	2(13.30)	0(0.0)
AB	0(0.0)	5(15.15)	2(3.62)	0(0.0)	0(0.0)	2(13.30)	1(100.0)
O	3(100.0)	9(27.27)	22(40.00)	2(66.70)	1(16.70)	5(33.40)	0(0.0)
P	N.A	0.109	0.244	N.A	N.A	0.781	N.A
RH+	3(100.0)	26(78.80)	51(92.72)	3(100.0)	6(100.0)	11(78.57)	1(100.0)
RH-	0(0.0)	7(21.20)	4(7.28)	0(0.0)	0(0.0)	3(21.43)	0(0.0)
P	N.A	0.110	0.158	N.A	N.A	0.374	N.A
Smoking							
Yes	2(50.00)	4(17.39)	9(14.52)	5(100.0)	3(50.00)	6(46.15)	0(0.0)
No	2(50.00)	19(82.61)	53(85.48)	0(0.0)	3(50.00)	7(53.85)	1(100.0)
P	N.A	0.426	0.005	N.A	N.A	0.091	N.A
Type 2 diabetes mellitus							
Yes	1(12.50)	2(5.12)	0(0.0)	0(0.0)	0(0.0)	1(3.57)	0(0.0)
No	7(87.50)	37(94.88)	76(100.0)	18(100.0)	11(100.0)	27(96.43)	1(100.0)
P	N.A	N.A	N.A	N.A	N.A	N.A	N.A

Data are number (Percentage)

The P was calculated based on a comparison of each site vs. other sites. N.A: Not applicable

Table 3. Site of head and neck neoplasm in &gt;40 years' age group (old adults)

Site	Larynx	Thyroid	Salivary glands	Naso-pharynx	Paranasal Sinuses	Oral and Oropharynx	Ear
Total	217(42.22)	47(9.14)	120(23.34)	33(6.43)	13(2.53)	81(15.76)	3(0.58)
Female	24(11.05)	24(51.06)	40(33.33)	8(24.24)	5(38.46)	37(45.67)	2(66.66)
Male	193(88.95)	23(48.94)	80(66.67)	25(75.76)	8(61.54)	44(54.33)	1(33.34)
P	<0.001	<0.001	0.101	0.840	0.355	<0.001	0.182
Blood group							
A	38(35.19)	10(26.31)	27(27.00)	2(12.50)	1(10.00)	20(45.45)	1(100.0)
B	24(22.22)	11(28.95)	26(26.00)	5(31.25)	5(50.00)	6(13.63)	0(0.0)
AB	5(4.63)	1(2.63)	9(9.00)	1(6.25)	0(0.00)	2(4.54)	0(0.0)
O	41(37.96)	16(42.11)	38(38.00)	8(50.00)	4(40.00)	16(36.36)	0(0.0)
P	0.693	0.672	0.275	N.A	N.A	0.117	N.A
RH+	100(92.59)	34(89.47)	93(93.00)	14(87.50)	9(90.00)	37(88.09)	1(100.0)
RH-	8(7.41)	4(10.53)	7(7.00)	2(12.50)	1(10.00)	5(11.91)	0(0.0)
P	0.676	0.549	0.666	0.636	0.597	0.380	N.A
Smoking							
Yes	168(93.85)	5(22.72)	50(44.64)	23(88.46)	3(42.85)	22(37.93)	1(50.00)
No	11(6.15)	17(77.28)	62(55.36)	3(11.54)	4(57.15)	36(62.07)	1(50.00)
P	<0.001	<0.001	<0.001	0.017	N.A	<0.001	N.A
Type 2 diabetes mellitus							
Yes	23(10.59)	4(8.51)	9(7.50)	2(6.06)	3(23.07)	12(14.81)	0(0.0)
No	194(89.41)	43(91.49)	111(92.50)	31(93.94)	10(76.93)	69(85.19)	3(100.0)
P	0.884	0.806	0.305	0.561	0.141	0.163	N.A

Data are number (Percentage)

The *P* was calculated based on a comparison of each site vs. other sites. N.A: Not applicable

There was no significant relationship between HNN and smoking in young adults except for the neoplasm of the salivary gland which was a negative relationship ( $P=0.005$ ). Thyroid neoplasm was more predominant in young women than men (74.35% vs. 25.65 respectively,  $P=0.001$ ). However, the percentage of nasopharynx neoplasm was significantly more in young men as compared women

(88.89% vs. 11.11% respectively,  $P<0.001$ ).

In the old adult group, the most common sites of neoplasm were larynx ( $n=217$ , 42.22%) and salivary glands ( $n=120$ , 23.34%). The larynx and oral cavity and oropharynx neoplasms were predominant in old men (88.95%, 54.33% respectively) and thyroid neoplasm was higher in old women (51.06%) (Table 3).

The most common blood group in old adults was O blood type. A blood group was for the oral cavity and oropharynx (45.45%) and B blood group was for paranasal sinuses (50.50%). Larynx and nasopharynx neoplasms had a positive relationship with a history of smoking in the

old adults ( $P < 0.001$ ,  $P = 0.017$  respectively), while thyroid neoplasm, salivary glands, and oral cavity and oropharynx neoplasms had a negative relationship with smoking. The data showed a non-significant relationship between each site of HNN and diabetes mellitus in old adults.

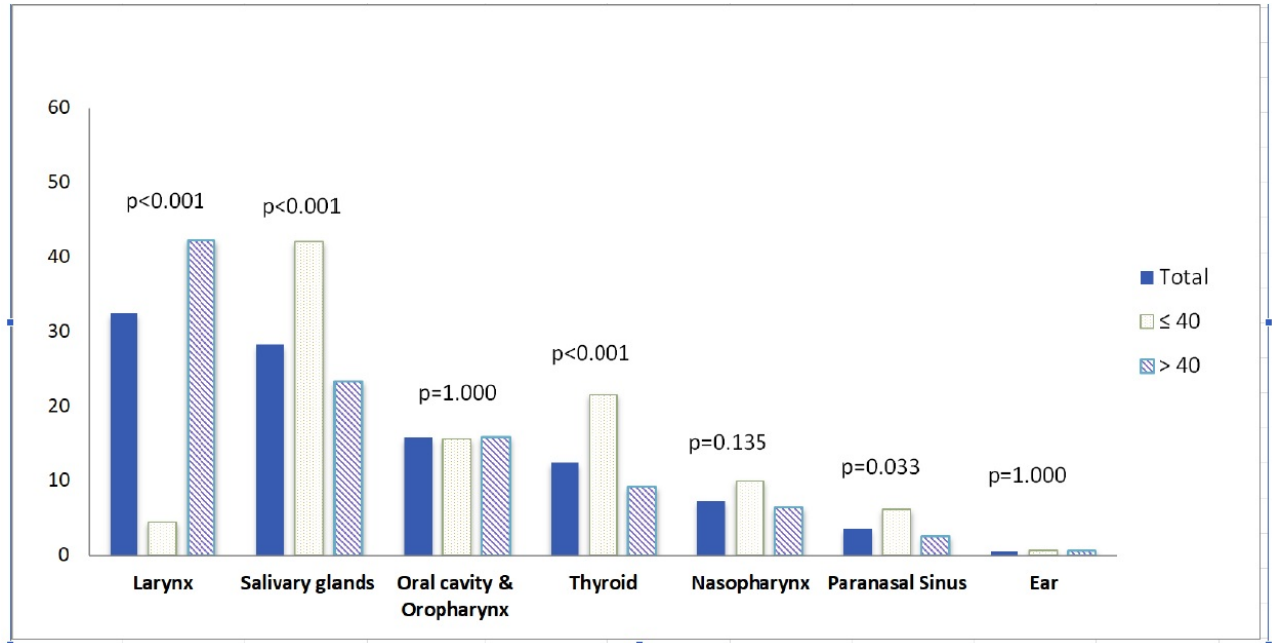


Figure 1. Frequency percentage of the site of head and neck neoplasms (Total, age group  $\leq 40$  and age group  $> 40$ , P between two age groups).

## Discussion

The proportion of young adults affected with HNN was less than old patients. The ratio of man to woman was almost 1:1 in young adults, and 2.5: 1 in old adults. The most common site of neoplasm was larynx in old adults, and salivary glands, thyroid and paranasal sinuses in young adults. Diabetes mellitus type 2 and a positive history of smoking were significantly more in old adults than the young. There was no association between the HNN and blood groups.

The incidence rate of HNN is usually rare among women and young adults due to the lower frequency of smoking and alcohol drinking, especially in developing countries (9-13). In line with this subject, we observed a lower percentage of female patients and young adults in our data. In general, the most common site of HNN is in the larynx (8), but we found larynx

neoplasm as the lowest percentage in young people, unlike old adults.

The higher percentage of thyroid neoplasm in young adults can be associated with a decreasing incidence of this neoplasm with aging (14), and also younger group, women were more predominant than older group and women are more susceptible to thyroid neoplasm due to hormonal exposure (2).

The salivary glands neoplasm is common in women and its peak incidence depends on the type of neoplasm and cellular morphology (15). Benign neoplasm usually occurs in the third and fourth decade of life, while the malignant neoplasm is observed in the fifth decade or higher (16). In our study, we found this neoplasm higher proportion in young adults. Studies conducted by Rutt et al. and Ellies et al. (15, 17) reported this neoplasm in the young patients and suggested that malignant parotid tumor is higher in

children and adolescents. However, we had no data separately for minor and major salivary gland tumors.

The paranasal sinuses neoplasm is often observed in people over 40 years old (18, 19), but we found a higher proportion of young adults and with no reasonable reason for this finding. Some studies reported that oral cavity and oropharynx neoplasia is one of the most common cancers in young adults (5, 6, 20). Most of these studies were from the developed countries which had an increasing trend from the oral cavity and oropharynx cancer in young people as compared to old adults. The reason can likely be the increased use of tobacco, alcohol, and marijuana and sexual promiscuity and human Papilloma virus (HPV) infection among young people (7, 21, 22).

In our study, the oral cavity and oropharynx neoplasia was the third neoplasm in old and young adults. The proportion of this neoplasm was in men over 40 years higher than that of women of the same age. This finding was incompatible with the study of Frederick (23). Mourad et al. reported an increasing trend of oropharynx cancer related to HPV in male patients due to high - risk sexuality behaviors (24), however, in our data, there was not checking HPV in the patients routinely. Certainly, the Prevalence of this neoplasia in our study is not high, and it can be related to low rates of sexual promiscuity, drinking and smoking in Iran compared with many the developed countries.

The majority of smokers patients were men and old. Our findings showed the positive association between smoking and larynx and nasopharynx neoplasms in old adults that supported existing evidence (1, 25). There was a negative association between smoking and neoplasia in salivary glands, thyroid and oral cavity and oropharynx in old adults. Similar to our finding, Kitahara et al. reached a negative relationship between smoking and thyroid cancer (26). A few studies assessed the risk of salivary

gland tumors with smoking and indicted a positive relationship between some of these tumors with smoking (27, 28). According to our findings, it requires further investigation on this issue.

We observed a higher proportion of diabetes type 2 in old adults than young adults. Despite the evidence about a possibility association between diabetes and some cancers such as thyroid (29, 30), but we found no association between HNN and diabetes. We may explain it due to the inadequate sample size in subgroups and the nature of the study.

Based on the evidence, some diseases, especially, cancers are more common in some blood groups (31-33). We found no association between blood group and HNN. The most abundant blood groups in our patients were O type, A type and B type respectively that were compatible with normal Population of Iran (34). B blood group was predominant among the young adults with thyroid neoplasia. Both age groups, blood group A or B were the most common type in paranasal sinus and oropharynx neoplasia. However, those findings should be supported with stronger epidemiologic studies, especially with a healthy control group.

Developing countries have faced the changing lifestyle and growth of alcohol and tobacco consumption in young people the same as the developed countries. Therefore, it is necessary to plan and conduct cohort studies with the Preventive approach to fight against the head and neck cancers.

The present study encountered some limitations. This study was based on patients' medical records referred to as a medical educational center. Therefore, we could not control any incomplete information. Also, we were not able to achieve robust statistical results because of the insufficient sample size in some subgroups. We were devoid of HPV screening in the patients with HNN, so there were no findings of this issue, especially in young adults.

Larynx neoplasm is common in people over 40 years that smoker males are predominant. Salivary glands and thyroid neoplasms are higher in patients aged equal or less than 40 years than older adults. Therefore, these neoplasms should be considered in cancer screening of young adults.

#### Acknowledgments

The authors would like to thank the Clinical Research Development Unit (CRDU) of Loghman Hakim Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran for their cooperation.

#### Conflict of interest

Authors declare no conflict of interests.

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