

Trends of oral cancer rates in Isfahan, Iran during 1991-2010

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ABSTRACT

Background: There is a variation in trends of oral cancers all over the world. Many studies have reported evidence of increasing incidence in oral cancers during recent years. The purpose of this study was to investigate time trends and changes in demographic distribution of oral cancers incidence in Isfahan during 1991-2010.

Materials and Methods: In this retrospective analytic study, we collected and recorded data on patients with oral cancers at Oral Pathology Department of Dental School of Isfahan University of Medical Sciences during 1991-2010. Collected data include age at presentation, gender, primary site, and histologic type of cancer. Statistical analysis performed using Jointpoint Regression Program version 3 and SPSS version 18.

Results: We analyzed data from 231 Pathology reports. The most frequent cancer was squamous cell carcinoma. Comparing the two time intervals (1991-2000) and (2001-2010), we found that carcinomas and salivary gland tumors had decreased while there was an increase in incidence of sarcomas and lymphomas. Gingiva was the most common site (46%) of oral cancers followed by tongue with (18%) through these 20 years. Male to female ratio was decreased from 1.4 to 1.1 during these two decades of study.

Conclusion: According to this study, there might be some changes in risk factors as well as changes in the diagnosis of oral cancers in Isfahan that calls for further investigations.

Keywords: oral cancers, incidence, trend, demographic features.

زمینه و هدف: تنوعات زیادی در روند تغییرات سرطان‌های دهان در کل جهان وجود دارد. مطالعات فراوانی روندی رو به افزایش را در شیوع سرطان‌های دهان در سال‌های اخیر گزارش کرده‌اند. هدف این مطالعه بررسی روند تغییرات زمانی و توزیع دموگرافیک شیوع سرطان دهان در اصفهان طی سال‌های ۱۹۹۱-۲۰۱۰ بوده است. **مواد و روشها:** در این مطالعه تحلیلی گذشته نگر، پرونده بیماران مبتلا به سرطان دهان و دندان که به بخش پاتولوژی دانشکده دندانپزشکی دانشگاه علوم پزشکی اصفهان در طی سال‌های ۱۹۹۱-۲۰۱۰، مراجعه کرده بودند، مطالعه شد. ۲۳۱ نمونه مورد بررسی و تحلیل قرار گرفت. اطلاعات استخراج شده شامل سن، جنس، محل بروز ضایعه، نوع ضایعه و زمان مراجعه بیمار، ثبت شدند. آنالیز آماری توسط نرم افزار **Jointpoint Regression Program ۳** و **SPSS ۱۸** انجام شد. سطح معنی‌داری ۰/۰۵ در نظر گرفته شد.

یافته‌ها: از کل بدخیمی‌های موجود، ۵۵٪ مربوط به مردان و ۴۵٪ زنان بودند. شایع‌ترین بدخیمی **SCC** بود. در مقایسه دو بازه زمانی ۱۹۹۱-۲۰۰۰ و ۲۰۰۱-۲۰۱۰، کارسینوماها و بدخیمی‌های بزاقی روندی رو به کاهش داشته‌اند در حالیکه سارکوماها و لنفووماها روندی رو به افزایش داشته‌اند. بروز کارسینوماها به خصوص **SCC** در بیماران جوان نادر است این در حالیست که بروز سارکوماها در این سنین شایع می‌باشد. لته بیشترین محل بروز بدخیمی‌های دهان با ۴۶٪ و زبان با ۱۸٪ در مکان دوم قرار دارد.

نتیجه گیری: یافته‌های مطالعه حاضر نشان از بروز تغییراتی در روند سرطان‌های دهان در شهر اصفهان دارد که بیانگر لزوم مطالعات بیشتر برای بررسی علت این تغییرات می‌باشد.

واژه‌های کلیدی: سرطان دهان، بروز، روند، خصوصیات دموگرافیک

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Introduction

Oral cancer is an important public health issue because its occurrence is strongly associated with cigarette smoking and alcohol drinking, and the majority of cases could probably be prevented with behavior modification.¹⁻⁴ Among all cancers, oral squamous cell carcinomas consist about 3% of all cancers in male and 2% of all cancers in female.⁵ But it seems that differences in prevalence of oral cancers in male and female has decreased and male to female ratio that was 6 to 1, in 1950, becomes less than 2 to 1 today.⁶ In Curado's study⁷ that analyzed epidemiology of head and neck cancers in 5 countries, researchers found that incidence of head and neck cancers are increasing in females, while it is decreasing in males.

According to World Health Organization, carcinomas of oral cavity in males in developing countries, is the sixth most common cancer after lung, prostate, colorectal, stomach and bladder cancer, while in females, it is the tenth most common site of cancer after breast, colorectal, lung, stomach, uterus, cervix, ovary, bladder and liver.⁸

Since, the oral cavity is more accessible to complete examination; it could be used in early detection of pre-cancerous and cancerous lesions. But either due to ignorance or inaccessibility to medical care, the disease gets detected in the later stages. Thus, there is a need for improvement in early detection of oral carcinomas, because in the initial stages, treatment is more effective and the morbidity is minimal.⁹

Several recent reports have already suggested an increasing incidence of oral squamous cell carcinoma (SCC) among young persons in many regions of the world. In Myers's study¹⁰ or Schantz's study,¹¹ researchers found that average age for diagnosis of head and neck squamous cell carcinoma was 60 years old, however, there was an increase in young adults mostly in tongue area.

Information on cancer incidence trends is necessary for the planning and implementation of prevention, diagnosis and treatment strategies of cancer in a community. Time trends in cancer incidence may also help to formulate new hypotheses concerning the etiology and biology of cancer.¹²

This study aimed at investigating time trends and changes in incidence and demographic characteristics of oral cancers in Isfahan, Iran during 1991-2010.

Materials and Methods

In this retrospective analytic study, all pathologic records (4000 reports) of Oral and Maxillofacial Pathology Department of Dental School of Isfahan University of Medical Sciences during 1991-2010 were studied.

After reviewing the pathologic reports, cases with inadequate or invalid information and benign lesions were excluded and data of age at presentation, gender, primary site, and histologic type of cancer for patients with malignant lesions were collected.

We divided age at diagnosis into three groups (<40 years of age, 40-60 years old and ≥60 years old) in order to find out if there is differences in the incidence by age. In addition, we divided the calendar period into two groups, 1991-2000, and 2001-2010. Statistical analysis was done using Jointpoint Regression Program version 3 and SPSS version 18.

Results

In this study, we found 231 of malignant oral cancer during 1991-2010. As shown in *Figure 1*, malignancies were classified into 13 groups which among them, SCC with 60% followed by muco-epidermoid carcinoma with 8%, were the most frequent malignancies. Overall, only 23% of cases occurred in 1991-2000, while, 77% of cases occurred in 2001-2010 indicating an increase in oral can-

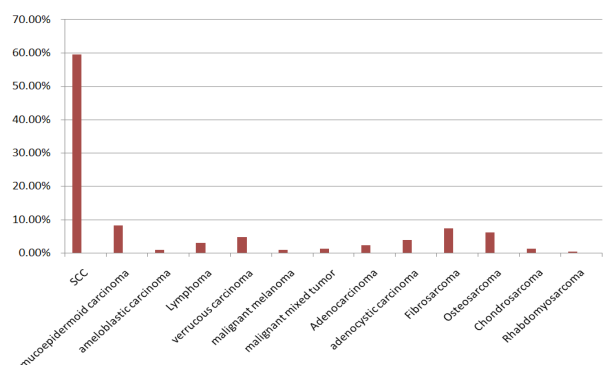


Figure 1: Distribution of histologic type of oral cancers during 1991-2010 in Isfahan, Iran

cer incidence in most recent years in Isfahan. We found an increasing but not significant (P -value > 0.05) trend in incidence of carcinoma over the period of 20 years (Figure 2).

As illustrated in Figure 3, 46% of oral cancers through 1991-2010 were located on gingiva. The next most common site was tongue with 18%. Since was the most common site of oral cancers, The trends in incidence of oral cancers in gingiva has been declining in 1991-1995 but increasing in 1996-2010 (Figure 4).

Male to female ratio for all cases was 1.2. As a result of increasing trend in the incidence in both genders, but more prominent in females, this ratio was 1.4 for the period of 1991-2000 and then decreased to 1.1 for the period of 2001-2010.

According to results, about 27% of cases occurred in patients younger than 40 years, 42% in patients between 40-60 years old, and 31% in patients older than 60 years. There was a statistically significant association between histologic type of oral cancer and age of patients at presentation (P -value < 0.001). Only 16% of carcinomas (mostly SCC) were occurred in patients younger than 40 years old, 32% in 40-60 years old and more than 52% of carcinomas were observed in patients > 60 . Compare to other age groups, around 47% of salivary gland tumors occurred in patients between 40-60 years old. Majority of sarcomas (more than 82%) were in patients younger than 40 years old and only 3% of sarcomas observed in patients older than 60 years. About half of lymphomas occurred in patients younger than 40 years ol.

Subcategories of oral cancers (including carcinomas, salivary gland tumors, sarcomas, lymphomas) showed a variation in trends over the last decade, that was marginally significant (P -value = 0.052). In the period 1991-2000, carcinomas occurred in 70% of cases but in the period 2001-2010 it occurred in 64% of cases. A decrease from 22% in 1991-2000 to 13.5% in 2001-2010 in salivary gland tumors observed, while, there was an increase in the incidence of sarcomas and lymphomas, as shown in Table 1.

The percentage of tongue cancer increased from 15% to 20% and lip cancer from 2% to 7% from the first decade to the next decade. But a decreasing trend was noted in incidence of buccal mucosa cancer from 15% to 12% and also in palate from 22% to 10%. (P -value = 0.161),

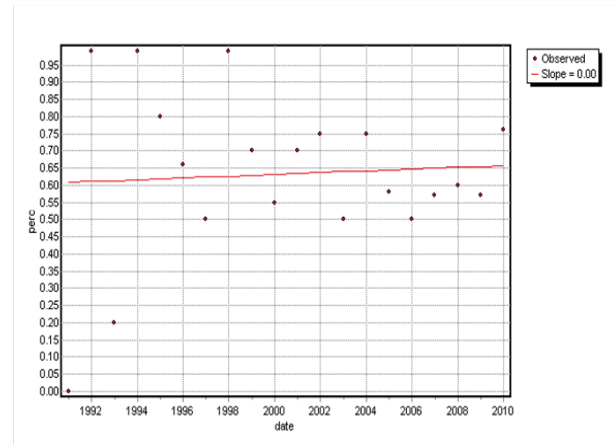


Figure 2. Trends in incidence of oral carcinomas during 1991-2010 in Isfahan, Iran.

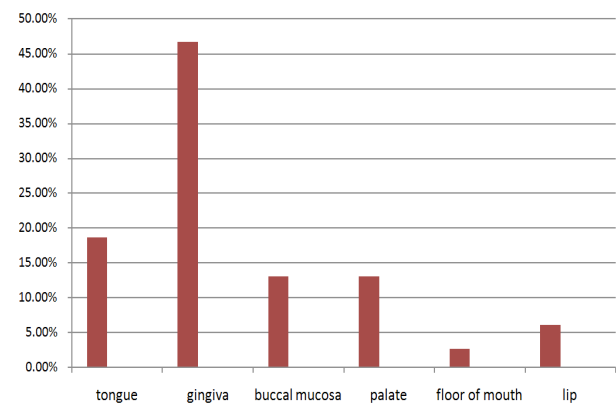


Figure 3: Distribution of anatomic site of oral cancers during 1991-2010 in Isfahan, Iran.

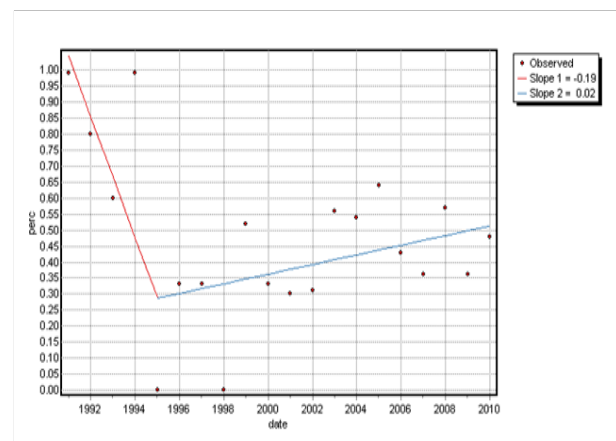


Figure 4: Trends in incidence of oral cancers on gingiva during 1991-2010 in Isfahan, Iran.

as shown in *Table 2*.

Discussion

In this retrospective analytic study, 231 patients with malignant oral cancer in Isfahan dental school were investigated. Although the average age at presentation for all patients was 52 years old, about one third of cases occurred in patients younger than 40 years old. In Myers's et.al¹⁰ study or Schants's et.al¹¹ study is mentioned that the median age at diagnosis for SCC is approximately 60 years, but the incidence of these cancers in young adults (age < 40 years) appears to be increasing. In Skinner's et.al¹³ study appearing age for prevalence of malignancies were 5th and 6th decade. Also Funk et.al¹⁴ in their study on oral cancers, reported 64 years of ages as average. Median age of patients in Delavarian's et.al¹⁵ study was 53.52 and Sargeran's¹⁶ study was 58.8 years.

Oral cancers occurred in men more frequently than women but the ratio of incidence among men to women has decreased from 6 to 1, in 1950, to less than 2 to 1 today.⁶ In this study, a rising incidence was observed in both genders, more apparently in female. Comparing two time

intervals, in first decade male to female ratio was (1.4) but in latter decade, it has decreased to (1.1). It seems that in recent years, women are exposed to carcinogens more than before. In a study⁷ that analyzed the head and neck cancers epidemiology in 5 countries, researchers found that the incidence of head and neck cancers is increasing in females whereas it is decreasing in males. In Idris's et.al¹⁷ study, men to women ratio was more than 1, similar to Skinner's et.al¹³ study. In Saavedra's¹⁸ study this ratio was reported to be more than 2. In Jemal's et.al¹⁹ study in USA approximately 1 in 3 oral and pharyngeal cancers, and 1 in 5 laryngeal cancers occurred in women.

The great majority of oral cancers in this study were SCC (60%), followed by mucoepidermoid carcinoma (8%), osteosarcoma (7%) and then fibrosarcoma (6%). In most previous studies, SCC was the most frequent lesion but it has different frequencies in each studies. In Funk's¹⁴ study was 86.3%, Delavarian's et.al¹⁵ was 73%, Bayat's²⁰ was 85%, in Razavi's et.al²¹ was 54.5%, Idris's¹⁷ was 66.5%, Tabesh's²² was 73.3%, and Tadbir's²³ was 73%. After SCC, in Bayat's²⁰ study, adenocystic carcinoma (4%), mucoepidermoid carcinoma (2%), and adenocarcinoma (1%) were the most frequent lesions. In Tabesh's²²

Table1. Trends of oral cancers by histologic type of cancer by sex and period in Isfahan, Iran.

	1991-2000			2001-2010		
	Male	Female		Male	Female	
Carcinoma	45.3%	24.5%	69.8%	32.6%	31.5%	64.1%
Salivary gland tumors	9.4%	13.2%	22.6%	7.3%	6.2%	13.5%
Sarcoma	1.9%	3.8%	5.7%	11.2%	6.7%	17.9%
Lymphoma	0%	0%	0%	2.2%	1.7%	3.9%
Malignant melanoma	1.9%	0%	1.9%	0.6%	0%	0.6%
Total	58.5%	41.5%	100%	53.9%	46.1%	100%

Table2. Trends of oral cancers by anatomic site by sex and period in Isfahan, Iran.

	1991-2000			2001-2010		
	Male	Female		Male	Female	
Tongue	5.7%	9.4%	15.1%	10.7%	9%	19.7%
Gingival	22.6%	20.8%	43.4%	24.2%	23.5%	47.7%
Buccal mucosa	11.3%	3.8%	15.1%	7.3%	5.1%	12.4%
Palate	15.1%	7.5%	22.6%	6.2%	3.9%	10.1%
Floor of mouth	1.9%	0%	1.9%	1.1%	1.7%	2.8%
Lip	1.9%	0%	1.9%	4.5%	2.8%	7.3%
Total	58.5%	41.5%	100%	54%	46%	100%

study basal cell carcinoma (16.25%), adenocystic carcinoma (1.9%) and lymphoma (1.5%) were in second to fourth position, and mucoepidermoid carcinoma and verrucous carcinoma were in fifth position. Also in Razavi's et.al²¹ study after SCC, mucoepidermoid carcinoma (10.2%), lymphoma (6.4%), osteosarcoma (4.6%) and verrucous carcinoma (3.9%) were the most frequent lesions.

In the present study only 16% of carcinomas (mostly SCC) were occurred in patients younger than 40 years old, 32% in 40-60 years old and more than 52% of carcinomas were observed in patients older than 60 years. It means that 84% of carcinomas occur in patients older than 40 years. Similar to other studies, it seems that among young persons, the occurrence of oral SCC is rare. Sheng Han et.al in 2010 in China,²⁴ found that SCC was the major histology in older patients (82.2% were over 40 years old). Also Ries et.al²⁵ reported that oral SCC predominantly occurs in individuals during the fifth through eight decade of life. In Susan Muller's et.al²⁶ study is noted that more than 95% of oral SCC occur in people \geq 40 years old with a mean age of onset in the seventh decade.

Sarcoma was more common in younger patients. In the present study, more than 82% of sarcomas were in patients younger than 40 years old and only 3% of sarcomas were in patients $>$ 60. Sheng Han et.al²⁴ in their study found that the incidence of sarcoma decreased with the increase of age. In Daley's and Darling's²⁷ study, jaw osteosarcoma usually affects adolescents and young to middle age adults of both sexes. Chidzonga et.al²⁸ that studied sarcomas of the oral and maxillofacial region in Zimbabwe, reported the mean age of 23 years for men and 29 years for women in oral sarcomas.

Subcategories of oral cancers showed a variation in trends over the last decade. In the period 1991-2000 carcinomas occurred in 70% of cases but in the period 2001-2010 it occurred only in 64% of cases, and also a decrease from 22% in 1991-2000 to 13.5% in 2001-2010 in salivary gland tumors was observed whereas there was an increase in the incidence of sarcomas and lymphomas.

In this 20 year study period, the most common site of oral cancers was gingival (46%), followed by tongue (18%), buccal mucosa (12%), palate (12%), lip (6%) and floor of mouth (2%). In Shiboski's²⁹ study more than one fourth of oral cavity cancers reported from were located

on tongue during 1973-1996. The next most common site was lip. In Razavi's et.al²¹ study, the most prevalent places were gingiva (30.7%), mandibular bone (12.7%), palate (11.4%) and tongue (10.7%). Also in Babazadeh's et.al³⁰ study, Sargeran's,¹⁶ Saavedra's¹⁸ and Izarzugaza's³¹ studies tongue was the most prevalent place of malignancies. Skinner's et.al¹³ found the floor of mouth to be the most common region for oral cancers in the United States, that is in contrast to the findings of the present study.

In this study the percentage of tongue cancer increased from 15% in first decade to 20% in the next decade. This finding is in line with Bhurgri's³² study in Karash south, that showed a moderate upward trend for tongue cancer. Myers et.al¹⁰ found that the percentage of tongue SCC patients who were younger than 40 years old, increased from less than 10% in 1948 to 25% in mid 1990s. Atula et.al³³ found that among cases of tongue SCC registered in Finland, the percentage of cases occurring in young adults increased from 4.3% in 1960s to 8.6% in 1970s and 7.2% in 1980s. In Muller's²⁶ study the percentage of tongue cancer increased significantly from 1991-2000 to 2001-2006, while no significant change was detected for incidence in other locations. In our study a decreasing trend was observed in incidence of buccal mucosa cancer from 15% to 12% and also in palate from 22% to 10% that is contrary to Bhurgri's³² study that a dramatic increase was observed for cancer of cheek.

Conclusions

In the present study, carcinoma were the most frequent lesions in these 20 years but in the last decade an increasing incidence was observed in sarcomas and lymphomas and this increase almost belongs to young adults. Among young persons, the occurrence of oral carcinomas (mostly SCC) is rare but sarcomas were more common in younger patients. Comparing the two time intervals, in first decade male to female ratio was (1.4) but in next decade, it has decreased to (1.1). According to this study, there might be some changes in risk factors as well as changes in the diagnosis of oral cancers in Isfahan that calls for further investigations.

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