

## Original Article

### Trends in 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 investigations have reported evidence of an increasing incidence in oral cancers during recent years. The purpose of this study was to investigate time trend and changes in demographic distribution of oral cancers incidence in Isfahan during 1991-2010.

**Materials and Methods:** In this retrospective analytic study archive of Oral Pathology Department of School of Dentistry, Isfahan University of Medical Sciences from 1991 to 2010 were reviewed. A total of 231 Pathology reports were analyzed. Age, sex, primary site, histologic type of cancer, and the referral year were recorded. Data were analyzed by using Jointpoint Regression Program 3 and SPSS 18. *P* value less than 0.05 consider as significant level.

**Results:** Out of all malignancies, 55% were male and 45% were female. The most frequent cancer was squamous cell carcinoma. Comparing the two time intervals (1991-2000) and (2001-2010) showed that the ratio of carcinomas and salivary gland tumors had decreased while there was an increase in incidence of sarcomas and lymphomas. Among young persons, the occurrence of oral carcinomas (mostly SCC) is rare but sarcomas were more common in younger patients. Gingiva was the most frequently involved in oral cancers with (46%), followed by tongue with (18%).

**Conclusion:** According to this study it revealed that some changes in trends of oral cancer have happened in Isfahan that calls for more study and evaluation of etiologies of these changes.

**Key Words:** Demographic features, incidence, oral cancers, oral cancers, trend

Received: April 2012  
Accepted: July 2012

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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 appropriate behavior modification.<sup>[1-4]</sup> Among all cancers, oral squamous cell carcinoma consists about 3% of all cancers in male and 2% of all cancers in female.<sup>[5]</sup> But it seems that difference 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.<sup>[6]</sup> In Curado's study<sup>[7]</sup> that analyzed the head and neck cancers epidemiology in five countries, found that the incidence of head and neck cancers are increasing in females whereas it is decreasing in males.

According to World Health Organization, carcinoma of oral cavity in males in developing countries, is the sixth commonest cancer after lung, prostate, colorectal, stomach, and bladder cancer, while in females, it is the tenth commonest site of cancer after breast, colorectal, lung, stomach, uterus, cervix, ovary, bladder, and liver.<sup>[8]</sup>

Oral cavity is more accessible to complete examination; it could be used in early detection of precancerous and cancerous lesions. But either due to ignorance or inaccessibility of medical care, the disease gets detected in the later stages. Thus, there

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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.<sup>[9]</sup>

Several recent reports suggest an increasing incidence of oral squamous cell carcinoma among young persons in many regions of the world. The average age for diagnosis of head and neck SCC was 60 years old but it seemed that it had increased in young adults and these increases almost belong to the tongue area.<sup>[10,11]</sup>

Information relating to cancer incidence trends forms the scientific basis for the planning and organization of prevention, diagnosis and treatment of cancer in a community. Time trends may also give rise to hypotheses concerning the etiology and biology of cancer, which can be applicable for the testing of various hypothesis made in clinical and experimental oncology.<sup>[12]</sup>

The aim of this study was to investigate trends and changes in demographic distribution of oral cancers incidence in Isfahan 1991-2010.

## MATERIALS AND METHODS

In this retrospective analytic study, archive of oral pathology department of School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran during 1991-2010 was reviewed.

After reviewing of the 4000 pathologic reports, by co-researcher under supervision of pathologist, cases with inadequate or invalid information were excluded from the study and patients with malignant lesions with research criteria which is having malignancy in oral cavity, were identified and then age, sex, primary site, and histologic type of cancer were recorded in the designed checklist. It should be noticed that coding patients were done without mentioning their name in order to keeping with privacy.

Comparisons were made between patients less than 40 years of age and those 40-60 years old and those greater than 60 years old to find out if there is difference between these three age groups. In addition, comparisons were made between data collected for the decades, 1991-2000, and 2001-2010 for all subjects and separately for the three age groups, to detect possible variations and trends across decades.

Statistical analysis was done using Jointpoint Regression Program version 3 and SPSS version 18. *P* value less than 0.05 consider as significant level.

## RESULTS

From all available cases in archives of Isfahan dental school, 231 cases were malignant. Out of them 55% were male and 45% were female. The mean age of patients was 52.

According to Figure 1, malignancies were classified into 13 groups which that, SCC with 60% followed by mucoepidermoid carcinoma with 8%, were the most frequent malignancies. Since the most frequency of malignancies relates to carcinomas, the trend in incidence of this malignancy over the past 20 years was shown in Figure 2. This is an increasing trend but it is not significant (*P* value > 0.05).

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

According to results, about 27% of cases occurred in patients younger than 40 years, 31% in patients older than 60 years and 42% in patients between 40 and 60 years old.

Male to female ratio for all cases was. ( $\frac{1.2}{1}$ ) To comparing the two time intervals (1991-2000) and (2001-2010), in the first decade,  $\frac{M}{F}$  ratio was ( $\frac{1.4}{1}$ ) but in the next decade this ratio has decreased to ( $\frac{1.1}{1}$ ). Therefore, a rising incidence was observed in both genders, more apparent in females.

From total, only 23% of cases occurred in (1991-2000), this is while 77% of cases occurred in (2001-2010). It seems that incidence of oral cancers have increased in recent years in Isfahan.

There was a statistically significant relation 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 and 60 years old.

Majority of sarcomas (more than 82%) were in

patients younger than 40 years old and only 3% of sarcomas were in patients older than 60 years.

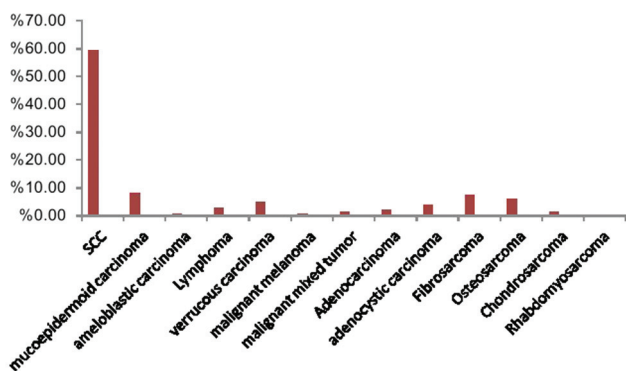
About half of lymphomas occurred in patients younger than 40 years old rather than other age groups.

Subcategories of oral cancers (including carcinomas, salivary gland tumors, sarcomas, lymphomas) showed a variation in trends over the last decade, that is borderline to 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, and also a decrease from 22% in (1991-2000) to 13.5% in (2001-2010) in salivary gland tumors was seen whereas there was an increase in incidence of sarcomas and lymphomas, as shown in Table 1.

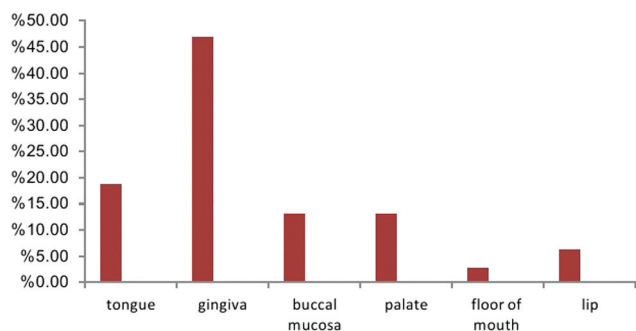
The percentage of tongue cancer increased from 15% to 20% and lip cancer from 2% to 7% from the first decade to the next decade. But a decreasing trend was noted in incidence of buccal mucosa cancer from 15% to 12% and also in palate from 22% to 10%. ( $P$  value = 0.161), as shown in Table 2.

## DISCUSSION

In this descriptive study, 231 patients from archive



**Figure 1:** Distribution of histologic type of oral cancers in 1991-2010

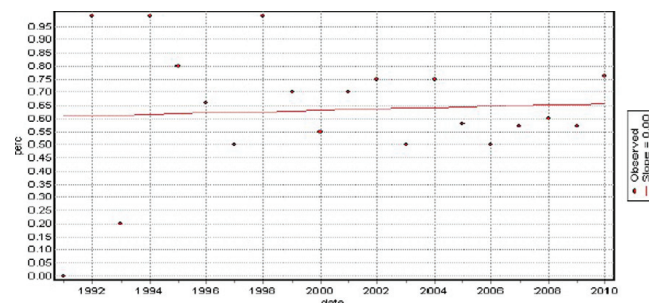


**Figure 3:** Distribution of anatomic site of oral cancers in 1991-2010

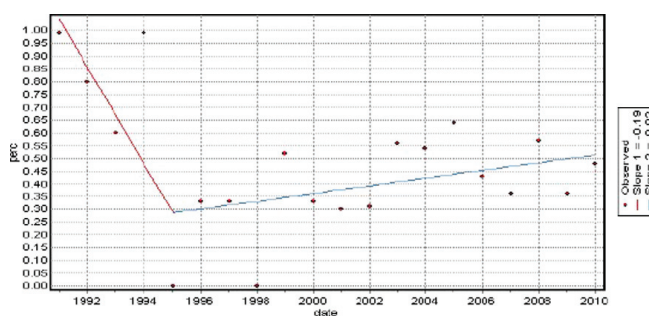
of oral pathology department of School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran during 1991-2010 were reviewed.

Although the mean of patients was 52, one third of cases occurred in patients younger than 40 years old. In Myers *et al.* study and Schants *et al.* study the mean age at diagnosis for SCC was approximately 60 years, but the incidence oral cancers in young adults (age <40 years) appears to be increasing.<sup>[10,11]</sup> Funk *et al.* in their study on oral cancers, reported 64 years of ages as average.<sup>[13]</sup> Median age of patients in Delavarian's *et al.* study was 53.5 and Sargeran's study 58.8.<sup>[14,15]</sup>

Oral cancers occurred in men more than women but today the men to women ratio was 6 to 1, in 1950, becomes less than 2 to 1<sup>[6]</sup> In this study, an increasing incidence was observed in both genders more apparent in female. Comparing the two time intervals, in first decade male to female ratio was 1.4 but in next decade, it is decreased to 1.1. It seems that in recent years, women are exposed to carcinogens more than before. Curado and others investigated the head and neck cancers epidemiology in five countries; they found that the incidence of head and neck cancers is increasing in females whereas it is decreasing in males.<sup>[7]</sup> In Idris *et al.* study men to women ratio was more than 1, which was similar to Skinner *et al.* study.<sup>[16,17]</sup>



**Figure 2:** Trends in incidence of oral carcinomas in 1991-2010



**Figure 4:** Trends in incidence of oral cancers on gingiva in 1991-2010

**Table 1: Trends of oral cancers by histologic type of cancer for each gender and period two decades**

Histologic type of cancer	(1991-2000)			(2001-2010)		
	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)
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

**Table 2: Trends of oral cancers by anatomic site for each gender and period**

Anatomic site of cancer	(1991-2000)			(2001-2010)		
	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)
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

The great majority of oral cancers in this study were SCC (60%), followed by mucoepidermoid carcinoma (8%), osteosarcoma (7%), and then fibrosarcoma (6%).

In all similar previous studies, SCC was the most frequent lesion but it has different frequencies in each studies. In Funk's<sup>[13]</sup> study was 86.3%, Delavarian's *et al.*<sup>[14]</sup> 73%, Bayat's<sup>[18]</sup> 85%, in Razavi's *et al.*<sup>[19]</sup> 54.5%, Idris's<sup>[16]</sup> 66.5%, Tabesh's<sup>[20]</sup> 73.3%, and Tadbir's<sup>[21]</sup> 73%. After SCC, in Bayat's<sup>[18]</sup> study in Tehran, adenocystic carcinoma (4%), mucoepidermoid carcinoma (2%), adenocarcinoma (1%) were the most frequent lesions. In Tabesh's<sup>[20]</sup> study in Isfahan in 1995, BCC (16.25%), adenocystic carcinoma (1.9%) and lymphoma (1.5%) were in second to fourth grade, and mucoepidermoid carcinoma and verrucous carcinoma were in fifth grade. In Aghbali *et al.*<sup>[22]</sup> study in Tabriz in 2011, after SCC (79%), salivary gland malignancies (13.6%) and sarcomas (3%) were the most frequent lesions. Also in Yazdizadeh *et al.* study<sup>[23]</sup> in Gilan in 2008, SCC with 67% was the most common malignant one. The second rank belonged to lymphoma with (8.8%). Adenocarcinoma and mucoepidermoid carcinoma with (3.9%) were in third place of incidence.

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. It seems that among young persons, the occurrence of oral SCC is rare. It is like the results of previous studies. Sheng Han *et al.* in China (2010),<sup>[24]</sup> found that SCC was the majority histology in older patients (82.2% were over 40 years old). Also Ries *et al.*<sup>[25]</sup> reported that oral SCC predominantly occurs in individuals during the fifth through eight decade of life. In Susan Muller's *et al.* study<sup>[26]</sup> 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 al.*<sup>[24]</sup> in their study found that the incidence of sarcoma decreased with the increase of age. In Daley's and Darling's<sup>[27]</sup> study, jaw osteosarcoma usually affects adolescents and young to middle age adults of both sexes. Chidzonga *et al.*<sup>[28]</sup> 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 in 64% of cases, and also a decrease from 22% in (1991-2000) to 13.5% in (2001-2010) in salivary gland tumors was seen whereas there was an increase in incidence of sarcomas and lymphomas. In this 20-year-study period, the most common site of oral cancers was gingival (46%), followed by tongue W(18%), buccal mucosa (12%), palate (12%), lip (6%), and floor of mouth (2%). In Shiboski's<sup>[29]</sup> study a more than one fourth of oral cavity cancers reported from 1973 to 1996 were located on tongue. The next most common site was lip. In Razavi's *et al.*<sup>[19]</sup> 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 al.*<sup>[30]</sup> study, Sargeran's,<sup>[15]</sup> and Izarzugaza's<sup>[31]</sup> study tongue was the most prevalent place of malignancies. Skinner's *et al.*<sup>[13]</sup> 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's<sup>[32]</sup> study in Karash south, that showed a moderate upward trend for tongue cancer. Myers *et al.*<sup>[10]</sup> found that the percentage of tongue SCC patients who were younger than 40 years old, increased from less than 10% in 1948 to between 15% and 25% in mid-1990s. Atula *et al.*<sup>[33]</sup> 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's<sup>[26]</sup> 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's<sup>[30]</sup> study that a dramatic increase was observed for cancer of cheek.

## CONCLUSION

In the present study, carcinoma were the most frequent lesions in these 20 years but in the last decade an increase incidence was seen 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. It seems that in recent years, women are exposed to carcinogens more than before.

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**How to cite this article:** Razavi SM, Siadat S, Rahbar P, Hosseini SM, Shirani AM. Trends in oral cancer rates in Isfahan, Iran during 1991-2010. *Dent Res J* 2012;9:88-93.

**Source of Support:** This report is based on a thesis which was submitted to the School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran, in partial fulfillment of the requirements for the DDS degree (#288043). The study was approved by the Medical Ethics and Research Office at the Isfahan University of Medical Sciences and financially supported by this University. **Conflict of Interest:** None declared.