

## RESEARCH COMMUNICATION

# Oral and Pharyngeal Cancer Among the Arab Population in Israel from 1970 to 2006

Avraham Zini\*, Nasser Nasser, Yuval Vered

### Abstract

**Background:** Israeli Arabs are considered as a developing society characterized by poverty and high levels of smoking among men. The purpose of this study was to describe their incidence, mortality and survival rates for oral and pharyngeal cancer between the years 1970-2006. Studies such as this in the Arab world, where the population is almost the same as the Arab population in Israel, are rare. **Methods:** The incidence and survival data were derived from all relevant registered data at the National Cancer Registry. The group of lesions included cancer of the lips, tongue, buccal mucosa, floor of the mouth, salivary glands, gums, palate and pharynx. Morphological description was according to WHO classification. **Results:** Most diagnosed patients were male. The mean age was 54.4 years, and mean years of survival were 3.83. The oropharynx was the most common site (28.3%) while the palate was the least frequent (3.12%). Squamous cell carcinoma (SCC) was the most common histological feature (66.3%), while basal cell carcinoma (BCC) was the least (3.9%). The overall 5 years survival rate was 59.4%, this being highest for BCC (82.1%), while SCC was significantly lower (56.2%) ( $p < 0.001$ ). Lip cancers survived better than other sites. **Conclusions:** Data from this society are similar to other developing societies in the majority of the results. The incidence of oral and pharyngeal cancer is lower among the Arab population, in comparison to the Jewish population in Israel.

**Keywords:** Oral cancer - pharyngeal cancer - survival - epidemiology - Israeli Arabs

*Asian Pacific J Cancer Prev*, 13, 585-589

### Introduction

Oral and pharyngeal cancer remains one of the few life threatening, non-infectious oral diseases, even after the antibiotics era. It is more common in developing countries (Petersen, 2003), (Stewart and Kleihues, 2003), for instance in India where the incidence varies, peaking at 12.6 per 100,000. Even in the western world, such as the U.S., it is 2.4% of all cancers (Jemal 2002). Oral and pharyngeal cancer is still more common than carcinoma of the brain, bone, stomach, liver or the cervix (Jemal et al., 2007). Among males, oral and pharyngeal cancer is the eighth most common cancer on a global level, and the third most common in certain parts of Asia (Petersen et al., 2002).

This is the most costly craniofacial treatment in the USA (Snowden et al., 2003), estimated at \$83,080 per case, annually. In developing countries, the proportion of smokers remains high, about 50%, and higher for men than for women (Petersen et al., 2002). Developing countries are characterized by a cycle of poverty, desolation, social disintegration, tobacco use, related illnesses, and less energy and motivation for tobacco abuse cessation (Efroymsen et al., 2001).

Oral and pharyngeal cancer affects the lips, tongue, buccal mucosa, floor of the mouth, salivary glands,

gums and pharynx (Burt and Eklund, 2005), (Eicd.com by Yaki Technologies, 2004), and histological includes: carcinomas, sarcomas, lymphomas and melanomas. The distribution and occurrence of oral and pharyngeal cancer varies by age, ethnic group, culture and level of country development (Petersen, 2003), (Burt and Eklund, 2005), (Bosetti et al., 2005).

Israeli Arab society is recognized as a developing society (Gigron and Bar, 2004) and characterized by poverty, high tobacco use and low percentage of alcohol consumption that has increased over recent decades (Neumark et al., 2001), (Bar et al., 1990). This society is also characterized by a high level of sun exposure as all the Israeli residents.

The collection of local epidemiological data on oral and pharyngeal cancer in Israel has been sparse, and only a few publications were located. One study, based upon data from the Israel Cancer Registry (N=1460) from 1960-1969, presented incidence rates of 14.7 per 100,000 among the non-Jewish population and 12.6 per 100,000 among the Jewish population, (crude and unadjusted rates) (Shteyer et al., 1976). A later report, based upon data from several Israeli hospitals (N=342) from 1970-1980, found twice the prevalence among males than females and differences by ethnicity and age (Gorsky et al., 1994). The last report was a broad report about the entire population in Israel,

Department of Community Dentistry, Hebrew University-Hadassah School of Dental Medicine, Jerusalem, Israel \*For correspondence: [aviz@hadassah.org.il](mailto:aviz@hadassah.org.il)

and based on data from 1970 till 2006 (Zini et al., 2009). This report will use the same data base, and will focus on the Arab society in Israel.

Studies, such as this, in the Arab world, where the population is similar to the Arab population in Israel, are rare. One of these studies is the study of Rawshdeh (Rawashdeh and Mtalka, 2004) in 2004 that aimed to explore the cases of oral and pharyngeal malignant cancers in the north of Jordan between the years 1991-2001. Another study was in, and aimed to explore the cases of salivary glands tumors in Jordan (Taiseer and Khansa, 2007).

The aim of the present study is to present collected oral and pharyngeal cancer data in Israeli Arab society from 1970 to 2006, to analyze associations with potential independent variables, and to determine possible trends of lymphoma over 36 years in Israel.

## Materials and Methods

Data of new cases of cancer are stored at the Israel National Cancer Registry. The present study includes all registered data between 1970 and 2006 of Israeli Arab citizens. Oral and pharyngeal cancer incidence distributions are presented by available registered data by gender, age, site of the cancer, and survival rate. The stage of the cancer at diagnosis was not available from the Registry.

Variables were operationally categorized. In the present study, the following potential independent variables are considered: gender; site of cancer; the histology of cancer; mean age of diagnosis and five-year-survival rate.

The criteria for the search of the Registry included all lymphomas of the oral region (ICD0 C00.0-14.8): lip; oropharynx; tongue; gum; floor (World Health Organization, 2010), (Swerdlow et al., 2008), (Vardiman et al., 2009). Morphological description is according to WHO classification of lymphoid neoplasms (Swerdlow et al., 2008), (Vardiman et al., 2009): Squamous cell carcinoma; Basal cell carcinoma; other epithelial tumors; connective tissue tumors; Hematological tumors; not specified tumors.

Data were analyzed using MS Excel (XP version) and SPSS for Windows (version 15.0) software. Numerical variable data were mainly descriptive (mean, range, standard deviation), categorized by frequency (N and percentage) and customarily presented. Analysis of sub-groups was employed using ANOVA and chi-square tests.

Kaplan-Meier five year survival plots and Log rank tests were calculated. A level of  $p < 0.05$  was considered to be statistically significant.

## Results

The total number of new cases diagnosed as oral and pharyngeal cancer between 1970 and 2006 was 647, and most cases were males (67.4%).

Distributions by anatomical site according to the ICD groups are presented in Table 1. The most common site in all of the cases was the oropharynx (28.6%), followed by the lip (27.4%), while the floor of the mouth was the least common site (2.5%). The salivary glands tumor was in third place of the total cases in both genders (14.8%). Among males, the most common site was the lip (30.7%), while among females the most common site was the oropharynx (27.5%). Differences for site of cancer were statistically significant by gender ( $p < 0.001$ ). Most of the diagnosed cases were above 54 years of age (53.7%). Among the younger age group ( $< 54$  yrs of age) the most common site was the oropharynx, while among the older group the most common was the lip (36.3% vs. 32. respectively;  $p < 0.001$ ).

Table 2 presents the distribution of cancer cases by histological group. It shows that in all age groups SCC is the most common histological group (66.2%), while BCC (3.7%) and other not specified (3.7%) are the least common histological groups. Squamous cell carcinoma is also the most common histological group of oral cancers among both genders: 72.5% among male, and 53.6% among female (66.3%). The distribution of other epithelial cancers (10.1%) among males and (18.5%) among females, and they are followed by the hematology group with 7.6% and 11.8% respectively. The group of connective tissue was the least common group in males (2.8%) while the group of unspecified cancer was the least common group in females (2.4%). The results show a significant difference between the two genders ( $p < 0.001$ ). In patients younger than 54, the most common is SCC (61.0), while the least common in this age group is BCC (1.7%). From the age of 54 and above, the most common is also SCC (70.9%), while the least common are connective tissue tumors (1.2%).

Table 3 presents the mean and standard deviation of age of diagnosis and years of survival. The mean age of diagnosis for all the patients was  $54.4 \pm 20.8$  years of age. No significant differences were found by gender.

**Table 1. Distribution of oral cancer cases among Arabs reported by the Israel National Cancer Registry from 1970 to 2006, by gender, age, and site**

	Other	Tonsil	Salivary	Palate	Floor	Gum	Tongue	Oropharynx	Lip	Total	p*
Gender:											
Male	24 (5.5)	21 (4.8)	60 (13.8)	11 (2.5)	13 (3.0)	7 (1.6)	39 (8.9)	127 (29.1)	134 (30.7)	436 (67.4)	<0.001
Female	13 (6.2)	10 (4.7)	36 (17.1)	9 (4.3)	3 (1.4)	18 (8.5)	21 (10)	58 (27.5)	43 (20.4)	211 (32.6)	
Age (years):											
<54	16 (5.3)	11 (3.7)	51 (17)	12 (4)	5 (1.7)	10 (3.3)	22 (7.3)	109 (36.3)	64 (21.3)	300 (46.3)	<0.001
≥54	21 (6.1)	20 (5.8)	45 (12.8)	8 (2.3)	11 (3.2)	15 (4.3)	38 (11)	76 (21.9)	113 (32.6)	347 (53.7)	
Total	37 (5.7)	31 (4.8)	96 (14.8)	20 (3.12)	16 (2.5)	25 (3.9)	60 (9.3)	185 (28.5)	177 (27.3)	647 (100)	

\* ANOVA

**Table 2. Distribution of oral cancer cases among Arabs reported by the Israel National Cancer Registry from 1970 to 2006, by gender, age, and histological group of cancer**

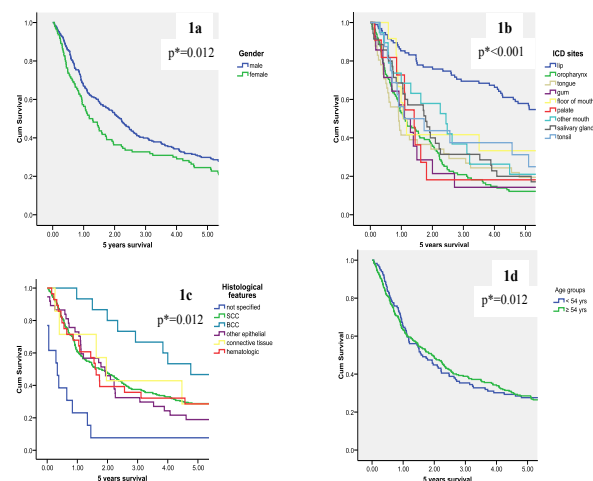
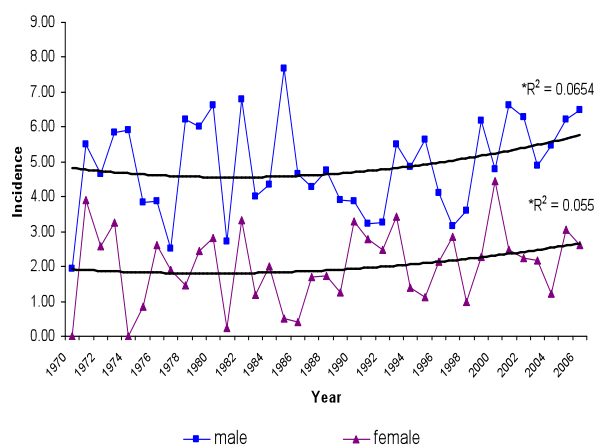
	Not specified	Hematological N(%)	Connective tumors N(%)	Other tissue N(%)	BCC epithelial N(%)	SCC N(%)	p* N(%)
Gender:							
Male	19 (4.4)	33 (7.6)	12 ( 2.8)	44 (10.1)	12 (2.8)	316 (77.5)	<0.001
Female	5 (92.4)	25 (11.8).	16 (7.6)	39 (18.5 )	13 (6.2)	113 (53.6)	
Age:							
< 54 yrs	12 (4)	26 (8.7)	24 (8)	50 (16.7)	5 (1.7)	183 (61)	<0.001
≥ 54 yrs	12 (3.5)	32 (9.2)	4 (1.2)	33 (9.5)	20 (5.8)	246 (70.9)	
Total	24 (3.7)	58 (9)	28 (4.3)	83 (12.8)	25 (3.9)	429 (66.2)	

\* 'ANOVA

**Table 3. Age of Diagnosis and Survival Years of Oral Cancer Cases Among Arabs Reported by the Israel National Cancer Registry from 1970 to 2006**

	Standard Deviation	Mean	P*	Age of diagnosis Standard Deviation	Mean	p*
Male	±5.11	4.16		±19.55	55.08	
Female	±4.09	3.06	0.029	±21.98	53.11	0.269
Total	±4.85	3.83		±20.8	54.4	

\* 'Independent t-test

**Figure 1. Kaplan-Meier Survival Plots by Gender (1a), Site (1b), Histological Features (1c), and Age (1d), Among Arabs Reported by the Israel National Cancer Registry starting in 1970 - 2006****Figure 2. Trends of Oral Cancer Incidence Among Arabs Reported by the Israel National Cancer Registry by Gender Between 1970-2006.**

The mean years of survival were  $3.83 \pm 4.85$  years. Significant differences of survival years were found by gender. Among males the mean of years of survival was  $4.16 \pm 4.11$  years, while for females it was  $3.06 \pm 4.09$  years ( $p=0.029$ ).

The total five years survival rate was 59.4%. The survival rates varied among gender and are presented by Kaplan-Meier survival plot in Figure 1a. The results indicated that male demonstrated a higher rate ( $p=0.012$ ) than female. The survival rates also varied in different sites of cancer ( $p<0.001$ ) and are presented in Figure 1b. Lip cancer survived more than other sites. For morphologic groups: BCC presented the highest survival rate at 82.1%, while SCC present only 56.2% of 5 years survival rate ( $p<0.001$ , Figure 1c). No differences of 5 years survival rate were found by age (Figure 1d).

Figure 2 shows the trend of cancer incidences among males and females between the years 1970-2006. We can see that the yearly incidence was almost constant and there were no statistically significant changes in the increment percentage of oral cancer cases among males and females during these years. Because of the small number of patients, the R2 is so small that we could not learn much about the trend.

## Discussion

Between the years 1970 and 2006, 647 cases of oral and pharyngeal cancer in the Arab population of Israel were registered. The population of Israel in 1970 was estimated to be about 3,022,100 people and 440,000 of them were Arabs (14%) (Central Bureau of Statistics, 2007). In 2007 the population of Israel was estimated to be about 7,200,000 people and 1,450,000 of them were Arabs (20%) (Central Bureau of Statistics, 2007).

The rate of Arab patients of the whole society (647 cases of oral and pharyngeal cancer to the average number of Arabs during the years 1970-2006) is much smaller than the rate of the Jewish patients (11,843 cases of oral and pharyngeal cancer to the average number of Jews during the years 1970-2006). Since oral and pharyngeal cancer is a multifactor disease, many factors could affect this outcome. Oral cancer is associated with life style. Therefore, a lower rate of alcohol consumption as compared to the Jewish population, as well as less of a "western" life style, may play a role in the results. Sun exposure is an important cause in lip cancer and the darker skin of Arabs may contribute to the lower rate of

lip cancer. The present available data base did not include lifestyle risk factors. Comparisons among the Israeli population have demonstrated higher levels of smoking and alcohol consumption among males (Neumark et al., 2001), (Bar et al., 1990), (Israeli Ministry of Health., 2009). It is also recognized that exposure to the sun is a characteristic occupational hazard of men. Males demonstrated, throughout, significantly higher incidence rates than females. This might be explained by the differences in the combined risk factor of smoking and exposure to the sun (Neumark et al., 2001), (Bar et al., 1990). It has been documented that Arab males smoke 6 times more than females (Barchana, 2004) and women are exposed less to the sun. Among Arabs, the percentage of smokers in 2004 was found to be 41.2% among males and 8% among females (Sarachev and Ananostev, 2001). The Muslim population, by religious dictate, avoids alcohol (Darwish, 2005). In this study, the oropharynx was the most common site for oral and pharyngeal cancer in the Arab community and the lip was the second, in comparison to other countries where the tongue was the most common site in the oral cavity (Israeli Ministry of Health, 2009). The increased risk to the lips may be due to the combination of high sun exposure among workers and the high rate of smokers.

Among all cases, the vast majority was male patients. This finding is similar to the global literature that generally demonstrates an OR of above 2 (Sarachev and Ananostev, 2001), (Mulligan, 2002). The average age of males with oral and pharyngeal cancer was higher than females. The average age of diagnosed patients was 54.4, however, most of the patients were older than 65 or younger than 45. In all of them, SCC was the dominant.

Patients who were younger than the average age of cases had a better chance of survival, and among patients who were older than this age, only one third survived. The five-year-survival rate for all people was (59.4%), similar but lower than a recent study in the USA (Gorsky et al., 1994). This finding is consistent with the literature (Siriwardena et al., 2006; Warnakulasuriya et al., 2006).

We can also see that the trends in increment percentage of oral cancer incidence among males and females from 1970 to 2006 did not change and were almost always constant. This notable stability, compared to the significant decrease in the incidence rates among the Jewish community (Zini et al., 2009), could be due to higher health awareness among Jews than Arabs. This improved awareness of the danger of sun exposure could explain the recent decrease in the Jewish community.

Data from this society is similar to other developing societies in most of the results. As we can see in the mentioned studies in Jordan, that there were twice as many male patients as female patients. The mean age of the patients was approximately 60, SCC was the most common cancer and the mean survival was 3 years (Rawashdeh and Mtalka, 2004; Taiseer and Khansa, 2007).

## References

- Bar H, Eldar P, Weiss S (1990). Three national surveys on nonritual alcohol drinking practices of the Israeli Jewish adult population in the '80s: what are the trends? *The Israel J of Psychiatry and Related Science*, **27**, 57-63.
- Barchana M, Israeli Ministry of Health (2004). Smoking in Israel 2002-2003: [http://www.old.health.gov.il/download/icdc/smoking\\_2003.pdf](http://www.old.health.gov.il/download/icdc/smoking_2003.pdf) [January 2012].
- Bosetti C, Malvezzi M, Chatenoud L, et al (2005). Trends in cancer mortality in the Americas, 1970–2000. *Annals of Oncology*, **16**, 489-511.
- Burt A, Eklund S (2005). Editors. Dentistry, dental practice and the community. 6th Edition. 294-304.
- Central Bureau of Statistics (2007). Population estimation by population group in Israel: [http://www1.cbs.gov.il/reader/newhodaot/hodaa\\_template.html?hodaa=200711171](http://www1.cbs.gov.il/reader/newhodaot/hodaa_template.html?hodaa=200711171) [January 2012].
- Darwish S (2005). The management of the Muslim dental patient. *British Dental J*, **199**, 503-4.
- Efroymsen D, Ahmed S, Townsend J, et al (2001). Hungry for tobacco: an analysis of the economic impact of tobacco consumption on the poor in Bangladesh. *Tobacco Control*, **10**, 212-7.
- Eicd.com by Yaki Technologies (2004). International Classification of Diseases, ninth revision: <http://www.eicd.com/EClass/2.htm> [January 2012].
- Gigron B, Bar M (2004). The Israeli third sector: between welfare state and civil society .Kluwer Academic Publishers New-York.
- Gorsky M, Littner MM, Sukman Y, et al (1994). The prevalence of oral cancer in relation to the ethnic origin of Israeli Jews. *Oral Surgery, Oral Medicine and Oral Pathology*, **78**, 408-11.
- Israeli Ministry of Health (2009). Smoking patterns among Israeli adults: [http://www.health.gov.il/Download/pages/smoke2007\\_2008](http://www.health.gov.il/Download/pages/smoke2007_2008) [November 2010].
- Jemal A, Thomas A, Murray T, et al (2002). Cancer statistics, 2002. *CA Cancer J Clin*, **52**, 23-47.
- Jemal A, Siegel R, Ward E, et al (2007). Cancer Statistics, 2007. *CA Cancer J Clin*, **57**, 43-66.
- Mulligan R (2002). The three phases of Eve: exploring the common and unique findings in oral and systemic health of differently aging women. *Compendium*, **23**, 32-40.
- Neumark YD, Rahav G, Teichman M, et al (2001). Alcohol drinking patterns among Jewish and Arab men and women in Israel. *J of Studies on Alcohol*, **62**, 443-7.
- Petersen PE, Bourgeois D, Ogawa H, et al (2005). The global burden of oral diseases and risks to oral health. *Bull WHO*, **83**, 661-9.
- Petersen PE (2003). The World Oral Health Report 2003: continuous improvement of oral health in the 21st century – the approach of the WHO Global Oral Health Programme. *Community Dentistry Oral Epidemiology*, **1**, 3-24.
- Rawashdeh M, Mtalka I (2004). Malignant oral tumors in Jordanians, 1991-2000. A descriptive epidemiological study. *Int J Oral Maxillofac Surg*, **33**, 183-8.
- Sarachev EL, Ananostev NH (2001). Tendencies in the oral cavity cancer morbidity in three regions of South Bulgaria for a period of 15 years (1985-1999). *Folia Medica*, **43**, 150-4.
- Shteyer A, Kunitz I, Steinitz R (1976). Oral malignancies in Israel – A ten year survey (1960-1969). *Israel J Dental Med*, **25**, 15-9.
- Siriwardena BSMS, Tilakaratne A, Amarantunga EAPD, Tilakaratne WM (2006). Demographic, aetiological and survival differences of oral squamous cell carcinoma in the young and old in Sri Lanka. *Oral Oncol*, **42**, 831-6.
- Snowden C, Miller T, Jensen A (2003). Costs of medically treated craniofacial conditions. *Public Health Reports*, **18**, 10-17.
- Stewart BW, Kleihues P (2003). World cancer report. Lyon: International Agency for Research on Cancer.

- Swerdlow SH, Campo E, Harris NL et al (2008). WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues. 4 ed. WHO Classification of Tumours, Volume 2. Lyon: *IARC*. **439**, ?-?.
- Taiseer H, Khansa T (2007). Salivary tumors in north Jordanians: A descriptive study. *Oral Surg Oral Med*, **103**, 53-9.
- Vardiman JW, Thiele J, Arber DA, et al (2009). The 2008 revision of the World Health Organization (WHO) classification of myeloid neoplasms and acute leukemia: rationale and important changes. *Blood*, **114**, 937-51.
- Warnakulasuriya S, Mak V, Moller H (2006). Oral cancer survival in young people in South East England. *Oral Oncology*, **10**, 16-21.
- World Health Organization (2010). International Classification of Diseases: <http://apps.who.int/classifications/icd10/browse/2010/en#/K00-K14> [January 2012].
- Zini A, Czerninski R, Vered Y, et al (2009). Trends of oral and pharyngeal cancer in Israel, by gender, age, ethnic group, and country of origin: 1970-2006. *Community Dent Oral Epidemiol*, **37**, 547-54.