RESEARCH COMMUNICATION

Cancer Incidence in Oman, 1998-2006

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Abstract

Background: This paper gives a profile of the cancer incidence in Oman for a nine-year period from 1998-2006. Methods: Data from the population-based national cancer registry were consolidated for the said nine-year period and analyzed. A breakdown of the incidence by year and gender have been given. Age-standardized incidence of common cancers in Oman and their age-specific rates have been tabulated. Further, a graphical comparison between common cancers in Omani men and women have been made with those of other Gulf countries and some developed countries. Results: There were a total of 8,005 (4,224 males and 3,781 females) cases reported and registered in the registry from January 1998 till December 2006 with a male female ratio of 1.1:1. The crude incidence rate was 49.4 per 100,000 males and 45.7 per 100,000 females. The corresponding age-standardized rates were 91.4 and 80.4 per 100,000 in males and females respectively. Conclusions: Incidence of cancer in Oman is lower than in some Gulf countries and many developed countries. Stomach cancer, Non-Hodgkin lymphoma and leukemia are three commonest cancers in males and breast, thyroid and cervical cancers are the most common in females in the nine-year period

Keywords: Cancer incidence - population-based data - Oman - 1998-2006

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Introduction

The burden of cancer has grown globally in the past 3-4 decades due to an increasing control of communicable diseases due to improved sanitation, vaccination and the use of antibiotics (Dos Silva, 1999). Of the 10 million new cases occurring each year, nearly 5.5 million are in the less developed countries (WHO, 2002) Cancer is currently the cause of 12% of deaths world wide, killing 7.6 million people in 2005, three quarters of whom were in developing countries.This number is expected to rise to 9 million by 2015 and 11.5 million in 2030 (WHO, 2007).

The rapid economic development due to the oil boom in the Sultanate of Oman over the past 4 decades has been reflected in the epidemiological transition. The health system which was burdened with infectious diseases in the period before the seventies is now inundated with chronic lifestyle diseases, including cancer (Hill et al., 2000) Data for 2006 show that cancer is the third leading cause of death in hospitalized patients (Ministry of Health, Sultanate of Oman, 2006).

A report on Cancer Incidence in Oman between 1993 -1997 was published in the Eastern Mediterranean Health Journal (Al-Lawati et al., 1999) which mentions that the incidence of cancer in Oman was lower than in some Arabian Gulf countries and many developed countries. The present report describes the incidence data in Oman for the following nine year period, 1998-2006; the results of which show that the picture still remains the same. Further epidemiological studies are needed to study the factors responsible for the lower rates of cancer in Oman.

Materials and Methods

Geographical background

The Sultanate of Oman is located in the southeastern corner of the Arabian Peninsula. The countries/water bodies bordering Oman are Saudi Arabia and United Arab Emirates (UAE) in the west, the Republic of Yemen in the south, the Strait of Hormuz in the north and the Arabian Sea in the east. Besides, there are a number of scattered Omani islands in the Arabian Sea, the most important of which are Masirah and Al-Halaniyat. The total area of the Sultanate of Oman is approximately 309,500 square kilometers and it is the second largest country in the Arabian Peninsula. It is divided for health administration into 11 Governorates/ Regions with 61 Wilayah.

Demography and health care

The estimated mid-year population in 2006 was 2.6 million of which 1.9 million were Omanis and 0.7 million were Non-Omanis. The Omani population showed a sex ratio of 980 females per 1000 males. A large proportion of the population (37.4%) is under-15 years. Only 3.6% of the total Omani population is above the age of 60 years (Ministry of Health, Sultanate of Oman, 2006).

Health care is provided free of cost to all Omanis

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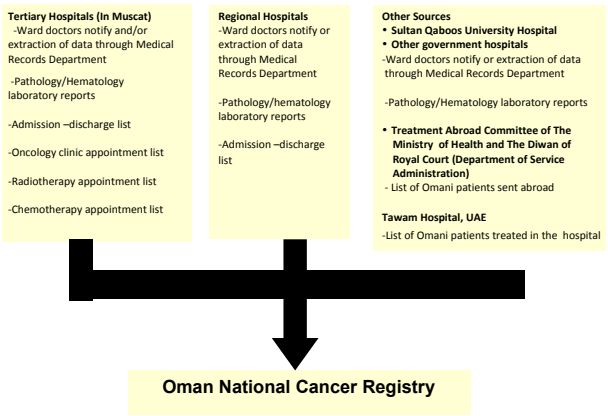

Figure 1. Data Flow into the National Cancer Registry

through 49 hospitals and 150 health centers. The establishment of the National Oncology Center with a radiotherapy unit in 2004 in the capital (Muscat) has enabled the availability of comprehensive cancer care in Oman. More recently, privatization of health care has led to the mushrooming of many clinics and hospitals.

The National Cancer Registry

The Oman National Cancer Registry was established in 1985 as a hospital based registry. Only cases treated in tertiary hospitals were registered. In 1996, the cancer registry started functioning as a population based registry. New cancer notification forms modified in the year 2000 were developed and distributed to all regional hospitals and sister institutions. Two trained cancer registrars are responsible for data collection, coding and data entry. The good quality of the data collected in the Oman National Cancer Registry has resulted in the country's data being included in the publication of the International Agency for Research on Cancer-"Cancer Incidence in Five Continents", both 8th and 9th editions (Parkin et al., 2002; Curado et al., 2007).

Data collection and data management

Data collection is both active and passive. Active collection involves the registry personnel visiting different sources and abstracting data on cancer registry forms. Data is also collected in the form of admission – discharge lists from hospitals, pathology reports of all patients

Table 1. Cancer Frequency and Incidence per 100,000 Population, Oman, 1998-2006

	Males			Females		
Year	Frequency	CR	ASR	Frequency	CR	ASR
1998	478	55.8	111.4	421	50.9	97.2
1999	475	54.1	108.8	413	48.6	92.8
2000	470	51.9	99.4	439	50.1	90.2
2001	504	54.3	103.4	420	46.8	84.8
2002	441	46.4	85.2	383	41.7	73.2
2003	459	51.0	91.7	411	46.7	81.5
2004	496	54.3	119.5	430	48.1	105.9
2005	491	52.8	122.4	427	46.9	100.6
2006	410	43.1	97.8	437	46.9	101.1
Total	4,224	49.4	91.4	3,781	45.7	80.4

CR, crude rate; ASR, age-standardized rate

diagnosed or suspected as cancer, appointment lists from the oncology clinic, chemotherapy and radiotherapy appointments.

Cancer notification was made mandatory in the year 2000 through a Ministerial Decision (4/2000). When a case of cancer is diagnosed, the attending physician of the relevant specialty or the medical records department at the regional hospital completes the notification forms and sends it to the registry.

Data is entered into the Canreg-3 (before 2003), and Canreg-4 (after 2003) software programme supplied by the International Agency for Research on Cancer (IARC). For coding of cases, the International Classification of Diseases for Oncology ICDO-2 was used from 1998-2002. Since 2003 all data was converted to the Can Reg -4 version and ICDO-3, since it was introduced in October 2002. This programme has a duplicate entry checking facility, which avoids the same case being registered more than once. Validity checks are performed for consistency between items: site/histology, gender/site and age/site/histology combinations by Canreg-4.28. Quality control checks are maintained during and after data collection (Skeet R G., 1991).

Frequency distribution and incidence tables were generated using the Canreg-4 programme. The crude incidence rates for each year from 1998-2002 were calculated using the estimations based on the 1993

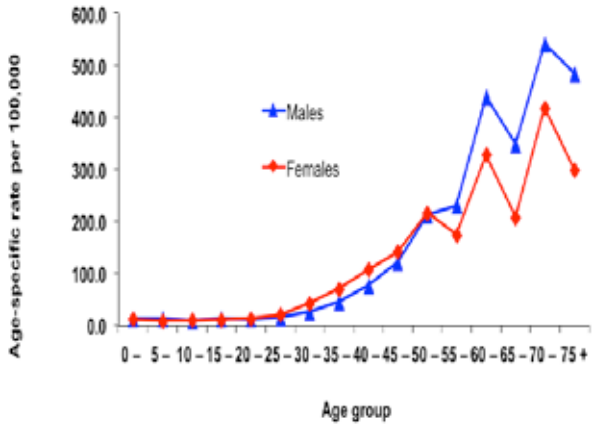

Figure 2. Age-specific Incidence Rates in Oman, 1998-2006

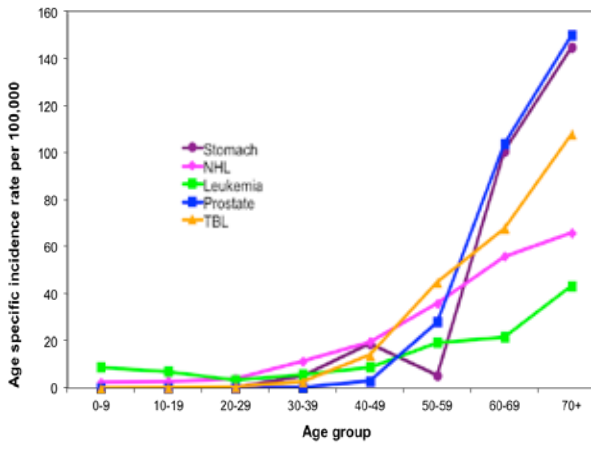

Figure 3. Age-specific Incidence Rates of Common Cancers in Omani Males, 1998-2006

Table 2. Frequency and Age-standardized incidence of Common Cancers in Oman, 1998-2006

	Male			Female	
Type	Freq (%)	ASR	Type	Freq (%)	ASR
Stomach	434 (10.3)	10.8	Breast	675 (17.9)	14.9
NHL	382 (9.0)	7.6	Thyroid	308 (8.2)	5.4
Leukemia	362 (8.6)	5.4	Cervix	239 (6.3)	5.7
Prostate	320 (7.6)	8.1	Leuk	239 (6.3)	3.6
TBL	311 (7.4)	7.7	Stomach	236 (6.2)	5.9
Liver	233 (5.5)	5.8	NHL	228 (6.0)	4.5
Bladder	197 (4.7)	4.8	Ovary	205 (5.4)	4.4
Brain, NS	180 (4.3)	2.9	Skin	127 (3.4)	3.0
HD	167 (4.0)	2.4	Brain, NS	125 (3.3)	1.9
Skin	167 (4.0)	4.0	Colon	99 (2.6)	2.2

NHL, Non-Hodgkin Lymphoma; TBL, Trachea, Bronchus, Lung; HD-Hodgkin disease; NS, Nervous system

population census data(Ministry of Health, Sultanate of Oman, 2006). The 2003 census data was used for incidence in 2003. From 2004-2006 we used population estimations based on the 2003 census. These estimations were made by the Ministry of National Economy based on projections using cohort component techniques using the West UN life-table model(Newell C., 1988). Incidence for the entire 9 year period was calculated using the mid-period population viz: mid 2002. The world standard population was used to obtain age-adjusted rates. Data for individual cancers were then exported to the EPIINFO version 6 (Centre for Disease Control and Prevention, Georgia, Atlanta, USA) for analysis of incidence by region, gender and morphological types. Bar diagrams and graphs were made using Microsoft excel. Source of data: The national Cancer Registry of Oman publishes its annual reports on the website of the Ministry of Health. The secondary data published in these annual reports of 1998 -2006 was the source of data for the present study (Ministry of Health, Sultanate of Oman, 2011).

Results

There were a total of 8,005 (4,224 males and 3,781 females) cases reported and registered in the registry from January 1998 till December 2006 with a male female ratio of 1.1:1. The crude incidence rate was 49.4 per 100,000 for males and 45.7 per 100,000 for females (Table 1). The corresponding age-standardized rates were 91.4 and 80.4 per 100,000 in males and females respectively.

Although the crude rate in males was the highest in 1998, age-standardization showed that the highest rate was in 2005 (122.4 per 100,000) In females, the crude rate was the highest in 1998 but the ASR (105.9) was the highest in 2004 (Table 1).

Age specific rates of cancer in the whole 9-year period (Figure 2) showed a slight increase between 60-64 and 70-74 years of age, probably due to the age during admission being reported in round numbers. Table 2 shows the common cancers in Omanis. The commonest among males was stomach cancer (10.27%) followed by non-Hodgkin lymphoma (9.04%) and in females it was breast (17.9%) followed by thyroid (8.2%) (Table 2).

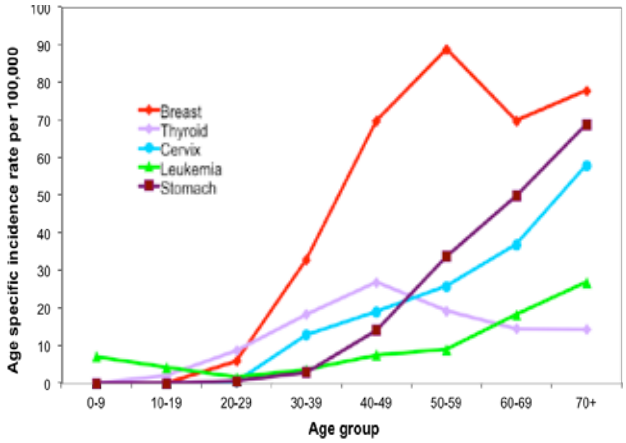

Figure 4. Age-specific Incidence Rates of Common Cancers in Omani Females, 1998-2006

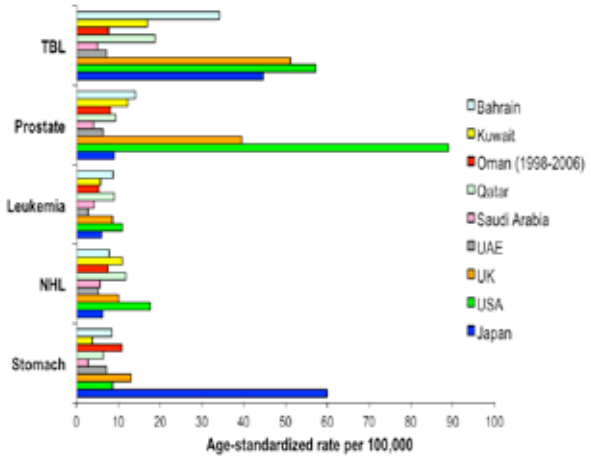

Figure 5. Comparison of Age-standardized Rates of Common Cancers in Omani Males with other Gulf Countries and Some Developed Countries

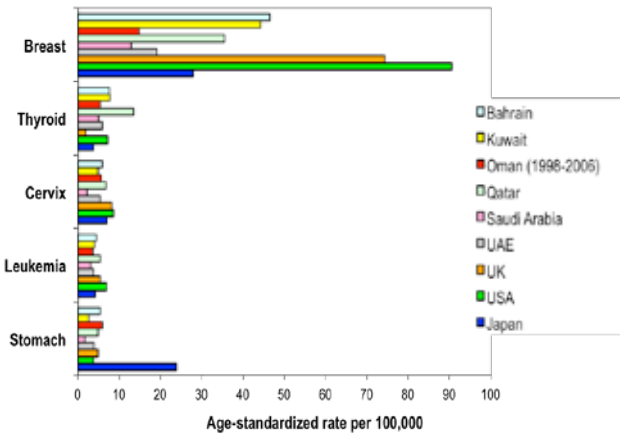

Figure 6. Comparison of Age-standardized Rates of Common Cancers in Omani Females with other Gulf Countries and Some Developed Countries

Discussion

The basis of diagnosis of cancer in the registry was on

microscopic evidence in majority of the cases. It ranged from 87.4 to 97.3% in different years except for 1998 when it was 73.2%. The diagnosis based only on the death certificate formed a negligible proportion. The ASR of cancers in both males and females was lower when compared to most developed countries as seen in "Cancer Incidence in Five Continents, Volume IX"(Curado et al., 2007). However it was observed that almost half of all cancers occurred in developing countries and its incidence is still rising (WHO, 2002). The range of ASR in males was 85.2 (2002) – 122.4 (2005) per 100,000 and in females it was 73.2 (2002) – 105.9 (2004) per 100,000. Even in comparison with other GCC countries, Oman features among those with lower incidence of cancer; the highest being Qatar followed by Bahrain and Kuwait (Al-Zahrani et al., 2006) As is the case in almost all populations, the incidence of cancer in Oman rises with age. The mean age at diagnosis was 51.1 years in males and 47.2 in females which was similar to the picture in other gulf countries.

Stomach cancer, non-hodgkin lymphoma and leukemia were the three commonest cancers in males for the whole nine-year period; the same three cancers were frequently observed among the common cancers every year. Although food habits in the gulf region were similar in all countries, it was noted that stomach cancer incidence was high in Oman as against other states (Figure 5 and 6) - Oman-12.8, Qatar-6.4, Kuwait 3.8 and Saudi Arabia-2.8 per 100,000) (Al-Zahrani et al., 2006). However, it was still much lower when compared to Japanese men and women (ASR 80 and 30 per 100,000 respectively) (Curado et al., 2007). There were 670 cases of stomach cancer constituting 8.4% of all cancers in the nine-year period. In males 434 cases constituted 10.3% of all cases, the age adjusted rate being nearly double that of females (10.3/100,000:5.9/100,000). A similar pattern of stomach cancer was reported from the same registry for the period 1993-1997 (Al-Lawati et al., 1999).

Cancer of the trachea, bronchus and lung remained at a relatively lower incidence as reported in the earlier report from this registry.This could be attributed to the traditional lifestyle and to the fact that the prevalence of tobacco smoking was not very high as seen by many surveys (15% in males and 1.5% in females (Oman Family Health Survey, 1996) and 14.2% in boys and 1.8% girls) (Moh'd Al-Mulla et al., 2008).

In females, it has been estimated that the commonest cancer and the leading cause of mortality world over was breast cancer (Feraly et al., 2004). In Oman too, breast cancer has been constantly topping the list every year. It was the commonest cancer in all the 6 GCC countries accounting for 21.8% of cancers in women, although the incidence in Oman was lower than in most of them. It may be postulated that the relatively lower incidence in Oman (14.9/100,000) is due to the still prevalent traditional cultural practices like early age at childbirth, and multiparity practiced in most regions in the country. However, as is the trend in most developed countries the ASR of breast cancer in Oman also seems to be rising, (11.7 in 1998 to 21.9 in 2006), although it is still one of the lowest in Asia. The number of breast cancer cases has shown an increase after 29 years of age and peaked between 50-59 years unlike cancers in other sites like stomach and cervix which increased gradually with age. Thyroid cancer had an earlier peak at 40-49 years before reducing marginally. In males, stomach and prostate cancer increased sharply after 59 years of age whereas Non Hodgkins Lymphoma and Trachea Bronchus and Lung cancer increased with increasing age. As is the picture in most populations, leukemia in both genders was seen to reduce from 0-9 years till 20-29 years after which it rose gradually with increasing age.

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