

RESEARCH ARTICLE

Profile of Lung Cancer in Kuwait

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Abstract

Background: Lung cancer is the most frequent cancer in males and the fourth most frequent site in females, worldwide. This study is the first to explore the profile of lung cancer in Kuwait. **Materials and Methods:** Cases of primary lung cancer (Kuwaiti) in Kuwait cancer Registry (KCR) were grouped in 4 periods (10 years each) from 1970-2009. Epidemiological measures; age standardized incidence rate (ASIR) with 95% confidence intervals (CI), Standardized rate ratio (SRR) and Cumulative risk and Forecasting to year 2020-2029 used for analysis. **Results:** Between years, 2000-2009 lung cancer ranked the 4th and the 9th most frequent cancer in males and females respectively. M:F ratio 1:3. Mean age at diagnosis (95% CI) was 65.2 (63.9-66.4) years. The estimated risk of developing lung cancer before the age of 75 years in males is 1.8% (1/56), and 0.6 (1/167) in females. The ASIR for male cases was 11.7, 17.1, 17.0, 14.0 cases/100,000 population in the seventies, eighties, nineties and in 2000-2009 respectively. Female ASIR was 2.3, 8.4, 5.1, 4.4 cases/100,000 population in the same duration. Lung cancer is the leading cause cancer death in males 168 (14.2%) and the fifth cause of death due to cancer in females accounting for 6.1% of all cancer deaths. The ASMR (95% CI) was 8.1 (6.6-10.0) deaths/100,000 population and 2.8 (1.3-4.3) deaths/100,000 population in males and females respectively. The estimated Mortality to incidence Ratio was 0.6. **Conclusions:** The incidence of lung cancer between years 2000-2009 is not different from that reported in the seventies. KCR is expecting the number of lung cancer cases to increase.

Keywords: Kuwait - cancer registry - incidence - prevalence - mortality

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Introduction

Lung cancer is the most frequent cancer in the world. The number of new cases worldwide is 1.6 million accounting for 12.7% of all new cancer cases in the world. The number of deaths due to lung cancer estimated to be 1.83 million representing 18.2% of all deaths due to cancer worldwide (GLOBOCAN, 2008).

It is the most frequent cancer in males estimated incidence is 1.1 million cases 16.5% of all new male cancer cases (GLOBOCAN, 2008); however, it is less frequent in females 516,000 cases accounting for 8.5% of all new female cancer cases worldwide and ranked the fourth most frequent site and the second cause of death due to cancer after breast.

North America has the highest incidence as lung cancer ranked the second most frequent cancer in females. The lowest incidence estimated in Middle Africa where it ranked the 15th most frequent cancer.

It is the seventh most common cancer site in the gulf area representing about 4.8% from all cancers (Ten-Years Cancer Incidence among Nationals of the GCC States 1998-2007, 2011). This study is the first to explore the profile of lung cancer in Kuwait.

Materials and Methods

Kuwait cancer registry (KCR) is a population based registry covering about three million Kuwaiti and non-Kuwaiti residents in Kuwait. KCR established and in operation since 1971. It is a full member of the International Association of Cancer Registries (IACR). It is the first Arab and Gulf country to have its results accepted and published in "Cancer in Five Continents" since its fifth edition in 1990. (Curado et al., 2007). Notification of cancer is compulsory by ministerial regulations. The registry collects information on malignant neoplasm according to the recommendations of the International Agency for Research on Cancer (IARC) (Curado et al., 2007), as well as mortality data from the Vital and Health Statistics Division, of MOH, Kuwait Health, Kuwait, (2010). Lung cancer cases included in this study defined as C33-C34 according to the international classification of disease for oncology third edition (Fritz et al., 2000). The study included all primary lung cancer cases (Kuwaiti) registered in Kuwait cancer registry grouped in 4 periods: Seventies (1970-1979), Eighties (1980-1989), Nineties (1990-1999) and 2000-2009. Calculation of age standardized incidence rate (ASIR)

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with 95% confidence intervals (CI), Standardized rate ratio (SRR) and Cumulative risk calculated according to the methods described in (Boniol and Heanue, 2007) Forecasting to year 2020-2029 calculated on Excel 2010.

Results and Discussion

Between January 2000 and December 2009, 15,714 new cancer cases added to Kuwait cancer registry database accounting for 35% of the registry data: 7,793 cases occurred among Kuwaiti (M:F ratio 1:1.35).

In the absence of other causes of death, a Kuwaiti male has an estimated 1.8% cumulative risk of developing lung cancer before the age of 75 years (one case for every 56 Kuwaiti males). The estimated risk for Kuwaiti female is 0.6 (one case in every 167 Kuwaiti female). Out of the collected cases, 813 were lung cancer, accounting to 5.2% of registry data in the same duration. About half (404 cases) were Kuwaitis. Lung cancer ranked the fourth and the ninth most frequent cancer in Kuwaiti males and females accounting to 8.8% and 2.5% of all new cancer cases diagnosed between 2000-2009; respectively. Seventy three percent of cases were males. Male to female ratio was three to one. Mean age at diagnosis (95%CI) was 65.2 (63.9-66.4) years. Seventy four percent of cases aged 60+ years. Three quarter (75%) of cases were living in Hawalli, Capital, and Farwaniya. Forty five percent of the lesions detected in the right lung. Histology of primary was the basis of diagnosis in 46.3% of cases while diagnosis confirmed by cytology in 35.4% of cases. Non-small cell carcinoma (M-8046/3) accounted to 36.4% of cases, while small cell carcinoma, NOS (M-8041/3) accounted one-tenth (10.9%) of cases. Grade III (poorly differentiated) tumors observed in 11.9% of cases. One-third (30.4%) of cases presented with regional metastatic disease. Distant metastasis was the first presentation in 37.4% of the cases. Twenty eight percent of cases were of unknown/NA extent of disease. Eighteen percent of cases submitted to surgery, forty-nine percent received chemotherapy and about 38% received radiotherapy.

Trend of lung cancer 1970-2009

The number of lung cancer cases (males) increased by about three folds from 101 in the seventies to 286 cases in 2000-2009. Number of female lung cancer cases increased by 5 folds from 21 cases in the seventies to 106 cases between 2000-2009. In the eighties and nineties, the ASIR (95%CI) of lung cancer among Kuwaiti males increased to reach 17 (9-25), 17 (10-24) cases/100,000 population respectively, compared to that of the seventies and between 2000-2009, 11.7 (4.2-19.2), 14.0 (8.8-19.2) cases/100,000 population respectively. Conversely, females lung cancer ASIR increased in the eighties to reach 8.4 (1.3-15.5) cases/100,000 population compared to that of the seventies, nineties, and between years 2000-2009; 2.3 (-0.9-5.5), 5.1(1.4-8.8), 4.4 (1.7-7.1) cases/100,000 population respectively.

When the 95%CI was taken into consideration, the calculated rates showed an overlapping pattern indicating a non-statistical significant variation Figure 1. Furthermore statistical significance was not proved in

pair-wise comparison of rates as the SRR is close to 1.0 Table 2.

Between year 2020-2029, Kuwait cancer registry is expecting the number of cases to reach 425 and 161 for males and females respectively. However, the ASIR shows slight increase from 14.0 to 17.33 cases per 100,000 population in males and 4.4 to 6.1 per 100,000 population in females (Figure 2).

Deaths due to lung cancer

Between years 2000-2009, 2,247 deaths were due to cancer among Kuwaiti people, of which lung cancer was responsible for 233 deaths. It is the leading cause of death due to cancer in males 168 (14.2%) deaths on the other hand it ranked the fifth cause of death due to cancer in Kuwaiti

Table 1. Characteristics of Lung Cancer Cases (Kuwaiti) 2000-2009

Kuwaiti (404)		Frequency	%	
Sex	Male	295	73	
	Female	109	27	
Male : female Ratio		3:01		
Age (years)	20-29	4	0.9	
	30-39	11	2.7	
	40-49	29	7.2	
	50-59	60	14.9	
	60+	300	74.3	
Residence	Capital	122	30.2	
	Hawalli	100	24.8	
	Farwaniya	83	20.5	
	Jahra	40	9.9	
	Ahmadi	38	9.4	
	Mubarak Al-Kabeer	12	3	
	Others	9	2.2	
Laterality	Right	181	44.8	
	Left	124	30.7	
	Bilateral	58	14.4	
	Unknown/NA	41	10.1	
Topography	C34.0 Main Bronchus	6	1.5	
	C34.1 Upper	97	24	
	C34.2 Middle	12	3	
	C 34.3 Lower	56	13.9	
	C34.9 NOS	233	57.7	
Basis of Diagnosis	Histology of primary	187	46.3	
	Cytology	143	35.4	
	Clinical	45	11.1	
	DCO	29	7.2	
Morphology	Adenocarcinoma	47	11.6	
	Carcinoma, NOS	55	13.6	
	Neoplasm, malignant	13	3.2	
	NSCLC,NOS	147	36.4	
	Squamous cell	49	12.1	
	SCLC	44	10.9	
	Other	49	12.1	
Grade	GI (well differentiated)	3	0.7	
	GII (Moderately differentiated)	26	6.4	
	GIII (Poorly differentiated)	48	11.9	
	GIV(Undifferentiated)	18	4.5	
	Unknown/NA	309	76.5	
Disease extent	In situ	1	0.2	
	Localized	16	4	
	Regional: Direct	43	10.6	
	Regional: Lymph nodes	10	2.5	
	Regional: Direct & Lymph nodes	40	9.9	
	Regional: NOS	30	7.4	
	Distant Metastasis	151	37.4	
	Unknown/NA	113	28	
	Treatment modalities	Chemotherapy	197	48.8
		Radiotherapy	155	38.4
Surgery		74	18.3	

females accounting for 6.1% of all deaths due to cancer. The ASMR (95%CI) was 8.1 (6.6-10.0) deaths/100,000 population and 2.8 (1.3-4.3) deaths/100,000 population in males and females respectively. The estimated mortality to incidence ratio was 0.6. Based on 2000-2009 data, the risk of dying from lung cancer by the age of 74 years was 1.1% for males and 0.7% for females Table 3.

Lung cancer in Kuwait and world

The estimated age-standardized incidence rate for the World was 22.9, which is lower than that estimated for Kuwait, 9.4 new cases per 100,000 people. The highest age-standardized incidence rate estimated was for Hungary, French Polynesia and United States of America 52.0, 43.6 and 42.1 new cases per 100,000 people respectively. The lowest estimated was for The Cape Verde, Niger, and Malawi 1.1, 0.9 and 0.7 respectively (GLOBOCAN, 2008). The incidence of lung cancer ranked Kuwait the third after Bahrain 19.7 new cases per

100,000 people and Qatar 11.9 new cases per 100,000 people (GLOBOCAN, 2008).

In 39 years from 1970 to 2009, the mid-year population of Kuwaiti people doubled from 347,396 to reach 1,102,485 individuals respectively. In the survey study conducted by the, ministry of health, Gulf council cooperation and WHO (Al-Nesf et al., 2008), to explore the risk factors of chronic non- communicable diseases in Kuwaiti people; the overall prevalence of daily smoking was 20.6%. It is one of the highest smoking prevalence reported compared to other countries in the area e.g. 7% in Oman, 10.8% in Iran, 29.6% in Tunisia, 14.8% in Iraq, 12.8% in United Arab Emirates 29% Jordan and 23.7% in Yemen as reported by (World Health Organization, 2011). Average age (years) of initiation of smoking (95%CI) was 18.5 (17.9-19.1) years. The most important environmental risk factor positively associated for smoking initiation were the history of smoking among siblings with a relative risk of 1.4 (Sugathan et al., 1998). Average duration (years) of smoking (95%CI) was 13.8 (12.9-14.7). Education, type of residence, and history of smoking among family members and friends found to be independently associated with the risk of initiation (Moody et al., 1998). The average

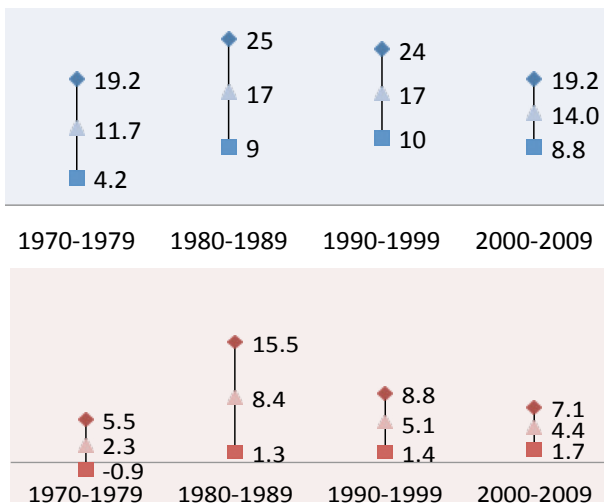


Figure 1. Trend of Lung Cancer 1970-2009 ASIR (95% CI)

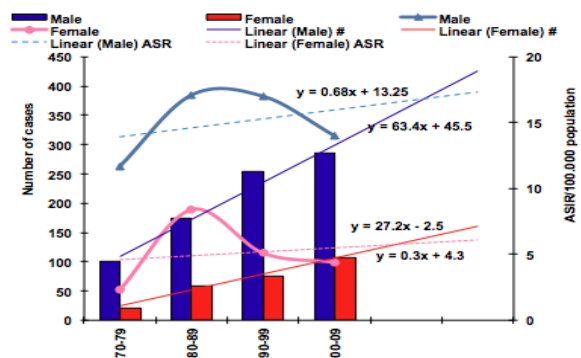


Figure 2. Forecasting Number and ASIR of Lung Cancer, Kuwaiti, 2029

Table 2. Pair Wise Comparison of Lung Cancer Age Standardized Incidence Rates 1970-2009, Kuwaiti

	Male(SRRa)				Female(SRRa)			
	1970-1979	1980-1989	1990-1989	2000-2009	1970-1979	1980-1989	1990-1989	2000-2009
1970-1979		0.31-1.50	0.34-1.40	0.41-1.71		0.05-1.43	0.11-1.83	0.14-1.91
1980-1989	0.31-1.50		0.54-1.87	0.65-2.29	0.05-1.43		0.49-5.54	0.56-6.52
1990-1989	0.34-1.40	0.54-1.87		0.70-2.10	0.11-1.83	0.49-5.54		0.44-3.07
2000-2009	0.41-1.71	0.65-2.29	0.70-2.10		0.14-1.91	0.56-6.52	0.44-3.07	

*SRR=Standardized rate ratio

Table 3. The 10 Most Common Most Common Causes of Death from Cancer, Kuwaiti, 2000-2009

Site/type	Male(SRRa)				Site/type	Female(SRRa)			
	Frequency	%	ASR	CI (95%)		Frequency	%	ASR	CI (95%)
Lung	168	14.2	8.1	6.6-10.0	Breast	250	23.4	8	6.4-9.6
Blood	119	10.1	4.4	2.8-10.0	Female genital*	149	14	5.5	4.0-7.1
Liver	117	9.9	5.7	4.3-7.2	Colorectal	93	8.7	3.6	2.0-5.1
Colorectal	110	9.3	5.1	3.6-6.6	Blood	78	7.3	2.4	0.8-4.1
Lymphoid*	88	7.5	3.5	2.0-5.1	Lung	65	6.1	2.8	1.3-4.3
Prostate	76	6.4	4	2.5-5.4	Liver	53	5	2.3	0.7-3.8
Brain	75	6.4	2.7	1.1-4.3	Lymphoid	51	4.8	1.8	0.2-3.4
Pancreas	63	5.3	3.1	1.6-4.5	Pancreas	48	4.5	1.9	0.4-3.5
Unknown Primary	60	5.1	2.9	1.4-4.4	Unknown Primary	47	4.4	1.8	0.2-3.4
Stomach	57	4.8	2.7	1.2-4.2	Brain	40	3.7	1.3	0-3.0
All Sites	1179	100	52.9	51.3-54.4	All Sites	1068	100	38.6	37.0-40.2

*The rates were standardized to the Kuwaiti population as at 30 June 2005 and are expressed per 100,000 populations; *Lymphoid cancers included B-cell, T-cell, NK-cell neoplasm and Hodgkin lymphoma; *Female genital cancers (ICD-10 codes of C51-C56)

amount of cigarettes/day (95%CI) was 22.1 (20.6-23.6) compared to 23.7, 15.9, and 13.5 of cigarettes/day in Jordan, Egypt and Qatar respectively (World Health Organization, 2011).

The high prevalence of smoking among Kuwaiti people and the high measures of smoking index can explain the increasing number of lung cancer cases. The rapid growth of population can partially explain the slow increase of ASIR.

In conclusion, Lung cancer is the first cause of death due to cancer among Kuwaiti males. The smoking indices in Kuwaiti population are high. The incidence of lung cancer in year 2000-2009 is not different from that reported in the seventies. Kuwait cancer registry is expecting the number of lung cancer cases to increase. As about 90% of lung cancer could be prevented through action and awareness. Effective health promotion measures should be applied to combat the threatening risk.

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