

Pattern and incidence of cancer in Northern Saudi Arabia

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ABSTRACT

Objective: To study the pattern and incidence of cancer in the Al-Jouf region of Saudi Arabia.

Methods: The record of all confirmed cancer cases were retrieved and studied from the files of the Histopathology and Cytology Department, Prince Abdulrahman Al-Sudairy Central Hospital, Al-Jouf, Kingdom of Saudi Arabia (KSA) during the period 1994 to 2001. The major types of cancer were ranked in order of relative frequency. The crude incidence rate and age standardized rate were then calculated.

Results: The age standardized rate in Al-Jouf was 38.5 per 100,000, a figure lower than the Saudi Arabian national average of 71.7 per 100,000 and lower than the lowest published international figure of 39.6 from

Gambia. The most common cancers in the whole population irrespective of sex were carcinoma of the breast, lymphoma and leukemia combined and colorectal cancer. The most common cancers in females in Al Jouf were those of the breast, thyroid, and lymphomas and leukemia combined. Comparative findings for males were lymphomas and leukemias combined, colorectal and skin cancers.

Conclusion: The incidence of cancer in Al Jouf region appears to be the lowest incidence published to date. The over all pattern of cancer is however similar to the findings in other regions of KSA. Carcinoma of breast, lymphomas and leukemias, and colorectal cancers are the leading cancers in the region.

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Cancer incidence is known to vary from region to region. The study of the epidemiology and the pattern of cancer may throw some light on the etiology of the disease. Awareness of the most common types of cancer and the magnitude of the problem also help in the formulation of research protocols to identify risk factors. It also helps to institute screening program for common cancer leading to early detection. The incidence and pattern of cancer has been documented from different regions of the Kingdom of Saudi Arabia (KSA).¹⁻⁹ To dates, no independent published report exists of the incidence of cancer in Al-Jouf region other than national cancer registry report (1994-1996).¹⁰ This study was undertaken as a small contribution to fill

this vacuum. Crude incidence rate (CIR), age standardized rate (ASR) were determined and compared with similar data from other regions of KSA.

Methods. The records of all newly diagnosed cases of cancers between October 1994 to October 2001 were retrieved from the files of the Histopathology Department, Prince Abdulrahman Al-Sudairy Central Hospital, Al-Jouf, KSA. Al-Jouf region is located in the north of the great Nefud desert at KSA with a total area of 58,425 square kilometers. The population is distributed over 3 towns (Sakaka, Domat Al-Jandal and Tabarjal),

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villages and nomadic settlements. The midterm population during this study period in this region (excluding Qurayat) was estimated to be 240,000 based on 1993 national census with an adjusted growth rate. Our hospital is the referral center for the whole region, wherein the only histopathology laboratory is located. Our Histopathology Department was established in 1994 and cancer cases were diagnosed in this hospital represent cases in the entire region except brain tumors, which were referred to tertiary centers. Diagnosis of cancer was based on surgical or fine needle aspiration biopsies. Cancer cases were categorized according to the systems and organ affected. Sex, age and nationality were also analyzed. Relative frequency rate of different categories was determined. Annual incident cases, CIR and ASR were calculated. Age standardized rate was calculated with reference to the world standard population.

Results. The total number of newly diagnosed cancer cases between October 1994 to October 2001 was 314. Among these, 166 were males and 148 were females, 263 cases were Saudis and 51 were non-Saudis. Males and females were more or less equally affected. The age of the affected population range between 7 months to 90 years with a mean age of 48 years. The types of cancers in the order of relative frequency rate are shown in the **Table 1**. Crude incidence rate and ASR of different cancers are also shown in the same table. The most common sites for

cancers in the whole population irrespective of sex were gastrointestinal (20.1%), head and neck (18.2%), followed by breast (10.5%) and skin (8.6%). However, carcinoma of the breast with ASR of 4.2, lymphoma and leukemia combined with ASR of 3.9 and colorectal cancer with ASR of 3.3 are the leading cancers in the region (**Table 1 & 4**). The rank of common cancers affecting males and females are shown in **Table 2 & 3**.

The most common cancers among females were the breast carcinomas, which constituted 22.3% of the total number of cancers occurring in female, followed by cancers of thyroid, lymphomas/leukemia combined, gastrointestinal tract (GIT) cancers and female genital tract cancers. In males, the common cancers in the relative order of frequency were, lymphomas and leukemia (combined), colorectal and skin cancers. The average annual incident cases were 45 per year. The CIR was 18.7 and ASR was 38.5 per 100,000/year populations. **Table 4** shows ASR of some common cancers in Al-Jouf compared with ASR in other regions of KSA.

Discussion. This is the first independent report concerning the pattern and incidence of cancer in Al-Jouf region. Although this study is hospital based and deals with a small number of cases, we believe it serves the purpose of shedding some light on the pattern of common cancers in this region. Unlike other developed regions of KSA, our Histopathology Department is the only reference laboratory for all

Table 1 - Types of cancer in order of relative frequency rate showing crude incidence rate and age standardized rate.

System	Total n	RFR %	CIR %	ASR %	Saudis	Non-Saudis	Male female ratio	Age range	Mean age
GIT	63	20.1	3.8	7.2	49	14	2.8:1	25-90	58
Head and neck	57	18.2	3.4	4.4	48	9	1:1.5	12-90	56
Lymphoma	35	11.1	2.1	2.3	31	4	2.2:1	4-80	45
Breast	33	10.5	2	4.2	26	7	0:32	28-88	44
Skin	27	8.6	1.6	3.1	26	1	1.9:1	25-90	59
Leukemia	26	8.3	1.5	1.6	20	6	1.8:1	0-80	29
Female genital tract	13	4.1	0.8	1.3	8	5	0:13	19-70	41
Urinary system	11	3.5	0.6	0.9	11	-	2.7:1	12-80	47
Soft tissue sarcomas	11	3.5	0.6	0.8	11	-	1:2.7	5-65	37
Hepatobiliary system & pancreas	11	3.5	0.6	1.2	9	2	1.8:1	27-70	55
Prostate	8	2.5	0.5	6.8	8	-	8:0	65-90	75
Lung, pleura and mediastinum	7	2.2	0.4	1.2	5	2	7:0	36-70	48
Metastasis of unknown origin	7	2.2	0.4	2.9	6	1	1.3:1	52-70	60
Bone and joints	5	1.6	0.3	0.6	5	-	1:1.3	16-55	20
Total	314	99.9	18.6	38.5	263	51	1.1:1	0-90	48
n - number, GIT - gastrointestinal tract, RFR - relative frequency rate, CIR - crude incidence rate, ASR - age standardized rate.									

Table 2 - Rank and relative frequency rate of common cancers in females.

Rank	System	RFR n (%)
1	Breast	33 (22.3)
2	Thyroid	21 (14.2)
3	GIT	18 (12.2)
4	Female genital tract	13 (8.8)
5	Lymphoma	11 (7.4)
6	Leukemia	9 (6.1)
7	Skin	9 (6)
8	Soft tissue tumors	8 (5.1)
n - number, RFR - relative frequency rate, GIT - gastrointestinal tract		

Table 3 - Rank and relative frequency rate of common cancers in males.

Rank	System	RFR n (%)
1	Colorectal	26 (15.6)
2	Lymphoma	25 (15.1)
3	Skin	18 (10.8)
4	Leukemia	17 (10.2)
5	Urinary system	8 (4.8)
6	Male genital system	8 (4.8)
7	Pleura, lung and mediastinum	7 (4.2)
n - number, RFR - relative frequency rate		

Table 4 - Age standardized rate in Al-Jouf versus age standardized rate in other regions of the Kingdom of Saudi Arabia.

Site of malignancy	Al-Jouf	Riyadh	Eastern region	Najran	Makkah	National average
Colorectal	3.3	6.7	3.3	6.2	5.7	4.5
Stomach	2.6	5.8	4.2	8.2	3.7	3.7
Thyroid	2	5.8	3.6	3.6	2.9	3.5
Non Hodgkin's lymphoma	1.9	7.3	NA	6.7	NA	5.2
Leukemia	1.6	4.2	NA	3.8	3.6	3.5
Breast	4.2	8.1	9.8	4.4	9.8	6.7
Prostate	6.8	3.6	4.7	1.7	2.3	4
NA - not available						

the hospitals in this region. Due to the unique position, all cancer cases in this region come under our purview and hence, we believe our data is quite representative of the region. Our data is probably more representative than data from tertiary center registries especially as results from these centers represent mainly referred cases for chemotherapy, radiotherapy or other management.

Age standardized rate of cancer at Al-Jouf (38.5 per 100,000) is lower than the national average (71.7 per 100,000) and it is also the lowest among all the regions in KSA.¹⁰ The highest cancer incidence is in Canada, British Columbia (345.4 per 100,000) and the lowest cancer incidence is in Gambia (39.6 per 100,000).¹¹ Cancer incidence in Al-Jouf is even lower than that of Gambia. The cancer incidence of our study is significantly higher than that reported by national cancer registry for Al-Jouf region (ASR 38.5 versus reported 28 per 100,000). The reason may be due to cases from peripheral regions were probably under reported to the national cancer registry. It may also represent a genuine change since the national report was published in 1996. In KSA, female breast cancer is the most common cancer followed by liver cancer, leukemia, non-Hodgkin's lymphoma and others.¹⁰ Not surprisingly different trend in the pattern of cancer are seen from various regions of the country. Kingdom of Saudi Arabia is a large country in which various regions differ in climate, geography, social life and phase of development. The incidence of lung cancer is higher in the Eastern province.⁷ Esophageal and liver cancers are common in South and Southwest regions, where as thyroid cancer is common in Central⁹ and Northern regions of KSA.¹⁰ The overall pattern of cancer distribution in Al-Jouf is the same with other regions in KSA. Thus, the common sites of involvement are GIT, head and neck, and breast. However, in term of types of cancer breast carcinoma, lymphomas/leukemia (combined) and colorectal cancer are the leading cancers.

In our region, breast cancer ranks first among malignant neoplasm affecting females. Their mean age is 45 years, which is close to the published reports by the National Cancer Registry and others.^{10,12,13} Breast cancer in KSA tend to be advanced on presentation and affects younger age population compared to Western countries.^{12,13} Eighty-eight percent of our cases were invasive ductal carcinoma. Special types like lobular carcinoma, colloid and tubular carcinoma were either very rare or absent. Thyroid cancer is the 2nd most common cancer among females in Al-Jouf region. Among thyroid cancers, 88% were papillary carcinoma, 8% were anaplastic carcinomas and 4% were malignant lymphomas. No follicular carcinoma was seen over the review period. Incidence of thyroid carcinoma is known to be higher in Central and Northern regions of KSA¹⁰ and our result

reinforce this finding. In this region, iodine deficiency most probably prevailed previously. The use of iodized salt and imported seafood during last few decades not only compensated for the iodine deficiency but also perhaps increased the incidence of papillary carcinoma. The phenomenon of marked predominance of papillary carcinoma and reduction in follicular carcinoma in the postgoiter era is well documented.^{14,15} The incidence of thyroid cancer is increasing in KSA.¹⁶ Thyroid cancer is also the 2nd most common neoplasm among females in Kuwait and several other countries in the Middle East.¹⁷ This may be related to increased iodine consumption, irradiation and increased parity.^{15,18-20} The incidence of cervical cancer is generally low in KSA and Al-Jouf region is not an exception. It is lower here than in the surrounding middle east countries.^{21,22} The incidence of prostate cancer is higher in the Northern region.¹⁰ Our ASR for prostate cancer is higher than those reported by the national cancer registry. The difference may be due to the included age group (65-90 years).

In conclusion, pattern of cancer in Al-Jouf is more or less similar to other regions of KSA but the incidence appears to be low. This study is however hospital based and therefore can only be an estimate of the incidence and pattern of cancer in our region.

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