Pattern and Incidence of Cancer in Red Sea State, Sudan

Ali K. Ageep*, Babikir M. Ali*, Mohamed A. Awadelkarim*

Abstract

Objective: To study the incidence rate and the pattern of cancer in Red Sea State, Sudan.

Methods: All the diagnosed cancer cases were recorded from the histopathology laboratory, Almawani Hospital, Red Sea State, Sudan during the period November 2003 to November 2006. The cancers were classified according to the organs affected and then ranked in their order of relative frequency. The mean age, age range, male to female ratio, the incidence rate and the age standardized rate were also calculated.

Results: The incidence rate of cancer was 12.7 per 100,000. Females were twice affected as males. The mean age of presentation was 48 years. The age standardized rate was 41.5 per 100,000. The most common cancers are breast, cervical, head and neck, gastrointestinal and skin cancer. In females, the most frequent types were breast, cervical, head and neck cancers and female genital system cancers. The most common cancers in males were head and neck, skin, soft tissue and gastrointestinal cancers.

Conclusion: Females' cancers, especially breast cancers and cervical cancers, were the most common types of malignancies in the general population. This necessitates the establishment of screening program to all women in their reproductive life for these cancers.

Keywords: Prevalence, malignancies, Africa, Middle East

Introduction

Cancer was estimated in 2000 to be responsible for about 7 million deaths (12%) worldwide, only preceded by cardiovascular diseases (30%) and by infectious and parasitic diseases (19%)[1]. Pisiani et al have projected a 30% increase in the number of cancer deaths in developed countries and more than twice this amount (71%) in developing countries, between 1990 and 2010[2]. In the early 1980's, Doll and Peto were already calling attention to the evidence of the avoidability of cancer[3]. According to these authors, approximately 75% of the cases of cancer in most parts of US, in 1970, could have been avoided. More recently, Parkin et al have estimated that there would have been 22.5% fewer cases of cancer in the developing world in 1990, if infections with hepatitis B virus, hepatitis C virus, human papilloma viruses, Epstein Barr virus, Human immunodeficiency virus, helicobacter pylori and liver flukes had been prevented[4]. In Red Sea state, Sudan, this is the first documented study on the incidence and pattern of cancer. The aims of this research were to determine the most common types of cancers and to calculate the incident rate, male to female ratio and mean age of cancer presentation. Age standardized rate (ASR) was also determined and compared to similar international data.

* Faculty of Medicine. Red Sea University. PortSudan, SUDAN.
Correspondence to: Dr. Ali Khidir.
E-mail: aleykh@yahoo.com
Tel: +249912638322
Fax: +249311820402

Materials and Methods

This study was carried in the histopathology department of Almawani Hospital, Red Sea State, Sudan. Red Sea State is located in Eastern Sudan, with total area of 238,101 square kilometer. The total population is 684271, according to 1998 national census with adjusted growth rate. Our histopathology laboratory is the only referral center for all hospitals in the region. The main occupations were working in the sea ports, in agriculture and nomad. Some of the cancer cases (like brain tumors) were referred to the capital of Sudan, due to the absence of specialized service. The specimens of the study were surgical biopsies, fine needle aspirations and blood (for leukemias). The records of all cases of cancer were reviewed. Cancers were classified according to the organs affected. The incidence rate and relative frequency rate were then determined. The sex and age were also analyzed. Age standardized rate was calculated with reference to the world standard population.

Results

Two hundred and sixty cancer cases diagnosed between Nov 2003 and Oct 2006 were included in the study. The male patients were 85. The mean age of presentation was 48 years (range between 2-80 years). The relative frequency rate for different types of cancer and their incident rate were illustrated in table 1.

All of the patients were Sudanese i.e. they were all exposed to more or less similar environmental, dietary and genetic factors. The five most common malignancies in both sexes were breast cancers (20.8%), cervical cancers (15%), head and neck cancers (14.6 %), gastrointestinal (GIT) cancers (8.4 %) and skin

cancers (8.1%). The rank of cancers affecting males and females were shown in tables 2 and 3.

In females breast cancers constituted (30.9%) of the total cases of malignancy. The most common cancers in males were head and neck cancers which form (18.8%) of the cases. The average annual incident cases were 86.7 per year. The incidence rate was 12.7 per 100,000 and the age standardized rate was 41.5 per 100,000/ year population.

Table 1- Types of cancers in order of relative frequency. IR & ASR were illustrated.

System	Total (n)	RFR (%)	IR*	ASR*	M : F	Age range	Mean age
Breast	54	20.8	2.6	5.3	0 :54	22-82	45
Cervix	39	15.0	1.9	5.8	0:39	30-76	56
Head and Neck	38	14.6	1.8	4.9	1:1.4	12-72	50
GIT	22	8.4	1.1	3.0	1:1.4	36-77	43
Skin	21	8.1	1.0	2.2	2.5:1	25-69	58
Soft Tissue	15	5.8	0.8	3.3	2.8:1	9-75	32
Secondaries	15	5.8	0.8	3.3	1:1.1	45-72	60
FemaleGenitasl	15	5.8	0.8	2.7	0:15	35-80	51
Leukemia	12	4.6	0.6	1.2	1:1	4-65	53
Lymphoma	11	4.2	0.5	1.7	1:1.8	20-50	35
Testis	06	2.3	0.3	1.7	6:0	37-50	39
Prostate	05	1.9	0.2	3.3	5:0	65-80	75
Urinary System	05	1.9	0.2	1.7	4:1	2-60	50
Lung	02	0.8	0.1	1.4	2:0	60-70	65
	260	100	12.7	41.5	1:2	2-80	48

*per 100,000 inhabitants

n- number, GIT- gastrointestinal tract, RFR relative frequency rate, IR- incidence rate, ASR age standardized rate, M- male, F- female.

Table 2- Relative frequency rate of female cancers.

Rank	System	Number	RFR (%)
1	Breast	54	30.8
2	Cervix	39	22.2
3	Head and Neck	22	12.6
4	Female Genital System	15	8.6
5	Gastrointestinal	13	7.4
6	Secondaries	8	4.6
7	Lymphoma	7	4.0
8	Skin	6	3.4
9	Leukemia	6	3.4
10	Soft Tissue	4	2.3
11	Urinary System	1	0.6
	Total	175	100

RFR- relative frequency rate

Discussion

This is the first documented study on the incidence and pattern of cancer in the Red Sea State, Eastern Sudan. Our histopathology department is the only reference laboratory for all hospitals and clinics in the region. This gave the data presented here reliability as a good representative of malignancy in the region.

The age standardized rate at Red Sea State (41.5 per 100,000) is in the lower extreme if compared with the international age standardized rate, where the highest cancer incidence rate is in Canada, British Columbia (345.4 per 100,000) and the lowest cancer incidence is in Gambia (39.6 per 100,000) and Al-Jouf, Saudi Arabia (38.5 per 100,000).[5,6]

Table 3- Relative frequency rate of male cancers

Rank	System	Number	RFR (%)
1	Head and Neck	16	18.8
2	Skin	15	17.6
3	Soft Tissue	11	12.9
4	Gastrointestinal	09	10.6
5	Secondaries	07	8.2
6	Testis	06	7.1
7	Leukemia	06	7.1
8	Prostate	05	5.9
9	Lymphoma	04	4.7
10	Urinary Tract	04	4.7
11	Lung	02	2.4
	Total	85	100

RFR- relative frequency rate

Breast cancer occupied the top of the list of malignancies in our study. The reason for this high incidence rate is not clear. Most of the cases were invasive ductal carcinomas. The other histopathological patterns were rare, represented by one case with lobular and one with papillary pattern. Although breast carcinoma was the commonest cancer in this region of East Africa,

the incidence rate still far below the figures reported for European countries[7]. Our results are in keeping with the general believe that breast cancer incidence rates vary considerably, with the highest rates in the developed world and the lowest rates in Africa and Asia[8].

Carcinoma of the cervix is the second most frequent cancer. Several studies also reported that, high incidence of human papilloma virus infection is associated with the development of cervical cancer[9] this highlights the importance of studying the prevalence of this virus in the region in the future.

Head and neck cancers were the most common frequent cancers in males and the third common cancer in the whole population. Their common sites were the nasopharynx, oral cavity, thyroid gland and salivary glands, respectively. Nasopharyngeal carcinomas, in most of the cases, were of the poorly differentiated type. The majority of the oral cavity tumors were squamous cell carcinomas. As like many countries in the world, papillary pattern was the most dominant type among thyroid cancers in the studied population.[10-14]

Unlike in the western countries, we found low incidence rates of lung and prostatic cancers[11]. The low incidence of tobacco smoking in our community had probably contributed to that effect.

In conclusion, cancer incidence rate was low in Red Sea State, with breast and cervical carcinomas in the top of the list. This study is however hospital based and therefore other epidemiological studies should be started to determine the true prevalence and specific risk factors for malignancy in the region.

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