

The Pattern of Malignancies in Karachi (1995 to 1996)

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Abstract

Objective: To determine the cancer pattern of the city of Karachi for the years 1995-1996.

Methods: The Karachi Cancer Registry, established in 1995 by the Government of Sindh, in collaboration with the IARC is an active registry. The staff collect the data pertaining to cancer patients and record it on the registry forms. Hospitals in Karachi, district south as well as some of the hospitals in other districts of the city, where patients are likely to go for treatment or diagnosis are visited. People residing in the district for more than six months prior to the onset of the malignancy were considered residents. All the cases diagnosed on or after 1st January 1995 till 31st December 1996 were considered for analysis.

Results: In the years 1995-96, the most common cancer sites among males were cancers of the lung, oral cavity and lymph nodes. For females, breast cancer ranked first, followed by cancer of the oral cavity and ovary. The age standardized rate for all cancers was 96.3 per 100,000 in males and 96.9 per 100,000 in females. At this early stage of registration we assume that the registry has a missing rate of approximately 20-25%.

Conclusion: The pattern of malignancies in Karachi is similar to the western countries, with lung and breast being the commonest tumors amongst the males and females respectively. The Asian countries have stomach/lung/oral cavity/liver as the commonest tumors amongst the males and cervix/breast amongst the females. Pakistan being a Muslim country, the incidence of cervical cancer showed an expected low figure (JPMA 49:157, 1999).

Introduction

The "Karachi Cancer Registry" is the first population-based cancer registry of Pakistan. Established in January 1995, by the Government of Sindh in collaboration with the International Agency for Research on Cancer (IARC), WHO, this active registry has completed 3 years of data collection.

The registry staff collect cancer data of Karachi District South, from various diagnostic and treatment centres within the district as well as centres outside the district where the cancer cases of District South are likely to go for diagnosis and treatment. The District South of Karachi has the distinction of being the only district in the country with a representation of all ethnic and socioeconomic groups of the country. It can thus be taken as a random sample population of the country in the absence of a nation-wide registration system.

An estimate of the population covered by the cancer registry was prepared for 1995 by IARC, on the basis of the 1981 census. The calculation was based on the assumption that the population structure of Karachi South 2.85 million was similar to the population structure of Pakistan as estimated by the UN for the year 1995. Population of Karachi, District South by localities, projected figures on the basis of the 1981 census was also prepared. The projected figures are based on an annual growth rate of 4.95%¹. This being the average growth-rate for the city of Karachi, as calculated by the Sindh Bureau of Statistics. The census results of 1998 will give the absolute statistical values of our population and the crude incidence rate of the same data may show a variation on subsequent analysis.

Incidence is the total number of new cases in a defined time period for a specific population at risk. In the absence of population data, the incidence of a disease cannot be calculated. As such the data of the

Karachi Cancer Registry comes as the first incidence data in the country, as it is a population-based data.

The population-based data of the Karachi Cancer Registry comes after a decade of near complete absence of data from Karachi. Previous to this the Jinnah Postgraduate Medical Centre (JPMC) and the Pakistan Medical and Research Council (PMRC), Cancer Registry was a source of data. The data from JPMC, though a single institution data can be taken as the closest representative of the data of the city of Karachi, as there was only one cancer institute, the Institute of Radiotherapy, JPMC in the city of Karachi till the early eighties.

Materials and Methods

The data of the cancer patients. residents of Karachi-District South was collected from the diagnostic and treatment centres of the district as well as from hospitals outside the district, where the Karachi-District South cancer patients were likely to go for diagnosis and treatment. The registry staff, actively visited these centres either getting computerised data or data from the hospital records. Most of the times the patients were directly interviewed as organised data was not available at most centres. After identification of the cases with a reportable diagnosis, the registry personnel noted the information on identification, referral, investigations and pathology reports, the basis of diagnosis, treatment records and information regarding the patients death.

The completed forms were submitted to the registry office where they were checked and coded. As there were atleast two or more sources of case finding / reporting per case, the forms had to be checked for duplication of the data. A registry number was given to each case. The number of notifications or sources were recorded for each case and the cases were updated as further notifications were received. People residing in the district for more than six months prior to the onset of the malignancy were considered "residents". All the cases diagnosed on or after 1st January 1995 till 31st December 1996 were considered for analysis.

The hospitals within the district, viz the Jinnah Postgraduate Medical Centre, Civil Hospital, Lyari General Hospital, Lady Dufferin Hospital. Sarfaraz Rafique Shaheed Hospital, Karachi Adventist Hospital, Anklesaria Hospital and Memon Hospital are the primary sources of data within the district. The bulk of the data is provided by the hospitals of Karachi, located outside District South, viz. Aga Khan University Hospital, Liaquat National Hospital, Baqai Institute of Oncology. Medicare Hospital. The pathology department of the Aga Khan University Hospital, provide diagnostic cover to a large population of Karachi, this includes the residents of Karachi South.

Descriptive epidemiological methods were applied to study cancer incidence for 1995-96. The validity of cancer registration was assessed for both completeness and accuracy. The data of the cancer patients was computerised and analysed using the Canreg-2 computer program, prepared for the registry at the International Agency for Research on Cancer.

The IARC Check program and the Childhood Check program to check data for validity and consistency were used to assess the data. The cases specified by the program as unlikely morphology/site combinations and cases considered unlikely combinations of site and/or histology had already been checked and proved authentic in Karachi.

Results

The age standardized rate for all cancers was 96.3 /100,000 in males and 96.9 per 100,000 in females per (Tables 1 and 2).

Age	Tot.	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude	ASR	S.E.		
Site	1253	2.6	6.3	7.0	11.1	7.7	13.5	25.1	40.9	101.2	118.5	184.9	229.4	441.9	354.1	498.3	909.5	42.4	96.3	3.12	ALL SITES	
140:140	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.4	0.17	Lip	
141:141	37	-	-	-	-	-	0.5	0.6	2.2	6.3	-	2.7	5.1	15.3	14.5	36.3	10.7	1.3	2.9	0.51	Tongue	
142:142	14	-	-	-	-	-	-	-	0.7	-	-	2.7	3.4	6.6	2.9	20.8	10.7	0.5	1.3	0.37	Salivary gland	
143:143	6	-	-	-	-	0.4	-	-	0.7	1.8	-	-	-	-	-	-	-	-	-	-	Gum	
145:145	74	-	-	-	-	-	-	0.9	5.1	4.3	8.1	5.6	13.6	11.8	24.1	23.2	20.8	32.1	2.5	5.3	0.69	Other mouth
146:146	19	-	-	-	-	-	-	-	-	1.8	-	-	8.4	10.9	8.7	5.2	10.7	0.6	1.6	0.39	Oropharynx	
147:147	17	0.2	-	-	0.3	0.4	0.9	-	1.4	0.9	1.1	1.4	3.4	-	2.9	15.6	10.7	0.6	1.2	0.34	Nasopharynx	
148:148	35	-	-	-	-	-	-	0.6	0.7	1.8	-	12.2	13.5	15.3	11.6	-	32.1	1.2	2.9	0.56	Hypopharynx	
149:149	11	-	0.2	-	-	-	-	0.6	-	-	-	-	6.7	2.2	5.8	10.4	-	0.4	0.8	0.25	Pharynx, NOS	
150:150	51	-	-	-	-	-	-	0.6	2.9	2.7	4.5	8.2	20.2	15.3	20.3	20.8	32.1	1.7	4.1	0.64	Oesophagus	
151:151	33	-	-	-	1.1	0.5	0.5	2.3	2.9	4.5	1.1	4.1	-	4.4	8.7	10.4	53.5	1.1	2.7	0.58	Stomach	
152:152	5	-	-	0.3	-	-	-	0.6	-	-	-	-	1.7	-	2.9	-	10.7	0.2	0.4	0.24	Small intestine	
153:153	26	-	0.2	-	0.6	0.4	0.5	1.1	2.2	2.7	3.4	5.4	1.7	4.4	5.8	-	10.7	0.9	1.6	0.37	Colon	
154:154	25	-	-	-	0.4	0.9	-	0.7	1.8	2.2	5.4	5.1	13.1	13.1	8.7	5.2	-	0.8	1.8	0.36	Sectum	
155:155	44	0.2	-	-	-	-	-	0.9	0.6	-	-	4.5	8.2	11.8	17.5	20.3	31.1	21.4	1.5	3.6	0.59	Liver
156:156	11	-	-	-	-	-	-	-	-	-	-	6.8	1.7	-	8.7	5.2	10.7	0.4	1.0	0.33	Gallbladder etc.	
157:157	8	-	-	-	-	-	-	-	-	0.9	1.1	1.4	1.7	6.6	2.9	-	-	0.3	0.6	0.22	Pancreas	
158:158	3	-	-	0.3	-	-	-	-	-	-	1.1	-	-	-	2.9	-	-	0.1	0.2	0.11	Fistoneum etc.	
160:160	3	-	-	-	-	-	-	-	-	1.8	-	-	-	-	-	-	-	0.1	0.1	0.08	Nose, sinuses etc.	
161:161	77	-	-	0.3	-	-	-	2.3	1.4	4.5	4.5	10.9	16.9	48.1	26.1	26.0	74.9	2.6	6.7	0.86	Larynx	
162:162	155	-	-	-	-	-	-	-	2.2	7.2	22.4	19.0	32.1	87.5	55.1	88.2	160.5	5.2	14.3	1.26	Trachea, lung	
164:164	1	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	0.0	0.0	0.04	Other thoracic org.	
169:169	47	0.7	0.9	1.0	0.6	1.5	0.5	1.1	1.4	2.7	3.4	5.4	3.4	8.8	11.6	10.4	21.4	1.6	2.7	0.49	Haemato./	

Age Site	Tot.	INCIDENCE RATE BY AGE GROUP (PER 100,000)																	FEMALES		75+ Crude	ASR	S.E.	ALL SITES
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+							
1313	1.5	3.0	7.3	11.8	15.3	27.2	45.3	82.9	172.0	181.0	214.1	176.0	354.5	288.3	411.4	682.7	47.9	96.9	3.03					
140:140	2	-	-	-	-	-	-	-	-	-	-	-	2.3	-	-	11.0	0.1	0.3	0.24	Lip				
141:141	33	-	-	-	-	-	-	0.5	1.3	1.6	5.8	3.6	7.2	8.8	4.6	9.1	21.4	-	1.2	2.4	0.43			
142:142	8	-	-	-	-	-	-	1.0	0.6	-	1.0	1.2	-	2.3	3.0	5.3	-	0.3	0.5	0.20	Salivary gland			
143:143	8	-	-	0.3	-	-	-	-	-	1.0	2.4	4.3	-	2.3	-	-	-	0.3	0.5	0.20	Gum			
145:145	65	-	-	-	-	0.8	1.5	1.3	1.6	6.8	8.4	27.5	5.3	16.0	9.1	32.1	44.0	2.4	5.3	0.73	Other mouth			
146:146	8	-	-	-	-	0.4	-	-	-	-	1.2	1.4	3.5	4.6	-	-	11.0	0.3	0.7	0.29	Oropharynx			
147:147	5	-	-	-	0.7	-	-	-	-	-	-	-	1.8	-	-	10.7	-	0.2	0.3	0.17	Nasopharynx			
148:148	13	-	-	-	-	-	0.5	1.3	1.6	1.0	1.2	-	1.8	2.3	6.1	10.7	-	0.5	0.9	0.27	Hypopharynx			
149:149	3	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-	22.0	0.1	0.5	0.32	Pharynx, NOS			
150:150	52	-	-	-	-	0.4	1.5	1.3	1.6	4.9	6.0	8.7	7.0	13.7	30.3	32.1	22.0	1.9	4.2	0.64	Oesophagus			
151:151	23	-	-	-	1.0	0.4	1.0	-	1.6	1.9	2.4	4.3	1.8	-	9.1	5.3	33.0	0.8	1.9	0.48	Stomach			
153:153	29	-	-	-	0.3	0.4	0.5	1.3	3.1	2.9	3.6	4.3	7.0	2.3	12.1	5.3	11.0	1.1	2.0	0.42	Colon			
154:154	15	-	-	-	-	0.4	0.5	0.6	0.8	1.0	1.2	2.9	5.3	6.9	-	5.3	-	0.5	1.0	0.28	Rectum			
155:155	24	-	-	-	-	-	0.5	-	2.3	1.9	6.0	7.2	3.5	2.3	3.0	21.4	-	0.9	1.8	0.37	Liver			
156:156	37	-	-	-	-	-	-	-	5.8	6.0	4.3	7.0	22.9	15.2	21.4	-	-	1.3	3.0	0.50	Gallbladder etc.			
157:157	7	-	-	-	-	-	-	0.6	-	1.0	2.4	-	1.8	4.6	-	-	-	0.3	0.5	0.19	Pancreas			
158:158	3	-	-	0.3	-	0.4	-	-	-	-	-	-	-	2.3	-	-	-	0.1	0.2	0.10	Peritoneum etc.			
160:160	2	-	-	-	-	-	-	-	-	-	-	-	-	4.6	-	-	-	0.1	0.2	0.13	Nose, sinuses etc.			
161:161	11	-	-	-	0.3	-	0.5	-	0.8	1.0	1.2	2.9	-	2.3	3.0	10.7	-	0.4	0.8	0.25	Larynx			
162:162	26	-	-	-	0.3	-	-	0.6	0.8	3.9	2.4	2.												

The second most common malignancy amongst the males was carcinoma of the oral cavity, with 1 36 (10.9%) cases for the years 1 995 and 1996. Oral cancer is known to be associated with tobacco

smoking and areca, tobacco and betal-quid chewing. This would explain the high incidence rate in both the males and the females. Carcinoma of the oral cavity showed a plateau between the fourth and eighth decade with a peak incidence in the seventh decade.

Table 3. Age Adjusted Rates* of Cancer.

Registry	AAR* Males	AAR* Females
Karachi, Pakistan	96.3	96.9
Madras, India	104.2	129.0
Shanghai, China	246.9	169.1
Songkhla, Thailand	116.7	88.7
Seoul, Korea	232.4	147.9
Spain	238.0	179.0
Netherland	443.0	309.0

The third most common malignancy was of the lymph nodes, with 100(8.0%) cases for the years 1995 and 1996. Lymphomas, both the Hodgkin's and the Non-Hodgkin's variety, with an even distribution in all the age groups were seen. The lymphomas and the leukemias form the bulk of the tumours in the first two decades of life. The age standardized rates for cancers of lung, oral cavity and lymph nodes in the males were 14.3, 9.0 and 5.0 per 100,000 respectively.

The most common malignancy in the females was carcinoma of the breast, with 436 (33.2%) incident cases for the years 1995 and 1996. The age pattern was typical of that observed in the developing countries with an increase in the risk around the fourth decade, peak at the age of around 45 years, i.e. perimenopausal, followed by an apparent slight decrease in the risk.

The second and the third most common malignancies amongst the females were of the oral cavity and the ovary. Carcinoma of the oral cavity with 116 (8.9%) cases for the years 1995 and 1996, and carcinoma of the ovary with 88 (6.7%) cases were seen for the same period. The malignancies of the oral cavity were seen predominantly in females above the age of 40 years, though the malignancies of the oral cavity were also observed in the second and third decades of life. The age standardized rates for cancers of breast, oral cavity and ovary in the females were 31.5, 8.5 and 6.0 per 100,000 respectively.

Validity and completeness are the essential components in assessing the quality of cancer registry data. The indicator of validity used are cases with histological verification (H.V.), and cases registered on the basis of information only from a death certificate (D.C.O.). The percentage of cases which were verified histologically for the year 1995 was 89.9%, for 1996 it was 88.7%. These included cases which were diagnosed on the basis of tissue or needle biopsy either of the primary or the secondary site of the tumour. Including the cases diagnosed on the basis of cytology or haematology this percentage rose to 94.0% for 1995 and 93.9% for 1996. The high HV% is an indicator that Karachi has diagnostic facilities at par with international standards.

Discussion

There is no incidence data available to date in Pakistan. The data on cancer occurrence in Karachi (1978-83) published by IARC, based on the studies by the PMRC and JPMC put pharynx and lung as the most common cancer sites amongst the males and breast amongst the females². This indicates a slight change of trend in malignancy in the two genders.

The population-based data of the Karachi Cancer Registry shows a slightly different pattern from the data of Karachi analysed from JPMC. There has been an overall increase in the total number of malignancies. The JPMC data showed an average of 2070 new cases annually, for the city of Karachi. The Karachi Cancer Registry data shows an average of 1270 new cases of cancer annually (both sexes), in Karachi - District South. It should be noted that Karachi-South is one of the 5 districts of Karachi. The number of female cancer cases have increased. The male/female ratio in the Karachi Cancer Registry is M F = 1: 1.04 whereas the JPMC registry data showed a ratio of M : F = 1.4 : 1. Breast cancer remains the most common malignancy amongst the females, and the number of cases have shown an increase over the last decade. CR=33.3% of the total and JPMC=21.7% of the total]. The age distribution remains similar. Cancer of the lung has replaced pharyngeal carcinoma as the number one malignancy in the males. Cancers of the ovary have shown a sharp increase. CR = 6.6% of the total and JPMC = 4.5 % of the total]. There is a sharp decline in the cancers of the pharynx in the females as well as in the males. [Females - KCR=2.2% of the total and JPMC=8.4%. Males - KCR=6.6% of the total and JPMC=17.0%]. Malignancies of the brain have become apparent in the list of the ten most common tumours. Malignancies of the bone have declined.

A recent institutional study of a similar nature from Peshawar cites skin and lymph nodes as the commonest site in males and breast in females³. The difference in the pattern is a probable indicator of tobacco abuse and environmental pollution in Karachi.

Incidence data from neighbouring countries is better organised (Table 3). The Madras Metropolitan Tumour Registry (MMTR) ⁴, covering a population of 3.8 million, showed an average annual world-standardised age-adjusted rates (AAR) per 100,000 as 104.2 in males and 129.0 in females. Stomach (AAR:15.2) was the leading site of malignancy among males, followed by cancers of the lung (AAR:9.8) and oral cavity (AAR:9.4). Among females, cancer of the cervix (AAR:44.0) was the commonest cancer, followed by breast (AAR:21.7) and oral cavity cancers (AAR:9.8). The population-based cancer registry, in Shanghai, covering a total population of about 5.7 million showed an annual average age-adjusted cancer incidence rates for all sites in males 246.9 and 169.1 for females⁵. The population-based cancer registry of Songkhla, southern region of Thailand, population of 1.2 million showed that the age-standardized rate for all cancers was 116.7 in males and 88.7 in females. Lung, oral cavity, liver, and esophagus were the main leading sites in males while the cervix and breast were outstanding in females⁶. In Japan the leading cancer site was stomach for males and females followed by lung, liver, colon and rectum in males and breast, colon and uterus in the females⁷. In Seoul the age standardized incidence rates were 232.4 per 100,000 in males and 147.9 per 100,000 in females. The major cancer sites were stomach, liver and lung in males and cervix, stomach and breast in females⁸. In Europe, the Murcia Cancer Registry, south-east Spain (955,487 inhabitants), showed the crude (all-ages) annual incidence rates per 100,000 as 238 in males and 179 in females. Lung and larynx were the most common malignancies amongst the males, whilst cancer breast was the most common cancer among women with an age-standardized rate of 29.4 per 100,000⁹. In Netherlands, the incidence rates for all malignancies were 443 per 100,000 males and 309 per 100,000 females. The most common cancers were lung cancer in males and breast cancer in females, accounting for 24% and 31% of the total cancer incidence by sex, respectively¹⁰.

The incidence of cancer appears to be slightly lower in Karachi as compared to developed countries, but is at par with neighbouring countries. The low incidence may also be an indicator of under-coverage, as it often happens with new registries. The pattern of malignancies as far as the most common cancers go, is similar however to the western countries, with lung and breast being the commonest tumors amongst the males and females respectively. The Asian countries have stomach/lung/oralcavity/liver as the commonest tumors amongst the males and cervix/breast amongst the females. Pakistan being a Muslim country the incidence of cervical cancer showed an expected low figure.

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