

THE EPIDEMIOLOGY OF CANCERS IN THE UNIVERSITY HOSPITAL, KUALA LUMPUR

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SUMMARY

A descriptive study of 1,945 cancer cases discharged from the University Hospital, Kuala Lumpur, during the three-year period from 1972 to 1974, was carried out to analyse cancer patterns and frequency in the various age, sex and ethnic groups. The highest frequency of cancers occurred among the Chinese (68.8 percent) in excess of that expected from their utilization rate of the hospital (50.5 percent). The five leading cancers in males were lung, liver, stomach, nasopharynx and rectum. In the females, the five leading cancers were cervix uteri, breast, stomach, lung and ovary. This was the pattern reflected among the Chinese; the patterns for the Malays and Indians were different. In addition, the Chinese constituted the highest proportions in most of the selected individual cancers analysed (including cancer of the nasopharynx, lung, liver, stomach, cervix, breast, rectum and colon). However, there was a high proportion of Indians in laryngeal and skin cancer. The age distribution of the patients showed that cancers of the oesophagus, stomach, colon, rectum, liver, lung, skin and bladder, were predominant in the older age groups (55 years and above).

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Carcinoma of the cervix uteri, ovary and breast were more common in the 45-54 years age group, while leukaemia, thyroid and nasopharyngeal carcinoma were more common in the younger age groups. Comparisons with other studies showed strikingly similar patterns to those found in Singapore, 1968-70.

INTRODUCTION

In a previous paper,¹ preliminary observations derived from a study of 1,945 cancer cases discharged from the University Hospital, Kuala Lumpur, 1972 to 1974, were presented. This preliminary report, based on data for a single year, 1973, revealed some interesting ethnic and age variations in the cancer patterns. The current paper presents the full observations derived from data for the three-year period.

OBJECTIVES AND LIMITATIONS

The objective of the study was to describe cancer patterns in the various age, sex and racial groups in the study population. This "descriptive epidemiology" approach (concerned with describing cancer patterns in different ethnic or geographic communities) is a valuable explorative tool in identifying possible clues of the causative or associative factors of cancers.² In this respect, a cosmopolitan country like Malaysia with her diversified population seems particularly suitable for such descriptive studies.

TABLE I
DISTRIBUTION OF TOTAL PATIENTS (ALL DIAGNOSES) BY AGE, SEX AND ETHNIC GROUP,
UNIVERSITY HOSPITAL, 1972-74

Age group (years)	Malay		Chinese		Indians*		Orang Asli		Others		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Below 1	583	449	1209	928	729	637	50	33	37	23	2608	2070
1 - 4	262	186	519	351	442	308	19	9	23	11	1265	865
5 - 14	310	197	931	645	604	401	28	16	23	33	1896	1292
15 - 24	1086	914	1964	1843	1014	1032	26	34	63	66	4153	3889
25 - 34	681	757	1476	2222	806	1027	35	30	67	115	3065	4151
35 - 44	322	252	975	1232	641	661	25	31	46	59	2009	2235
45 - 54	251	198	721	1093	737	465	24	5	65	36	1798	1797
55 - 64	186	107	1150	942	847	351	9	9	26	37	2218	1446
65 & above	120	65	1011	765	579	196	10	4	41	27	1761	1057
Total	3801	3125	9956	10021	6399	5078	226	171	391	407	20773	18802

* (Includes Pakistanis and Sri Lankans)

However, cancer research in Malaysia is greatly hampered by the absence of a population-based cancer registry. Thus, cancer incidence data in the country are derived mainly from biopsy series³ but these are inherently biased in favour of sites more accessible to biopsy. Hospital-based studies are also heavily biased by selective utilization and intake of patients. In addition, hospital populations cannot be related to a denominator "population-at-risk"; thus frequency rates cannot be computed, and only the cancer patterns in terms of relative proportions or relative frequencies can be described.

METHODOLOGY

The material for this study was derived from computerised hospital medical records. The study population consisted of all cancer patients discharged from the University Hospital from 1.1.72 to 31.12.74, inclusive. Readmissions were programmed by computer to be excluded from the analysis: each case therefore being counted only once. Using the W.H.O. International Classification of Diseases,⁴ the age, sex and ethnic group distributions of each of the various types of cancers seen in the study population were analysed. A detailed description of the most common cancers among males and females in the total study population, and in each of the three major ethnic groups (Malays, Chinese, Indians*) was carried out. Case records and pathology reports were also examined to determine the basis of diagnosis for each of the cancer cases.

To obtain a general baseline impression of the

utilization pattern, the total number of cases discharged from the hospital during the same time period (for all diagnoses, including cancers) was also analysed. Readmissions were again similarly excluded.

* includes Pakistanis and Sri Lankans

OBSERVATIONS

The total number of patients discharged from the University Hospital during 1972-74 was 39,575. Table I shows the age, sex and ethnic group distribution. There were 20,773 males (52.5 percent) and 18,802 females (47.5 percent). The majority of the patients were Chinese (50.5 percent), followed by Indians (29.0 percent), Malays (17.5 percent), Orang Asli (1.0 percent) and Others (2.0 percent). This reflects the utilization pattern of the hospital during the three-year period, and shows a preponderance of Chinese patients, with also a relatively high utilization rate among the Indians. Consequently, subsequent findings in the study have to be interpreted in the light of these racial differences in hospital utilization.

The number of cancer patients during the same period was 1,945, constituting 4.9 percent of the total. The age, sex and ethnic group distribution is shown in Table II. There were 1,047 males (53.8 percent) compared to 898 females (46.2 percent). The highest frequency of cancers occurred among the Chinese (68.8 percent), followed by Indians (19.1 percent) and Malays (10.1 percent). The racial distribution of these cancer cases is compared with

TABLE II
DISTRIBUTION OF ALL CANCER PATIENTS BY AGE, SEX AND ETHNIC GROUP.
UNIVERSITY HOSPITAL, 1972-74

Age group (years)	Malay		Chinese		Indians*		Orang Asli		Others		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Below 1	0	1	2	1	1	0	0	0	0	0	3	2
1 - 4	5	4	17	7	4	5	1	0	0	0	27	16
5 - 14	9	4	19	13	3	3	0	0	0	1	31	21
15 - 24	13	5	30	37	6	8	0	0	1	0	50	50
25 - 34	10	18	52	63	10	13	2	0	0	0	74	94
35 - 44	13	10	76	90	22	28	4	1	0	2	115	131
45 - 54	23	20	100	150	37	47	3	1	1	1	164	219
55 - 64	25	16	211	148	66	44	3	6	2	0	307	214
65 & above	12	8	206	116	52	23	1	1	5	3	276	151
Total	110	86	713	625	201	171	14	9	9	7	1047	898

* (Includes Pakistanis and Sri Lankans)

that of the total hospital patients in Table III. There was a relatively higher percentage of Chinese among the cancer patients (68.8 percent) in relation to their hospital utilization rate (50.5 percent). This suggestion of racial differences in the pattern of cancers should become clearer when specific cancers are analysed.

In relation to age distribution, Table IV compares the percentage age distributions for the cancer patients with the total hospital patients. There is a marked contrast between the age patterns of the two groups. Among the cancer patients, the older age groups (45 years and above) were predominant, while among the total hospital patients, the largest proportions were found in the

15-44 years age group.

Cancer patterns

The ten most common cancers in this series are listed in Table V. Among males, carcinoma of the lung was the most common cancer, accounting for 13.2 percent of all cancers in male patients, followed by carcinoma of the liver (10.9 percent) and stomach (10.3 percent). The other common sites were nasopharynx (6.0 percent), rectum (5.7 percent), colon (5.3 percent), oesophagus (5.2 percent), leukaemia (4.9 percent), skin (4.1 percent) and bladder (2.8 percent). Among females, carcinoma of the cervix uteri was the predominant cancer (17.8 percent of all cancers in female patients). (N.B. This excludes carcinoma-in-situ of the cervix uteri). Breast cancer, accounting for 10.7 percent was the next most common cancer. The other sites were stomach (6.7

TABLE III
PERCENTAGE DISTRIBUTION OF ALL CANCER PATIENTS BY ETHNIC GROUP, COMPARED WITH TOTAL UNIVERSITY HOSPITAL PATIENTS, 1972-74

Ethnic group	Total University Hospital patients		All cancer patients	
	No.	%	No.	%
Malay	6,926	17.5	196	10.1
Chinese	19,977	50.5	1,338	68.8
Indian	11,477	29.0	372	19.1
Orang Asli	397	1.0	23	1.2
Others	798	2.0	16	0.8
Total	39,575	100.0	1,945	100.0

TABLE IV
PERCENTAGE AGE DISTRIBUTIONS OF TOTAL HOSPITAL PATIENTS AND ALL CANCER PATIENTS, UNIVERSITY HOSPITAL, 1972-74

Age group (years)	% of total hospital patients			% of all cancer patients		
	M	F	Both sexes	M	F	Both sexes
0 - 14	14.6	10.7	25.3	3.1	2.0	5.1
15 - 44	23.3	25.9	49.2	12.3	14.1	26.4
45 & above	14.6	10.9	25.5	38.4	30.1	68.5
Total	52.5	47.5	100.0	53.8	46.2	100.0

TABLE V
TEN MOST COMMON CANCER SITES, UNIVERSITY HOSPITAL,
1972-74

Male				Female			
Site (ICD 8th Revision)	Number of cases	% of all male cancer case	Site (ICD 8th Revision)	Number of cases	% of all female cancer cases		
162 Lung	138	13.2	180 Cervix	160	17.8		
155 Liver	114	10.9	174 Breast	96	10.7		
151 Stomach	108	10.3	151 Stomach	60	6.7		
147 Nasopharynx	63	6.0	162 Lung	50	5.6		
154 Rectum	60	5.7	183 Ovary	49	5.5		
153 Colon	56	5.3	172.3 Skin (including melanoma)	43	4.8		
150 Oesophagus	55	5.2	154 Rectum	35	3.9		
204.7 Leukaemia	51	4.9	204.7 Leukaemia	35	3.9		
172.3 Skin (including melanoma)	43	4.1	153 Colon	34	3.8		
188 Bladder	29	2.8	193 Thyroid	32	3.6		
140-209 All sites	1047	100.0	140-209 All sites	898	100.0		

percent), lung (5.6 percent), ovary (5.5 percent), skin (4.8 percent), rectum and leukaemia (each 3.9 percent), colon (3.8 percent) and thyroid (3.6 percent).

Analysis of the results by ethnic groups showed that the five leading cancers among 713 Chinese male cases were lung (14.9 percent of all cancers among Chinese males), liver (12.6 percent), stomach (9.8 percent), nasopharynx (7.7 percent) and rectum (6.9 percent), (Table VI). Among 625 Chinese female cases, the leading cancer was carcinoma of the cervix uteri (18.4 percent of all cancers among Chinese females), the other four leading sites being breast (10.9 percent), stomach (7.4 percent), lung (6.7 percent) and ovary (5.8 percent), (Table VI). Among the Indians (including Pakistanis and Sri Lankans), the five leading cancers in 201 male cases were stomach (15.9 percent of all cancers among Indian males), oesophagus (9.0 percent), skin (8.5 percent), lung (7.0 percent) and hypopharynx (6.5 percent), (Table VII). Among the 171 Indian female cases, carcinoma of the cervix uteri was the most common malignancy (17.5 percent of all cancers among Indian females). The other common sites were skin (12.9 percent), breast (9.9 percent), stomach (6.4 percent) and oesophagus (5.8 percent), (Table

VII). In the case of the Malay patients, the number of cases seen during this three year period consisted of only 110 males and 86 females. As with the Indian patients, the relatively small numbers involved may not produce representative results. The pattern of cancers, however, appears similar to the Chinese, especially in the males. The leading malignancies in the Malay males were cancer of the lung (14.5 percent of all cancers among Malay males), liver (11.8 percent), leukaemia (10.0 percent), stomach (5.5 percent) and rectum (5.5 percent). In the females, the leading malignancies were cancer of the cervix (15.1 percent of all cancers among Malay females), breast (10.5 percent), liver (7.0 percent), leukaemia (7.0 percent), and skin (5.8 percent), (Table VIII). For the other races, the number of cases seen were too small for detailed analysis.

Ethnic variations in selected individual cancers

The ethnic distributions of fifteen selected cancers (in which the numbers were adequately large) were analysed separately (Table IX). The highest percentages were found in the Chinese in most of the fifteen individual cancers analysed, varying from 88.8 percent in nasopharyngeal carcinoma, 82.1 percent in rectal cancer, 80.0

TABLE VI
FIVE MOST COMMON CANCERS IN CHINESE PATIENTS, UNIVERSITY HOSPITAL
1972-74

Male				Female		
Site (ICD 8th Revision)	Number of cases	% of all male Indian cancer cases	Site (ICD 8th Revision)	Number of cases	% of all female Indian cancer cases	
162 Lung	106	14.9	180 Cervix	115	18.4	
155 Liver	90	12.6	174 Breast	68	10.9	
151 Stomach	70	9.8	151 Stomach	46	7.4	
147 Nasopharynx	55	7.7	162 Lung	42	6.7	
154 Rectum	49	6.9	185 Ovary	36	5.8	
140-209 All sites	713	100.0	140-209 All sites	625	100.0	

percent in carcinoma of the colon, 78.7 percent in lung cancer, 77.6 percent in liver cancer, 75.0 percent in bladder cancer, 73.5 percent in ovarian cancer, 71.9 percent in carcinoma of the cervix, 70.7 percent in breast cancer, 69.0 percent in carcinoma of the stomach, 62.5 percent in thyroid cancer, 61.7 percent in oesophageal cancer to 59.3 percent in leukaemia. However, in the case of laryngeal carcinoma, there was an equal proportion of Indians (43.3 percent) compared to the Chinese (also 43.3 percent). In the case of skin cancer, Indians accounted for the majority of the cases (45.3 percent) compared to 41.9 percent in Chinese.

Age variations in selected individual cancers

The age distribution of the patients in fourteen selected cancers (in which there were adequately large numbers) were analysed separately, as shown in Table X. The general age pattern of most of these cancers analysed show an increasing number of patients with increasing age. Hence, there was a greater proportion of patients in the older age groups, the modal class (with the highest frequency) being the 55-64 years age group, for oesophageal cancer, carcinoma of the stomach, colon, rectum and liver, and lung and skin cancer. The modal class for bladder cancer was slightly

TABLE VII
FIVE MOST COMMON CANCERS IN INDIAN PATIENTS, UNIVERSITY HOSPITAL,
1972-74

Male				Female		
Site (ICD 8th Revision)	Number of cases	% of all male Indian cancer cases	Site (ICD 8th Revision)	Number of cases	% of all female Indian cancer cases	
151 Stomach	32	15.9	180 Cervix	30	17.5	
150 Oesophagus	18	9.0	172-3 Skin (including melanoma)	22	12.9	
172-3 Skin (including melanoma)	17	8.5	174 Breast	17	9.9	
162 Lung	14	7.0	151 Stomach	11	6.4	
148 Hypopharynx	13	6.5	150 Oesophagus	10	5.8	
140-209 All sites	201	100.0	140-209 All sites	171	100.0	

TABLE VIII
FIVE MOST COMMON CANCERS IN MALAY PATIENTS, UNIVERSITY HOSPITAL,
1972-74

(ICD 8th Revision)		Male		Site (ICD 8th Revision)	Female		
		Number of cases	% of all male Malay cancer cases		Number of cases	% of all female Malay cancer cases	
162	Lung	16	14.5	180	Cervix	13	15.1
155	Liver	13	11.8	174	Breast	9	10.5
204.7	Leukaemia	11	10.0	155	Liver	6	7.0
151	Stomach	6	5.5	204.7	Leukaemia	6	7.0
154	Rectum	6	5.5	172.3	Skin	5	5.8
140-209	All sites	110	100.0	140-209	All sites	86	100.0

higher, being 65-74 years.

In the case of the female genital cancers (carcinoma of the cervix uteri and ovarian cancer) as well as breast carcinoma, the greatest proportions were found in the 45-54 years age group. Nasopharyngeal carcinoma was more common in the young adult and early middle age groups, the modal class being the 35-44 years age group. Thyroid cancer was also more common in young adults, most cases occurring around 15-24

years. In the case of leukaemia, there was a preponderance of cases occurring in the childhood years, and in young adults below 25 years of age. The modal class was the 5-14 years age group.

DISCUSSION

In cancer studies, the reliability and validity of data is also affected by diagnostic accuracy and precision, which is in turn dependent on the

TABLE IX
DISTRIBUTION OF SELECTED CANCER SITES BY ETHNIC GROUP, UNIVERSITY HOSPITAL, 1972-74

Site (ICD 8th Revision)	Malay		Chinese		Indian		Orang Asli		Others		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
147	Nasopharynx	6	6.7	79	88.8	3	3.4	0	0	1	1.1	89	100.0
150	Oesophagus	2	2.5	50	61.7	28	34.6	0	0	1	1.2	81	100.0
151	Stomach	8	4.8	116	69.0	43	25.6	1	0.6	0	0	168	100.0
153	Colon	8	8.9	72	80.0	8	8.9	1	1.1	1	1.1	90	100.0
154	Rectum	9	9.5	78	82.1	7	7.4	1	1.0	0	0	95	100.0
155	Liver	19	13.3	111	77.6	11	7.7	1	0.7	1	0.7	143	100.0
161	Larynx	2	6.7	13	43.3	13	43.3	2	6.7	0	0	30	100.0
162	Lung	20	10.6	148	78.7	16	8.5	3	1.6	1	0.6	188	100.0
172.3	Skin (including malanoma)	7	8.1	36	41.9	39	45.3	4	4.7	0	0	86	100.0
174	Breast	9	9.1	70	70.7	18	18.2	0	0	2	2.0	99	100.0
180	Cervix uteri	13	8.1	115	71.9	30	18.8	2	1.2	0	0	160	100.0
183	Ovary	4	8.2	36	73.5	8	16.3	0	0	1	2.0	49	100.0
188	Bladder	3	7.5	30	75.0	7	17.5	0	0	0	0	40	100.0
193	Thyroid	5	12.5	25	62.5	9	22.5	0	0	1	2.5	40	100.0
204.7	Leukaemia	17	19.8	51	59.3	15	17.4	2	2.3	1	1.2	86	100.0
140-209	All sites	196	10.1	1338	68.8	373	19.2	23	1.2	16	0.7	1945	100.0

TABLE X
AGE DISTRIBUTION OF PATIENTS BY SELECTED CANCER SITES, UNIVERSITY HOSPITAL, 1972-74

Site (ICD 8th Revision)	Below 1	Age (years)									Total
		1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75 & above	
147 Nasopharynx	0	0	0	11	18	22	20	14	4	0	89
150 Oesophagus	0	0	0	0	1	8	17	29	20	6	81
151 Stomach	0	0	0	0	4	23	34	55	45	7	168
153 Colon	0	0	0	0	6	13	16	28	22	5	90
154 Rectum	0	0	0	0	5	11	17	31	23	8	95
155 Liver	0	0	3	2	12	17	29	43	31	6	143
162 Lung	0	0	0	0	4	12	26	80	58	8	188
172-3 Skin	0	2	0	0	7	7	19	30	14	7	86
174 Breast	0	0	0	3	12	13	31	22	18	0	99
180 Cervix uteri	0	0	0	2	15	43	56	27	16	1	160
183 Ovary	0	0	4	5	8	3	14	11	0	4	49
188 Bladder	0	0	0	0	0	3	9	7	16	5	40
193 Thyroid	0	0	1	12	7	7	5	3	5	0	40
203-7 Leukaemia	2	15	22	17	10	5	10	2	2	1	86
140-209 All sites	5	43	52	100	168	246	383	521	342	85	1945

prescribed criteria forming the basis of diagnosis for the disease. Generally, diagnostic accuracy and precision is enhanced if tissue diagnosis (by cytology, biopsy or autopsy) is available. Table XI shows the basis of diagnosis for the 1,945 cancer cases. A high percentage of these cases (80.8 percent) were diagnosed by autopsy, surgical biopsy haematology or cytology. (Diagnosis by autopsy included histopathological examination). Another 9.9 percent of cases were diagnosed by explorative operation or radiology (including radioactive isotope studies). Only 4.1 percent of cases were diagnosed "clinically", without any form of confirmatory investigation. This is a factor, in favour of data reliability, in the sense that a great proportion of cases were diagnosed by methods which were presumably highly accurate and precise.

Cancer patterns in relation to other Malaysian and Singaporean studies

Comparisons with other studies must be made with caution because of differences in sources and methods of data collection, variations in diagnostic techniques and criteria, and differences in the extent of coverage. Moreover, as noted earlier, it is not possible to calculate frequency rates in the present study, but only to describe general cancer patterns in terms of relative proportions. Tables XII and XIII compare the five leading cancers in

three studies. The present University Hospital study shows strikingly similar patterns to those of the Singapore study.⁵ On the other hand, the cancer patterns in the Institute of Medical Research study⁵ appeared different. These differences could be due to bias factors such as the selective interest of the physician, or the accessibility of the cancer site for biopsy on which diagnosis is made.

TABLE XI
BASIS OF DIAGNOSIS OF CANCER CASES,
UNIVERSITY HOSPITAL, 1972-74

Basis of diagnosis	Number of cases	Percentage
Autopsy	65	3.3
Biopsy	1346	69.2
Haematology	121	6.2
Cytology	41	2.1
Exploratory	192	9.9
Operation and Radiology		
Clinical	79	4.1
Unknown*	101	5.2
Total	1945	100.00

* This includes 70 cases in which the records were missing or untraceable, as well as 31 cases which were diagnosed in other hospitals but referred to the University Hospital for treatment without mention of the basis of diagnosis.

TABLE XII
FIVE LEADING CANCERS IN MALES (ALL RACES) IN THREE COMPARATIVE STUDIES

University Hospital, Kuala Lumpur, 1972-74			Singapore, 1968-70			Institute of Medical Research, Kuala Lumpur, 1969-71		
Site	Number of cases	% of cases	Site	Number of cases	% of case	Site	Number of cases	% of cases
Lung	138	13.2	Lung	795	19.4	Nasopharynx	267	15.7
Liver	114	10.9	Stomach	674	16.4	Skin	220	12.9
Stomach	108	10.3	Liver	526	12.8	Lymph nodes, neck	151	8.9
Nasopharynx	63	6.0	Nasopharynx	326	7.9	Lymph nodes, other	131	7.7
Rectum	60	5.7	Oesophagus	273	6.7	Lung	128	7.5
All sites	1047	100.0	All sites	4103	100.0	All sites	1704	100.0

TABLE XIII
FIVE LEADING CANCERS IN FEMALES (ALL RACES) IN THREE COMPARATIVE STUDIES

University Hospital, Kuala Lumpur, 1972-74			Singapore, 1968-70			Institute of Medical Research, Kuala Lumpur, 1969-71		
Site	Number of cases	% of cases	Site	Number of cases	% of cases	Site	Number of cases	% of cases
Cervix	160	17.8	Breast	378	13.0	Cervix	418	24.9
Breast	96	10.7	Cervix	331	11.4	Breast	231	13.8
Stomach	60	6.7	Stomach	313	10.8	Skin	128	7.6
Lung	50	5.6	Lung	277	9.6	Nasopharynx	116	6.9
Ovary	49	5.5	Colon	142	4.9	Lymph nodes, neck	89	5.3
All sites	898	100.0	All sites	2897	100.0	All sites	1676	100.0

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