

A Hospital Based Study of Cancer Admissions

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Summary

A study was done on patients admitted to Penang Hospital with malignant disease in 1995. A total of 1333 patients (638 male, 695 female) with 1335 malignancies were studied. The majority (77.3%) were aged 41 - 80 years. The commonest cancers in males were cancers of lung, nasopharynx, colon and rectum, leukemia and larynx whereas the commonest malignancies in females were of the breast, cervix, colon and rectum, leukemia and ovarian/lung carcinoma. The average number of admissions was 2.2 and the average length of stay was 12.7 days. Cancer admissions account for a significant proportion of the inpatient workload of Penang Hospital.

Key Words: Cancer admissions, Penang Hospital

Introduction

Penang Hospital is a 1390 bedded hospital providing primary through tertiary care to approximately 1.2 million people in the state of Penang. It is also a regional referral hospital for the northern region of Peninsular Malaysia. Its clinical departments include the full range of subspecialties in medicine and surgery. Although radiotherapy services are not available on-site, patients who require treatment can readily be referred to Mount Miriam Hospital, a private cancer hospital on Penang Island.

In order to determine the burden of cancer admissions to a major regional hospital in Malaysia, a study was done on cancer admissions to Penang Hospital in 1995.

Materials and Methods

A retrospective study was made from clinical records of patients admitted to Penang Hospital with a principal diagnosis of malignant disease during the 12 month period from 1st January to 31st December 1995. The inpatient records were traced for patients coded as having malignant disease by the Medical Records Department, patients with a provisional diagnosis of malignant disease recorded in all ward admission registers and those with histological or

laboratory evidence of malignant disease. These records were scrutinised by the first author and patients deemed to have been admitted for malignant disease were included in the study.

Details including age, sex, race, site, date of diagnosis, stage, treatment, number of admissions during 1995 and length of stay were recorded. For patients in whom the inpatient records provided insufficient information, the outpatient records from the Specialist Clinics concerned were also traced in order to obtain the necessary data.

Differences between proportions were tested using the Chi-square test of significance.

Results

A total of 1350 patients with 1352 malignancies were admitted for malignant disease to Penang Hospital in 1995. Only 1333 patients with 1335 malignancies were included in the study because the records of 17 patients could not be traced and they were excluded from the study. These 17 patients had been admitted on 21 occasions in 1995.

For patients with histological or laboratory confirmation of malignancy, 91 cases were excluded

because 28 were not admitted in 1995 and 63 were treated by other hospitals in Penang.

The 1333 patients included in the study comprised 638 male and 695 female patients. The age range was 10 months to 94 years and 77.3% of the patients were in the age range 41 to 80 years of age. Most of the patients were from Penang (69.1%) but 28.8% were from the other northern Malaysian states of Kedah, Perak and Perlis. Chinese accounted for 53.0% of cancer patients in this study, and Malay, Indian and other ethnic groups accounted for 32.0%, 13.3% and 1.7% respectively. Analysis of the ethnic distribution of all admissions to Penang Hospital in 1995 showed that 43.7% of patients admitted were Malay, 34.1% Chinese, 18.3% Indian and 3.9% were from other ethnic groups. In the study group, the Chinese accounted for a higher proportion of cancer cases than expected from the hospital admissions figures, with a corresponding lower proportion of cases among the other ethnic groups ($p < 0.01$).

Year of diagnosis

The year of diagnosis was 1995 for 857 patients (64.3%), 253 were diagnosed in 1994, and the rest had the initial diagnosis of malignant disease made as far back as 1973. For patients resident in Penang, 576 had the diagnosis of 577 malignancies made during 1995.

Primary site

Table I shows the primary site for the 1335 malignancies in the patients studied. There were 2 patients who had cancers in 2 primary sites diagnosed during 1995. One was a 62 year old Chinese man who had resection for squamous cell carcinoma of lung in August, and in September was found to have signet ring adenocarcinoma of the pancreas for which triple bypass surgery was done. Another patient was a 51 year old Chinese man from Penang who had a basal cell carcinoma removed from the skin of the cheek in May and died of hepatocellular carcinoma in October.

The commonest cancers in male patients were those of lung, nasopharynx, colon and rectum, leukemia and larynx whereas the commonest malignancies in females were of

the breast, cervix, colon and rectum, leukemia and ovarian/lung carcinoma. The commonest cancers according to sex and ethnic origin are shown in Table II.

The proportion of Chinese patients was higher than expected from the ethnic distribution of hospital inpatients for many of the common cancers including lung, nasopharynx, colon and rectum, cervix, breast, leukemia, stomach, larynx and liver. The proportion of Malay patients was higher than expected for soft tissue tumours whereas there was a preponderance of Indian patients for cancers of the oral cavity and oesophagus. All these differences were statistically significant ($p < 0.05$).

Methods of diagnosis

For the 1335 malignancies in this study, histology of the primary site was the basis of diagnosis in 79.6% of patients. Another 4.5%, 5.0% and 6.2% had the diagnosis based on histology of metastases, positive cytology and haematological tests respectively. For the remaining cancers the diagnosis was based on clinical findings and investigation or exploratory surgery.

Stage

The stage at the time of admission was determined as far as possible from information in the patients' records using the TNM classification system¹. The majority of patients admitted to Penang Hospital had cancers which were in Stage III or IV, as shown in Table III. This was true for cancers of the lung, breast, colon and rectum, nasopharynx, larynx, oral cavity, stomach, oesophagus, ovary, soft tissues, oro- and hypopharynx, prostate, liver, kidney and other urinary organs, biliary tract and pancreas.

Treatment, length of stay and deaths

In this group of patients, 1085 (81.5%) received some form of treatment, 226 did not have any definitive treatment for their malignant disease and in 22 no information could be obtained as to whether they were treated or not, since their complete medical records could not be traced. The 226 patients who did not receive any treatment included those who refused procedures needed for diagnosis and staging and those who refused definitive treatment. Some patients could

Table I
Primary site

Site	Number of cases
Lung	193
Breast	176
Cervix	154
Colon/rectum	94
Leukemia	74 [#]
Nasopharynx	72
Lymphoma	45 [@]
Larynx	40
Oral cavity	39
Stomach	38
Oesophagus	37
Bladder	36
Skin	36
Ovary	35
Unknown	29
Endometrium	25
Brain	22
Soft tissues	21
Liver	17
Oropharynx	17
Prostate	17
Thyroid	17
Kidney & other urinary organs	15
Bone	13
Biliary tract	12
Hypopharynx	12
Pancreas	12
Sinuses	8
Retina	6
Myeloma	5
Vulva	4
Penis	3
Salivary glands	3
Testes	3
Malignant histiocytosis	2
Adrenal (neuroblastoma)	1
Lip	1
Thymus	1
Total	1335

[#] (ALL 40, AML 22, CML 8, CLL 1, acute 3)

[@] (NHL 38, Hodgkin's 6, unknown type 1)

not be treated because of advanced disease or because they were too ill, a number died before diagnosis or treatment and a few were referred to other centres for treatment. In addition, some patients were not readmitted after the initial admission for diagnostic biopsy and may have subsequently received treatment on an outpatient basis. The total number of admissions for these 1333 patients was 2947, hence the average number of admissions was 2.2 per patient. The number of admissions ranged from 1 to 17. Since there were a total of 44411 admissions to Penang Hospital in 1995, cancer admissions accounted for 6.6% of the total admissions to the hospital. The length of stay could be determined for 2782 admissions and ranged from 1 to 130 days. The average length of stay was 12.7 days. The average number of admissions and average length of stay was affected by the treatment modalities as shown in Table IV. On the whole, patients who had chemotherapy had a larger number of admissions and shorter average length of stay than patients who had radiotherapy or surgery. The long average length of hospital stay reflects the complexity of some of the cancer patients treated and the numerous procedures often required for diagnosis, staging and therapy.

During 1995, there were 175 deaths in this group of patients in hospital, of which 2 were from causes other than malignant disease. Since there were 1250 deaths in Penang Hospital during 1995, the 173 deaths from malignant disease constitutes 13.8% of inpatient deaths. Another 22 patients are known to have died after discharge or during a later admission and 49 patients took their own discharge terminally ill and probably died soon after.

Discussion

Accurate epidemiological data on the cancer burden in Malaysia is lacking although it has been estimated that there are over 20 000 and up to 70 000 new cases of cancer a year². The systematic and coordinated collection of cancer statistics has been recognised as essential to patient management, cancer control programme formulation, implementation and evaluation³. Hence, the National Cancer Registry of Malaysia was established in 1987 by the Ministry of Health with the aim of registration of all cancer patients diagnosed in Malaysia. An epidemiological

Table II
Commonest cancers according to sex and race

	Malay	Chinese	Indian		
Male	Female	Male	Female	Male	Female
Lung	Breast	Lung	Breast	Lung	Cervix
Bladder	Cervix	Nasopharynx	Cervix	Larynx	Breast
Colorectal	Leukemia	Colorectal	Lung	Oral cavity	Oral cavity
Leukemia	Colorectal/ ovary/ lymphoma	Larynx/ leukemia	Colorectal	Stomach	Oesophagus
Lymphoma	Oesophagus	Stomach	Ovary	Bladder/ oesophagus	Leukemia

analysis of 2124 cancer cases diagnosed and/or treated in Penang between 1987 and 1990 and reported to the National Cancer Registry of Malaysia revealed that 85% of case notifications were from Mount Miriam Hospital⁴. The Registry's records were built up through passive case detection i.e., voluntary reports from hospitals and it was estimated (based on Singapore's age-specific cancer incidence rates for the various ethnic groups between 1978 and 1992) that only a third of the expected number of incident cases for Penang was reported to the Registry in 1989.

The National Cancer Society of Malaysia, Penang Branch, and the State Health Department subsequently took the initiative to start the Penang Cancer Registry in 1994 and this registry relied not only on voluntary reports by doctors but also employed the strategy of active case searching from pathological reports and death certificates in the state. In 1994, it received 444 notifications from Penang Hospital, the largest government run hospital in Penang, and another 455 reports from the Pathologist serving the 5 government hospitals in the state⁵. Since at least 1333 patients with 1335 malignancies were admitted to Penang Hospital in 1995, these figures indicate that more concerted efforts at active case searching may be needed to ensure that all cancer cases treated by Penang Hospital are recorded in the Penang Cancer Registry. The rank order of the leading cancer sites listed in the Penang Cancer Registry's report for 1994 i.e., lung, breast,

unknown sites, colon and rectum, cervix, stomach, nasopharynx, leukemias and lymphomas, liver and skin, is similar to the rank order of the commonest primary sites for the patients in this study.

In the past, a few hospital pathology based studies of Malaysian cancer patients have been reported and one recent study was done in Hospital Universiti Sains Malaysia from 1985 to 1992⁶. In this study the commonest malignancies were those of the female genital tract (ovary, cervix and endometrium), digestive organs (colon and stomach), lung, unspecified sites and nasopharynx (including oral cavity). There are striking differences in the leading cancer sites between this study and our series and this could be the result of bias in favour of sites more accessible to biopsy by the professional expertise available in the 2 institutions studied, or genuine regional differences in the occurrence of different cancers since Hospital Universiti Sains Malaysia is located in the eastern coastal state of Kelantan. Histopathology based studies from Sabah⁷ and Sarawak⁸ have also shown differences in the leading cancer sites; although breast and cervical cancer were the commonest cancers in women, nasopharyngeal carcinoma was the commonest cancer in men in these 2 East Malaysian states. These differences highlight the fact that regional cancer registries located so as to cover different social environments in Malaysia will be needed to provide an accurate picture of cancer epidemiology in this country.

Table III
Stage at admission

Primary site	0	I	II	III	IV	Unknown	Total
Lung	0	14	0	104	57	18	193
Breast	0	6	31	59	73	7	177
Cervix	16	22	49	32	29	6	154
Colon & rectum	0	1	23	22	37	11	94
Leukemia	0	0	0	0	0	74	74
Nasopharynx	0	1	5	14	49	3	72
Lymphoma	0	11	12	6	10	6	45
Larynx	1	1	6	18	9	5	40
Oral cavity	0	3	3	5	27	1	39
Stomach	0	2	5	6	18	7	38
Oesophagus	0	1	0	11	12	13	37
Bladder	0	14	3	5	6	8	36
Skin	0	11	11	10	2	2	36
Ovary	0	10	0	11	14	0	35
Unknown	0	0	0	0	21	8	29
Endometrium	0	10	6	0	6	3	25
Brain	0	0	0	0	2	20	22
Soft tissues	0	5	3	4	9	0	21
Liver	0	0	0	1	11	5	17
Oropharynx	0	0	1	10	6	0	17
Prostate	0	0	5	0	11	1	17
Thyroid	0	5	2	5	5	0	17
Kidney & other urinary organs	0	2	2	2	6	3	15
Bone	0	4	1	1	5	2	13
Biliary tract	0	0	1	0	7	4	12
Hypopharynx	0	0	0	0	11	1	12
Pancreas	0	0	2	5	4	1	12
Sinuses	0	0	1	1	5	1	8
Retina	0	1	1	2	1	1	6
Myeloma	0	0	0	1	0	4	5
Vulva	0	0	1	1	2	0	4
Penis	0	0	1	1	1	0	3
Salivary glands	0	0	1	1	1	0	3
Testes	0	0	0	1	1	1	3
Malignant histiocytosis	0	0	0	0	0	2	2
Adrenal	0	0	0	0	1	0	1
Lip	0	0	0	1	0	0	1
Thymus	0	0	0	1	0	0	1
Total	17	124	176	341	459	118	1335

Table IV
Treatment modalities, average admissions and average length of stay

Treatment	No. of patients	Average admissions	ALOS/days
Radiotherapy alone	233	2.1	17.6
Chemotherapy alone	107	3.7	8.6
Surgery alone	235	1.5	11.3
Surgery, radiotherapy and chemotherapy	107	2.6	12.5
Radiotherapy and chemotherapy	126	2.8	12.6
Chemotherapy and surgery	86	3.7	6.6
Radiotherapy and surgery	191	2.3	16.9
No treatment	226	1.2	11.7

Earlier studies of cancer patients in Peninsular Malaysia have been reviewed by Lim⁹ in a book published in 1993 and have all been done in the Klang Valley. There were 2 studies based on pathology records from the Institute of Medical Research^{10,11} published in 1958 and 1979 respectively and 2 studies based on pathology specimens from Kuala Lumpur General Hospital in the early 1980s^{12,13}. A series of all cases seen at the University Hospital from 1972 to 1974 including those in whom the diagnosis was only clinical was reported in 1982¹⁴. It was concluded that over the years there had been some change in the pattern of cancers reported, for example, skin cancer was a leading site in men in the earlier studies but the rank order had fallen in more recent studies. This could be because biopsy of other sites such as lung and bladder had become more readily available. It was therefore difficult to ascertain what the commonest malignancy was in the past and whether there had been any change in the pattern over time, especially in men. In women, the commonest cancers in all the series were those of cervix followed by breast. A study of the commonest cancers causing deaths in Kuala Lumpur from 1979 to 1981 was reported in 1986¹⁵. In this study, the commonest cancers leading to death in men were those of lung, liver, stomach, leukemia and colorectal cancer and the commonest cancers causing death in women were those of lung, cervix, stomach, leukemia and breast cancer.

It is notable that although Chinese accounted for 49.1% of the population of Penang State in 1995, only 34.1% of patients admitted to Penang Hospital in 1995 were Chinese. However, Chinese accounted for 53.0% of patients admitted to Penang Hospital for malignant disease in 1995. The predominance of Chinese patients in this study could be because Chinese patients utilise Penang Hospital more if they suffer from malignant disease than for other ailments. Another possible explanation is that the Chinese have a higher incidence of certain cancers including the more common ones. A preponderance of Chinese patients has been noted in all previous series of cancer patients in Peninsular Malaysia⁹, and this has been attributed to the predominance of Chinese for the common cancers in most series. Statistics from the Singapore Cancer Registry for the period from 1968 to 1992 have also shown that the Chinese have a significantly higher risk of cancer than the Malays and Indians¹⁶.

Lung cancer, the commonest malignancy in this study, has been shown to be more common among Chinese than other ethnic groups in three previous Malaysian series¹⁷⁻¹⁹. The factors responsible can only be speculated upon as there are no figures on differences in smoking habits and other risk factors for lung cancer in the different ethnic groups in the general population. Figures from the Singapore

Cancer Registry have demonstrated much higher rates of colon cancer in Chinese compared to Indians and Malays²⁰, and in this study there are also more Chinese patients with colorectal cancer than expected from the hospital admission statistics. Epidemiological studies have shown striking international correlations between intake of red meat and colon cancer rates²¹. There is also evidence that physical inactivity or excess energy intake relative to requirements increases the risk of this malignancy and that high consumption of fruits and vegetables may reduce the risk^{22,23}. Studies on ethnic differences in dietary intakes will probably be useful to shed more light on the reasons for the preponderance of colorectal cancer in Chinese compared to Malays and Indians.

The incidence rates of nasopharyngeal carcinoma for Malaysian Chinese have been shown to be much higher than for Malays and Indians²⁴ in a previous study. That people of southern Chinese origin have a high frequency of nasopharyngeal carcinoma is well known and this is attributed to genetic predisposition and Epstein-Barr virus infection. The preponderance of Indian patients with oral cavity cancer in Malaysia associated with the habit of betel chewing has been well documented²⁵⁻²⁷ and it is no surprise that nearly half of the patients with oral cavity cancer in this study were Indian. It is also evident that more studies will be needed to fully elucidate the factors, genetic or environmental, responsible for the ethnic differences in the occurrences of various cancers demonstrated in this study.

No conclusions regarding incidence rates of the various cancers for Penang State can be drawn from this study since Penang Hospital is a referral centre serving patients from Penang as well as from other northern states. Furthermore, there are other government hospitals and private hospitals serving the population of Penang state. Only patients who were admitted were included in the study hence our data does not reflect the full magnitude of utilisation of health services by cancer patients. Patients treated solely as outpatients (e.g., some patients with skin and head and neck cancers) and those who attended for biopsy,

chemotherapy or blood transfusion on a day care basis would not have been included in the data. Furthermore, some patients treated with radiotherapy were not admitted but were referred to Mount Miriam Hospital as outpatients (e.g., some patients with head and neck cancer), therefore some malignancies treated with radiotherapy may be under-represented in this series. Many patients were followed-up in the Specialist Clinics after discharge and this workload would not have been included.

This study gives information on stage-on-admission, not stage-at-diagnosis, and it is apparent that the majority of patients admitted have advanced disease. It is possible that some patients with early stage cancers were not admitted causing a preponderance of patients with advanced stage but this explanation is unlikely since very few of patients with pathological confirmation of malignancy were treated as outpatients. More efforts have to be directed towards early detection of cancers amenable to treatment if this gloomy scenario is to improve in the future.

Conclusion

This study provides comprehensive information on cancer admissions to a major regional hospital in Peninsular Malaysia. Documentation of the pattern and magnitude of the cancer burden is useful for the purposes of policy and planning of health services. Hospital based studies such as this can complement the efforts of regional cancer registries in determining the epidemiological pattern of cancer in Malaysia.

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