STANDARDISED MORTALITY RATIOS FOR SOME CANCER SITES AMONG THE MAIN ETHNIC AND CHINESE DIALECT GROUPS IN SINGAPORE, 1970

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SYNOPSIS

A study of cancer mortality patterns among the main ethnic and Chinese dialect groups in Singapore would be useful in the search for aetiological clues. Standard Mortality Ratios are presented for all the main cancer sites.

Malays are remarkable in having very low SMRs, except for leukaemia. Chinese, as expected, have high SMRs for stomach and lung (both significant at 5%), as well as for nasopharynx, oesophagus, liver, bladder, intestine, and rectum.

There are interesting variations for Chinese dialect groups. The Hokkiens have high SMRs for stomach, rectum and leukaemias. The Teochews have high SMRs for oesophagus, intestine and lung. The Cantonese have high SMRs for nasopharynx, lung, liver and bladder. Among the females, the Cantonese have high SMRs for lung, breast, cervix and uterus.

Comparisons of these findings with other morbidity studies, including the population-based registry, are made.

INTRODUCTION

During the period between the census years 1957 and 1970, there has been a definite increase in cancer mortality in Singapore. The numbers of deaths more than doubled, from a mean annual number of 791.6 for 1955-59 to 1622.2 for 1968-72. In terms of the relative proportion to all deaths, cancer has been second only to the large group of "Diseases of the Circulatory System" ever since 1965. The age-standardised rate also increased from 96.4 per 100 000 population (1955-59) to 126.1 for 1968-72.

That cancer is now a major cause of death in Singapore can hardly be questioned. What would be interesting and useful is to look at ethnic and Chinese dialect group variations in cancer mortality, especially for specific sites. This will help complement morbidity data from the Cancer Registry.

An earlier paper from the same study, focusing on other diseases, has already indicated the limitations of mortality data, and the general approach undertaken in this study (2). Standardised mortality ratios (SMRs) on certain cancer sites will be presented, according to sex for the main ethnic and Chinese dialect groups. Some sites had to be left out as there were too few or no deaths recorded in that year.

MATERIAL AND METHOD

The material and methods have been described in the earlier paper. Due to financial and logistical constraints, it was not possible to study a whole period. Instead, the study is confined to 1970, the year of the last Singapore Census, for which reliable age-breakdowns for the ethnic and dialect groups are available.

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Comparisons are made at 2 levels:-

(a) each SMR to be compared to the baseline of 100%, with statistical significance at 5%, based on confidence limits worked out by Bailor and Ederer (3),

(b) SMRs for different groups to be compared for each site.

One must exercise caution in interpreting some SMRs which have been calculated from small numbers - especially in the Malay, Indian and Chinese dialect groups, They are, at best, rough indicators which should be confirmed in an enlarged study.

RESULTS

SMRs by main ethnic group

Table 1 is remarkable more for the very low SMRs (many significant at the 5% level) for Malays than the higher SMRs for Chinese. The only high SMR for Malays is the one for leukaemia (147%), although it is not significantly greater than 100%.

The two significantly high SMRs for Chinese are for stomach (123%) and lung (131%), although SMRs for nasopharynx, oesophagus, liver (unspecified), bladder, intestine, and rectum are all higher compared to the other two groups.

The Chinese females also seem to have higher SMRs for nearly all the sites, except bladder, thyroid, and leukaemia (Table 2). The numbers of deaths are very small, especially among the Malays and Indians, thus rendering the indices unstable.

SMRs by main Chinese dialect group

Among the males (Table 3), the following important differences are noted:

(a) Hokkiens have the highest SMRs for stomach (143%, $p<0.05$), rectum (135%) and leukaemias (95%).

(b) Teochews have highest SMRs for oesophagus (225%, $p<0.05$), and intestine (93%). They also have a significantly higher SMR for lung (139%, $p<0.05$).

(c) Cantonese have highest SMRs for nasopharynx (203%, $p<0.05$), lung (172%, $p<0.05$), liver (unspecified) (149%), and bladder (250%).

(d) For many of the sites except oesophagus, the Teochews either resemble the Hokkiens or have SMRs that are intermediate between the Hokkiens and Cantonese.

Among the females (Table 4), the pattern is quite similar to the males, for most of the sites. The Cantonese have a very high SMR for lung (371%, $p<0.05$), and also high SMRs for the main female cancers - breast (149%), cervix (174%), and uterus (161%).

DISCUSSION

Before comparing mortality indices for specific causes among ethnic groups, there are some other influences to be considered. Malays generally utilize hospital facilities to a much lesser extent than the Indians and Chinese. They also seem to have significantly lower rates of reported illnesses (4). As such, cancers if they do occur are less likely to be diagnosed and known to medical personnel. The situation is worse for specific sites. This may be partial explanation for the generally low cancer death rates among Malays.

On the other hand, any SMR for Malays that is found higher than expected would be suspicious and requires further study. Malay males are found to have a high SMR (147%) for leukaemias, although it could have arisen by chance due to small numbers. The Leukaemia Study Group (5) in a study covering 5 year, 1961-65, reported no significant differences in incidence among the ethnic groups.

The Chinese, as expected, have the highest SMRs for most sites, especially stomach (123%, $p<0.05$)

Table 1
Number of cancer deaths and standardised mortality ratios (SMRs) for some sites among males, by main ethnic groups

ICD Code	Cancer Site	Chinese		Malays		Indians	
		No deaths	SMR (%)	No deaths	SMR (%)	No deaths	SMR (%)
147	Nasopharynx	64	125	1	10*	3	54
150	Oesophagus	74	113	4	31*	8	111
151	Stomach	150	123*	3	12*	8	60
152, 153	Intestine	28	117	3	63	1	39
154	Rectum	39	118	2	30	2	56
155, 197	Liver (unspecified)	122	118	10	49*	6	53
162	Lung	211	131*	1	3*	2	11*
188	Bladder	9	120	1	67	0	—
204-7	Leukaemias	16	92	5	147	2	105

Highest SMR for each cause underlined

*SMR significantly different from 100 ($p<0.05$)

Table 2
Number of cancer deaths and standardised mortality ratios (SMRs) for some sites among females, by main ethnic groups

ICD Code	Cancer Site	Chinese		Malays		Indians	
		No deaths	SMR (%)	No deaths	SMR (%)	No deaths	SMR (%)
147	Nasopharynx	23	129	0	—	0	—
150	Oesophagus	33	119	1	19	0	—
151	Stomach	60	108	6	55	3	73
152, 153	Intestine	40	129	0	—	0	—
154	Rectum	17	121	0	—	0	—
155, 197	Liver (unspecified)	39	110	4	57	1	39
162	Lung	65	124	2	19*	1	26
174	Breast	48	102	8	87	3	86
180	Cervix	53	114	5	55	1	29
182	Uterus	18	106	1	30	0	—
188	Bladder	3	77	0	—	2	667
193	Thyroid	5	81	2	167	0	—
204–7	Leukaemias	18	93	3	79	2	143

Highest SMR for each cause underlined

*SMR significantly different from 100 ($p<0.05$)

Table 3
Number of cancer deaths and standardised mortality ratios (SMRs) for some sites among males, by main Chinese dialect groups

ICD Code	Cancer Site	Hokkiens		Teochews		Cantonese	
		No deaths	SMR (%)	No deaths	SMR (%)	No deaths	SMR (%)
147	Nasopharynx	18	83	15	130	16	203*
150	Oesophagus	27	97	33	225*	5	50
151	Stomach	75	143*	34	124	11	58
152, 153	Intestine	8	78	5	93	2	54
154	Rectum	19	135	7	95	4	78
155, 197	Liver (unspecified)	45	102	29	125	24	149
162	Lung	83	121	50	139*	43	172*
188	Bladder	2	63	3	177	3	250
204–7	Leukaemias	7	95	2	51	1	37

Highest SMR for each cause underlined

*SMR significantly different from 100 ($p<0.05$)

Table 4
Number of cancer deaths and standardised mortality ratios (SMRs) for some sites among females, by main Chinese dialect groups

ICD Code	Cancer Site	Hokkiens		Teochews		Cantonese	
		No deaths	SMR (%)	No deaths	SMR (%)	No deaths	SMR (%)
147	Nasopharynx	7	95	7	180	7	212
150	Oesophagus	15	129	14	226*	1	20
151	Stomach	25	108	13	106	11	107
152, 153	Intestine	14	109	11	159	8	140
154	Rectum	5	86	4	129	4	154
155, 197	Liver (unspecified)	17	115	7	89	10	152
162	Lung	11	50*	8	68	36	371*
174	Breast	16	81	12	114	13	149
180	Cervix	20	104	9	87	15	174
182	Uterus	7	99	3	79	5	161
188	Bladder	2	125	0	—	1	143
193	Thyroid	3	115	0	—	2	182
204-7	Leukaemias	10	123	2	47	1	28

Highest SMR for each cause underlined

*SMR significantly different from 100 ($p<0.05$)

and lung (131%, p 0.05). Nasopharynx is the other important one (125%). The pattern is quite similar for females. According to the initial results of the population-based cancer registry (6), the Chinese have significantly higher incidence rates for oesophagus, stomach, liver, nasopharynx and lung.

Reports from China, Hong Kong, and other pockets of Chinese populations around the world have all confirmed the significantly higher risk for nasopharyngeal cancer among resident and emigrant Southern Chinese, particularly the Cantonese. To date, there is general agreement that genetic predisposition mediated by the HL-A System to one or more environmental factor is the likely aetiological model (7).

Incidence of stomach and oesophageal cancers are known to be higher in Hokkiens and Teochews. In terms of their origins in China, they seem very closely related. Both groups are thought to have migrated from Honan province in Northern China (where oesophageal cancer is highly prevalent) to the south. The Hokkiens are now in Fukien province while the Teochews are in a nearby district of neighbouring Kwantung (6). Can this also explain why there seems to be a gradient of mortality risks in certain cancers between Hokkiens and Cantonese, with the Teochews in between?

Among the females, the high SMR for lung cancer corresponds closely to the very high incidence of lung cancer among Chinese women, particularly the Cantonese. Whereas the males tend to have mainly epidermoid carcinoma, the females have both epidermoid and adeno-carcinoma (8). A case-control study failed to identify any particular risk factor to account for the high incidence observed (9).

Although Cantonese females also have the highest SMRs for breast, cervix and uterus, they are all not significantly greater than 100%. Shanmugaratnam (6) reported a significantly higher incidence rate for breast cancer among Cantonese women. This he attributes to the relatively higher proportion of elderly single Cantonese women who migrated into Singapore during the 1930s.

CONCLUSION

The SMRs produced correlate well with hospital and other morbidity findings of ethnic and Chinese dialect group differences in cancer patterns in Singapore. Such variations, unfortunately, may be obliterated with time as more and more inter-group marriages and other forms of socio-cultural exchanges take place. There is thus an urgent need to conduct more case-control studies based on ethnic/dialect groups while they are still discernible.

ACKNOWLEDGEMENTS

This study was supported by a grant from the Singapore Cancer Society. Miss S K Tan typed the manuscript.

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