THE INCIDENCE OF UPPER GASTRO-INTESTINAL DISEASE IN A MALAYSIAN COMMUNITY

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SNOPSIS

The results of 2449 investigations of the upper gastro-intestinal tract were analysed to determine the incidence of disease. Abnormalities were detected in 53% of patients who had endoscopy, but were found in only 24% of patients who had barium studies ($p \leq 0.001$). Altogether 916 patients had abnormal findings. Duodenal ulcer accounted for 42% of cases, gastric ulcer 16% and gastric cancer 9%. The prevalence of perforated ulcer was 13%. The annual incidence/1000 in males and females (>14 years) were respectively, for duodenal ulcer 1.66 and 0.42, for gastric ulcer 0.57 and 0.25, for perforated ulcer 0.36 and 0.05, and for gastric cancer 0.29 and 0.14. Most types of gastro-duodenal disease were less common in Malays than expected ($p = <0.001$). However oesophageal cancer and varices were more common in Indians compared to Malays and Chinese ($p = <0.001$). This study showed that the pattern of perforating ulcers was not the same as that of non-peforating ulcers, suggesting a differing pathogenesis. Identification of the factors causing a different prevalence of disease between the three ethnic groups would help in the understanding of the causes of upper gastrointestinal disease.

INTRODUCTION

Approximately 5 persons in every 1000 of our adult population undergoes one or more types of upper gastro-intestinal investigation every year. In Malaysia it has been estimated that the cost of peptic ulcer disease is $200 million per year in terms of man hours lost (1). Additionally the occurrence of peptic ulcer disease has been increasing between 1960 and 1980 (1). However, with the advent of specific ulcer healing drugs such as H_2 receptor antagonists it would be expected that at least the incidence of haemorrhage and perforation would decrease (2).

Our objectives were firstly, to estimate the annual incidence of symptomatic upper gastro-intestinal disease in our community, secondly, to assess the influence of ethnic origin on the prevalence of disease and thirdly, to audit our methods of investigation.

PATIENTS AND METHODS

Our hospital serves an estimated population of 290,486 persons of whom 51% are Chinese, 36% Malay, 11.7% Indian and 1.3% other ethnic groups. During a 25 month period from January 1982 to January 1984, 2,449 endoscopic, radiologic and operative investigations of the upper gastro-intestinal tract were performed. Oesophago-gastro-duodenoscopy was carried out with forward viewing endoscopes (Olympus Optical Co. Ltd. Tokyo, Japan), using a standard technique. (3) Radiological investigations were performed by a single-contrast barium technique. Operative investigations were those investigations where the diagnosis was made by an operation and was usually performed for perforated ulcers.

A record was made of each patient's identity, age, sex, ethnic grouping, reason for investigation and diagnosis based on one of the above procedures. Patients who had both endoscopic and radiologic investigations were categorised under the diagnosis found at endoscopy. The patient's diagnoses were classified under one of fourteen categories (table 1). The term duodenal ulcer was used to encompass all ulcers occurring in the first part of the duodenum, pyloric canal and prepyloric area.

A sample of 137 patients undergoing endoscopy were questioned about their consumption of Chinese medicines and cigarettes in order to assess the influence of these materials on upper gastro-intestinal disease. A control sample of 197 in-patients were also interviewed about usage of the same materials.

Statistical analysis was performed using the Chi Square test, with Yates's correction in fourfold tables. The S_3 sign test of Cox and Stuart for detection of a monotonic trend was used to analyse the admission pattern for perforated ulcers for the 7 years preceeding March 1984. (4)

Basic demographic data about the population served by Penang General Hospital was obtained from the Population and Housing Census of Malaysia 1980 (5) and the Department of Medical Health and Dentistry, Penang State. This data was used to calculate the age specific annual incidence of various upper gastro-intestinal diseases.

RESULTS

In total 1815 endoscopies, 537 barium studies and 97 operative investigations were performed on 1939 patients. The commonest reasons for endoscopy and radiology were, pain in 52% of patients, gastro-intestinal bleeding in 22.5% and dysphagia in 10.2%. The annual incidence of gastrointestinal bleeding was 1.01 per 1000 (age > 14 years). Pysician endoscopists endoscoped more patients with pain, surgeon endoscopists, more patients with bleeding and radiologists saw more patients with dysphagia (X^2 = 134 p = < 0.001). Of the 1,327 patients who were endoscoped, 697 (53%) had an abnormality detected, however of the 515 patients who had a barium study, only 122 (24%) had abnormal findings (X^2 = 125 p = < 0.001).

The types of diseases detected and the number of patients in each category are given in table 1, while the frequency of the eight commonest diseases are illustrated in figure 1. Seventy six of the 97 operative investigations revealed perforated ulcers, the remaining 21 patients having lesions causing bleeding, gastric outlet obstruction or a perforated gastric carcinoma. Diseases categorised under miscellaneous were, moniliasis 4 cases, duodenal polyp 3 cases, stomal ulcer 2 cases, duodenal cancer 2 cases, pharyngeal cancer 2 cases, gastro-colic fistula 2 cases, gastric polyp 1 case, oesophageal web 1 case, leiomyoma of the stomach 1 case and aspergillosis of the stomach 1 case. There was more than one possible diagnosis in 10 patients and both a duodenal ulcer and gastric ulcer was found in 4 patients.

Active bleeding at the time of endoscopy was observed in only 39 patients with the symptom of

TABLE 1
Diagnostic category ranked in decreasing order of frequency and the number of patients in each category. There were 926 diagnoses in 916 patients.

DIAGNOSIS	NUMBER OF PATIENTS	FREQUENCY
Duodenal ulcer	380	41%
Gastric ulcer	153	17%
Gastric cancer	80	9%
Perforated ulcer	76	8%
Oesophageal cancer	46	5%
Oesophagitis	39	4%
Gastric erosions	35	4%
Oesophageal varices	34	4%
duodenitis	30	3%
Miscellaneous	17	2%
Gastritis	15	2%
Oesophageal stenosis	9	< 1%
Bleeding/pyloric stenosis cause not determined	9	< 1%
Hiatus hernia	6	< 1%

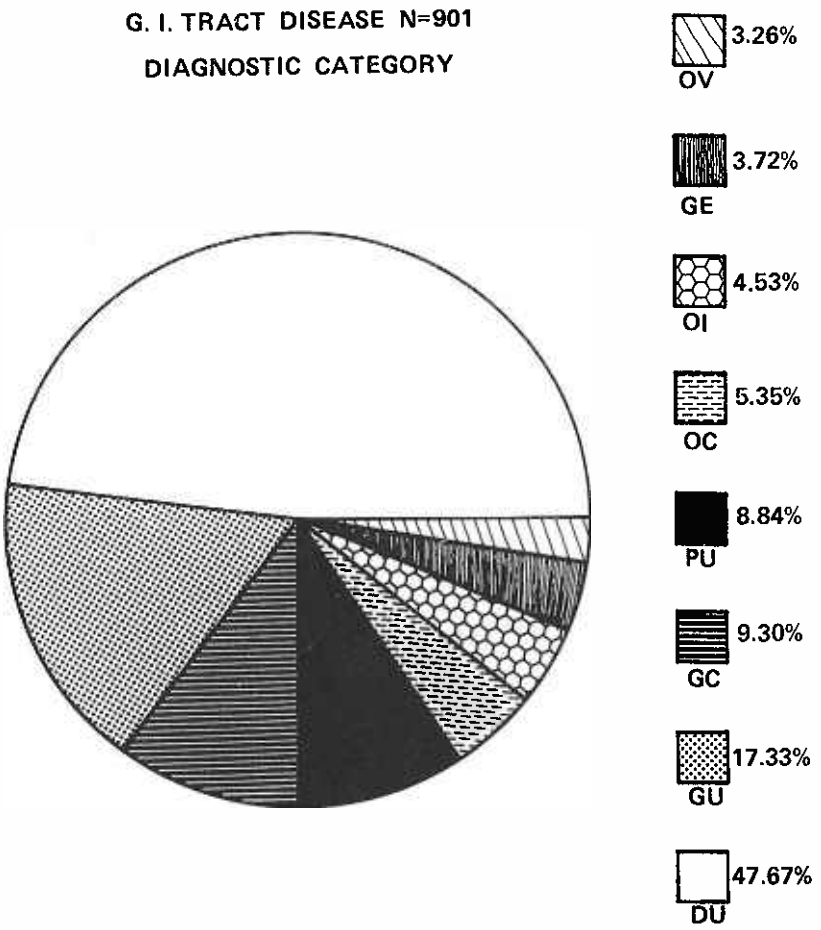

Figure 1.
Proportional representation of the eight commonest upper gastro-intestinal diseases diagnosed, duodenal ulcer (DU), gastric ulcer (GU), gastric cancer (GC), perforated ulcer (PU), oesophageal cancer (OC), oesophagitis (OI), gastric erosions (GE) and oesophageal varices (OV).

bleeding (< 2% of patients with gastrointestinasl bleeding). Thirteen (3%) of 380 patients with duodenal ulcer had pyloric stenosis.

Most types of disease increased in incidence with age. The median age of onset of the 5 commonest diseases are shown in table 2. Duodenal, gastric and perforated ulcers were commonest in the sixth decade and gastric and oesophageal cancers commonest in the seventh decade. The ages of onset in males and females were not significantly different. The age specific incidences for males of duodenal and gastric ulcers and gastric cancer are illustrated in figure 2. In males aged 60 years or above a diagnosis of gastric cancer was equally as likely as 'benign' gastric ulcer. Table 3 shows the age specific incidences of the various diseases. Upper gastro-intestinal diseases were commoner in males than females (X^2 = 229 p = < 0.001). The overall male to female ratio was 3 to 1, but varied from 19 to 1 for oesophageal varices to 0.5 to 1 for oesohageal stenosis (table 3).

The perforation rate for all gastric and duodenal ulcers was 13%. However, although both the number of non-perforating ulcers and perforated ulcers increased with age, there was no constant, proportional relationship between the two types of ulcers (X^2 = 12 p = < 0.01) (figure 3). In addition the male to female ratio for gastric and duodenal ulcers combined was 3.2 to 1, but in perforating ulcers was 7.2 to 1 (X^2 = 4.1 p = < 0.05). Thus perforating ulcers do not have the same epidemiological pattern as non-perforating ulcers.

Observations on 248 patients admitted with a perforated ulcer over a 7 year period did not reveal any significant alteration in trend, regarding the number of admissions per month.

Upper gastro-intestinal disease was much less frequent than expected in Malays, the proportion of patients with disease being 13.8% (expected 36%). In Chinese the proportion with disease was 65% (expected 51%) and in Indians 20.5% (expected 11.7%) (X^2 = 282 p = < 0.001). Other ethnic groups constituted only 0.7% of the 916 patients with abnormal findings. Malays had less gastro-duodenal disease than the other 2 ethnic groups, but Indians had more oesophageal cancer, varices and duodenal ulcers (table 4). This discrepancy is exemplified for duodenal ulcer in figure 4.

Fifty five (40%) of 137 patients endoscoped were smokers and 19 (14%) were consuming Chinese medicines. There was no increase in the prevalence of abnormal findings in the patients who smoked (X^2 = 2.6 p=>0.05). However amongst the patients who were taking Chinese medicine, there was a higer proportion of abnormal results (X^2 = 6.5 p = > 0.01). In the in-

Table 2
Median age in years at time of diagnosis for the five commonest diseases. Values in parenthesis are the age range.

DISEASE	MALE	FEMALE
Duodenal ulcer	51 (11—85)	54 (13—83)
Perforated ulcer	52 (17—83)	55 (21—70)
Gastric ulcer	54 (28—82)	53 (16—87)
Gastric cancer	62 (32—80)	58 (32—74)
Oesophageal cancer	66 (19—83)	62 (37—81)

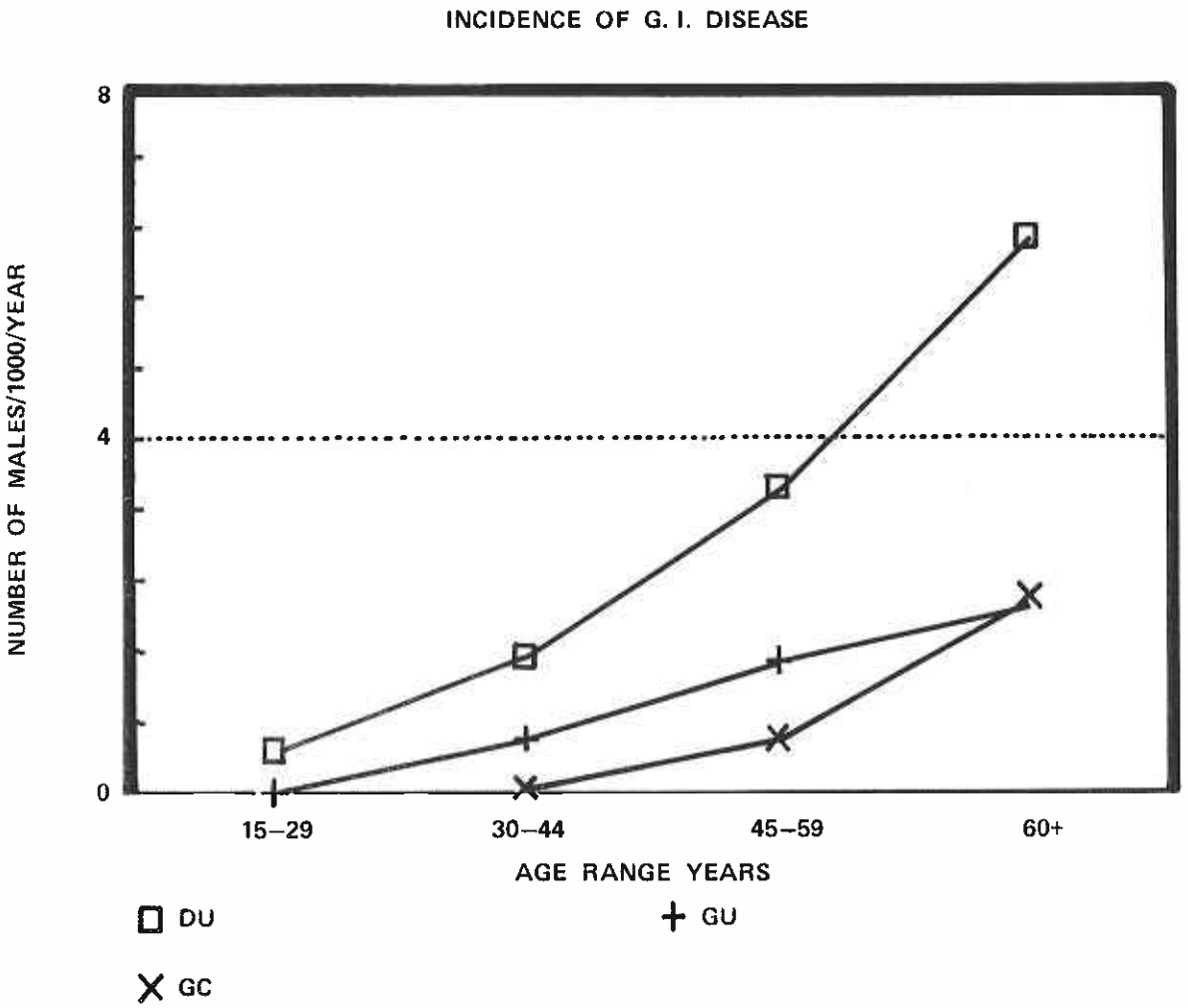

Figure 2
Age specific incidence of duodenal ulcer (DU), gastric ulcer (GU) and gastc cancer (GC) in males.

Table 3

Annual incidence per thousand of the population of symptomatic upper gastrointestinal disease in adults (>14 years) and the male to female sex ratio.

DIAGNOSIS	MALE	FEMALE	TOTAL	RATIO M:F
Duodenal ulcer & duodenitis	1.8	0.45	1.11	4
Duodenal ulcer	1.66	0.42	1.03	4
Gastric ulcer	0.57	0.25	0.40	2.3
Perforated ulcer	0.36	0.05	0.21	7.2
Gastric cancer	0.29	0.14	0.21	2.1
Oesophageal cancer	0.19	0.07	0.13	2.7
Oesophageal varices	0.19	0.01	0.09	19
Gastric erosions	0.11	0.07	0.09	1.6

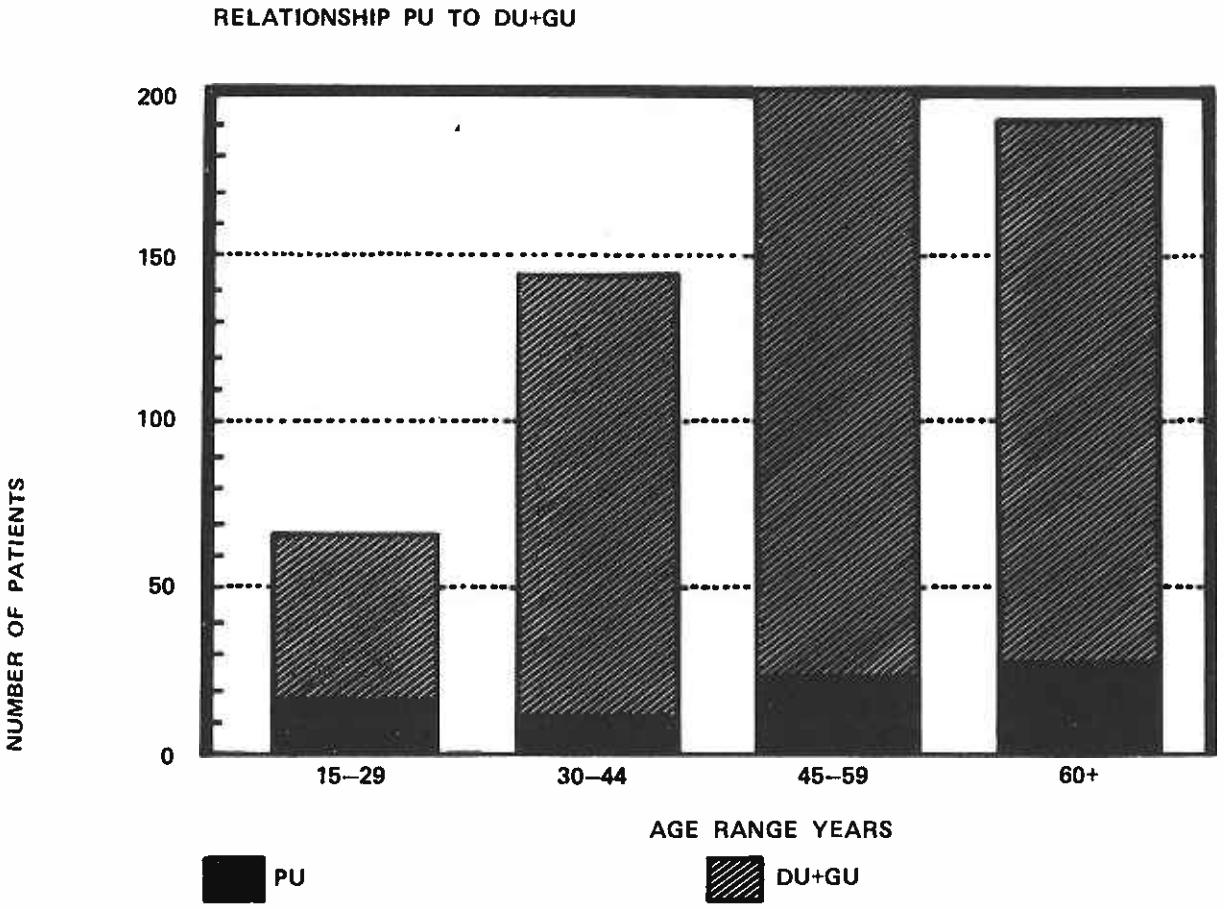

Figure 3.
Relationship between the numbers of patients with perforated ulcers (PU) and the number with non-perforating gastric ulcers (GU) and duodenal ulcers (DU). The latter diseases increased with age, but there was no parallel increase in the number of perforating ulcers ($X^2 = 12$ p =< 0.01).

Table 4

Comparison of the observed frequency of symptomatic upper gastrointestinal disease with that expected from the parent population, in Malay (M), Chinese (C) and Indian (I) ethnic groups. Vertical arrows signify that there is a significant increase in the number of patients from the indicated ethnic group. 'As expected' indicates the X^2 value is not significant. Number in parenthesis are p values.

DISEASE	MALAY/CHINESE	MALAY/INDIAN	CHINESE/INDIAN
Oesophageal cancer	as expected	I ↑ (<0.001)	I ↑ (<0.001)
Oesophageal varices	as expected	I ↑ (<0.001)	I ↑ (<0.01)
Gastric cancer	C ↑ (<0.001)	I ↑ (<0.001)	as expected
Gastric ulcer	C ↑ (<0.001)	as expected	as expected
Duodenal ulcer	C ↑ (<0.001)	I ↑ (<0.001)	I ↑ (<0.05)
Perforated ulcer	C ↑ (<0.005)	I ↑ (<0.001)	as expected

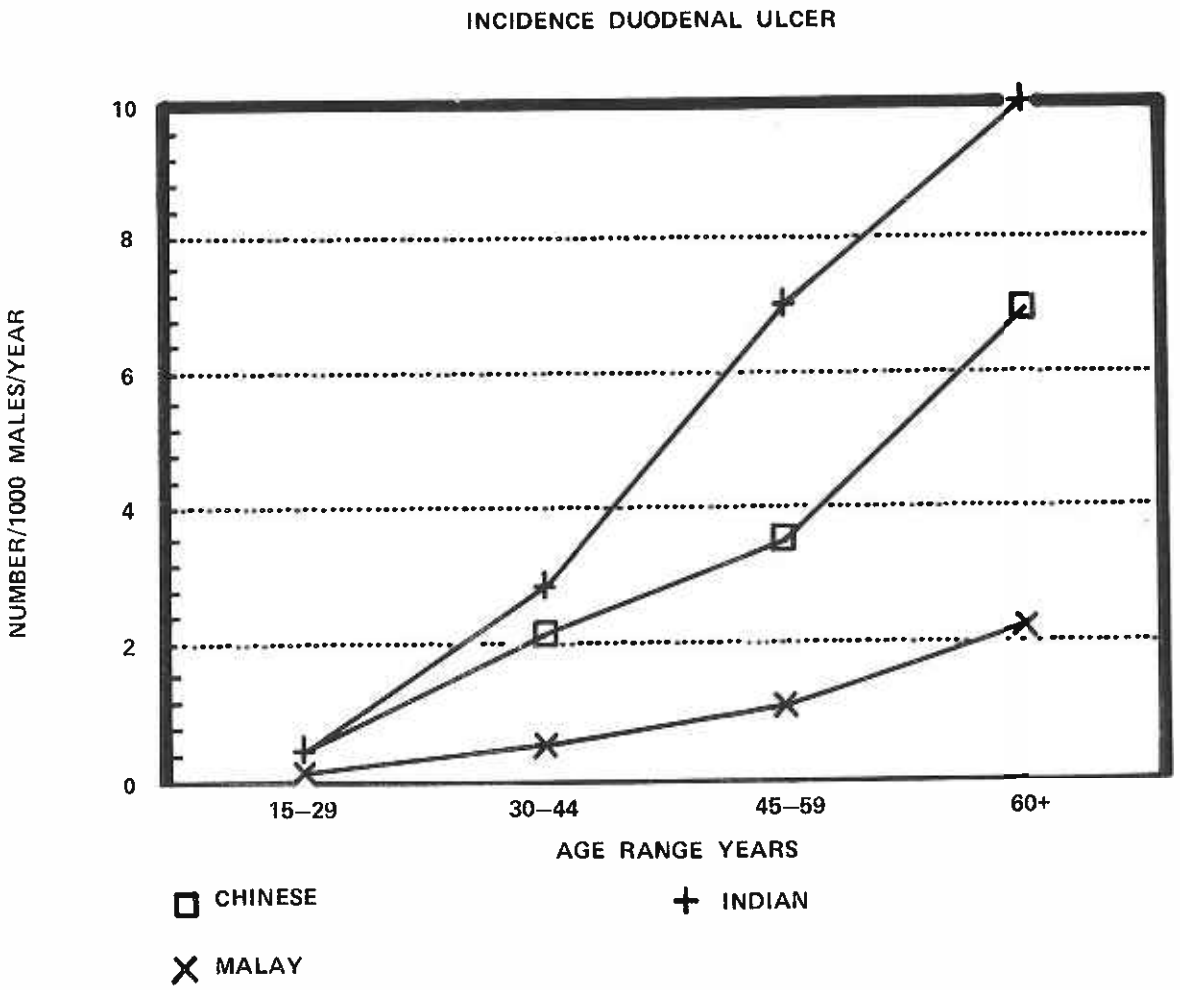

Figure 4.
Age specific incidence in males of duodenal ulcer amongst the three ethnic groups. The number of Malay patients were less and the number of Indian patients more than that expected (X^2 = 112 p = < 0.001).

patient sample only 7% of females were smokers compared to 53% of males. More Malay males smoked than Chinese males ($X^2 = 4$ p = < 0.05).

DISCUSSION

The incidence of upper gastro-intestinal disease in our study is similar to that seen in Western countries. For example the incidence of gastric ulcer was 0.4/1000 compared to 0.34 to 0.45 in Europe. (6) Nevertheless, the incidences quoted in this paper are an underestimate, as firstly, only symptomatic patients were studied, secondly, the study was a hospital patient enquiry and thirdly, endoscopic and radiologic investigations have a false negative rate of upto 10% and 30% respectively. (6)

The reasons for the differing incidences of disease between the sexes and amongst the three main ethnic groups is unclear, but has been described in other studies. (7, 8) Blood group 0 is found more frequently in peptic ulcer disease, but occurs with similar frequency in Malays and Indians and is only slightly increased in Chinese. (9) Blood group A is associated with an increased risk of gastric cancer, but does not differ in frequency between the ethnic groups. (9) Therefore genetic factors as reflected by blood groups are unlikely to explain the differing incidences.

Smoking has been associated with both peptic ulcer disease and oesophageal and gastric cancers. (10, 11) Nevertheless significantly more Malays are smokers (12), but have less gastro-duodenal disease than expected. Overall there was no association between smoking and the occurrence of disease in our patients. Other studies indicate that smoking delays healing of ulcers, but is only a minor factor in their causation. (11)

Consumption of Chinese medicines was associated with a higher proportion of abnormal findings. Such medications can contain aspirin, phenylbutazone and corticosteroids (unpublished observations). However the risk of developing peptic ulcer disease amongst heavy consumers of aspirin is only 0.1/1000/year, while corticosteroids are though to exacerbate and delay healing of ulcers, but not precipitate them. (13, 14) The role of these medicines in perforated ulcers is discussed below.

Admissions for alcohol related diseases, in particular liver cirrhosis, is higher amongst the Indian population. (15) Alcohol could be a reversible environmental factor accounting for the higher incidence of oesophageal cancer, varices and duodenal ulcer within this ethnic group, as alcohol is associated with all three above diseases. (16) In addition betel nut juice has been incriminated as a potential carcinogen causing oesophageal cancer in Indians. (17) Finally, dietary factors such as the intake of salted preserved foods and a low intake of vitamin C are implicated in gastric cancer. (18) These factors could be invoked to explain the higher incidence of gastric cancer amongst Chinese.

The perforation rate of ulcers in Western countries has fallen dramatically such that one surgeon bemoaned that instead of seeing 2 perforations a month, he now only saw 1 perforation every 2 years (19,20). This change in incidence is attributed partly to H_2 antagonists. (2) In our population there appears to be no such change suggesting either that the aeteological factors are still at play or that there is under-use of specific ulcer healing drugs.

The pattern of perforation reported here, that is a male preponderance, a relative excess of patients in the 15 to 29 year age group and predominantly gastric perforations has been described elsewhere in Malaysia. (21, 22) This pattern is not the same as that for non-perforating ulcers suggesting a different aeteology. Aeteological factors quoted are alcohol (23) and chronic aspirin ingestion. (24) In a study performed in our hospital on 60 perforated ulcer patients, more than 50% gave a history of recent ingestion of Chinese medicines (unpublished observations), compared to 7% of in-patients and 14% of patients with upper gastro-intestinal symptoms. This suggests that these preparations may be related to perforation.

Endoscopic investigation had a better detection rate than radiological investigation. Although the patients studied by these two methods were not strictly comparable, as subjects with bleeding were more likely to be endoscoped than X-rayed, but were also more likely to have disease. In addition double-contrast barium meals would have improved diagnostic accuracy (25). Despite this, endoscopy must be the investigation of choice in the middle aged and elderly, in whom the finding of gastric cancer was equally as common as gastric ulcer. Whilst the false negative rate for early gastric cancers is 20%, when investigated by double-contrast barium studies, but only 0 to 10%, when employing endoscopy. (26)

In conclusion we believe that the variation in incidences of disease amongst the ethnic groups could be due to identifiable, reversible, environmental factors. (27) The role of Chinese medicine consumption in perforated peptic ulcer needs further enquiry.

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