

MORTALITY FROM PEPTIC ULCER IN SINGAPORE 1938 — 1980

J Y Kang

SYNOPSIS

A study of peptic ulcer mortality in Singapore from 1938 to 1980 showed a declining trend over this period. However there were two periods of increased incidence in mortality: during the period of the Japanese Occupation and around 1970. The general declining trend parallels findings in Great Britain, United States and West Germany. A stable or increasing incidence of ulcer disease was however reported from Scandinavia, Hong Kong, Greece and Israel. The limitations of death certificate data as an index of peptic ulcer disease are discussed. Further independent data, for example, on ulcer perforations are required to confirm that the incidence of peptic ulcer disease in Singapore has indeed declined.

INTRODUCTION

Data from the United States (1), United Kingdom (2, 3, 4, 5) and West Germany (6) suggests a decline over the last 40 years in the incidence of peptic ulcer disease and mortality arising from it. No significant change, however, occurred in the incidence of gastric ulcer in Scandinavia. (7) A rising trend occurred in Hong Kong (8), Greece (9) and Israel (10). We have studied mortality from peptic ulcer disease in Singapore from 1938 to 1980, using death certificate data.

MATERIALS AND METHODS

Data from the Annual Reports of the Registrar-General of Births, Deaths and Marriages were available for the years 1938 to 1980. Mortality from "ulcer of the stomach", "ulcer of the duodenum" and "peptic ulcer, site unspecified" were considered together. The annual incidences of deaths from peptic ulcer disease per 100,000 population, were calculated from mid-year population estimates available from the Department of Statistics. Sex, age and race-related data were available from 1958 onwards for "ulcer of the stomach" and "ulcer of the duodenum" only. Population figures were not available between 1942 to 1946 but the population during this period was taken to be the average of the 1941 and 1947 figures.

RESULTS

Mortality rates from peptic ulcer disease from 1938 to 1980 are shown in Figure 1. The downward trend is clearly demonstrated, the incidence falling from about 10 per 100,000 per year in the late nineteen forties to under 5 per 100,000 per year in the late nineteen seventies. On top of this general trend, however, there were two periods of excess mortality: from 1942 to 1946 and from 1966 to 1975. When annual standardised death rates for gastric and duodenal ulcers were separately calculated for each race (from 1959 to 1980) and for each sex (from 1954 to 1980), all race-sex groups followed the same general trend. Male mortality was twice that of the female. Mortality was highest for the Chinese, lowest for the Malays with the Indians in between (Table 1).

Department of Medicine II
National University of Singapore
Singapore General Hospital
Outram Road
Singapore 0316

J Y Kang, MB ChB (Hons), MRCP, FRACP
Senior Lecturer

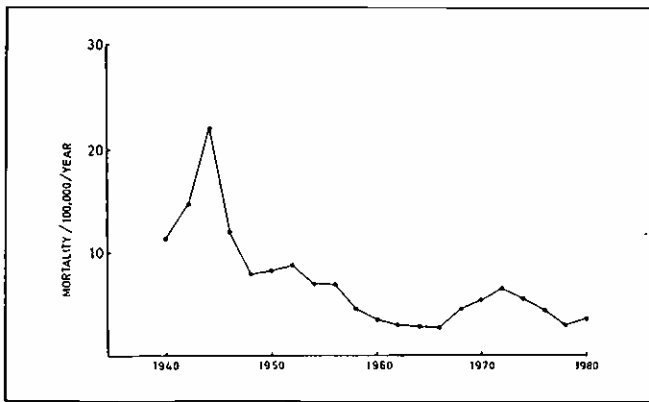


Figure 1: Mortality from peptic ulcer in Singapore. (for clarity, two-yearly averages are shown)

Table 1: Mean Annual Mortality Rate/100,000 population for Gastric and Duodenal Ulcer by Sex and Race 1959 — 1980.

	Malay	Chinese	Indian	All
Male	2.3	6.5	4.3	5.6
Female	1.7	3.0	1.1	2.8

When age and sex specific death rates were calculated from 1957 to 1980, all age-sex groups followed this general downward trend with a peak around 1970. Mortality was higher in the older age groups and the peak mortality around 1970 was most noticeable for the over 65 age groups (Fig. 2).

Deaths from gastritis and duodenitis totalled 460 between 1941 to 1950 compared to 1154 for gastric and duodenal ulcers. After 1950, the incidence dropped sharply and from 1971 to 1980 there were only 22 deaths recorded under this cause, compared with 1,038 for gastric and duodenal ulcers (Table 2). No deaths from gastritis and duodenitis occurred in 1979 or 1980.

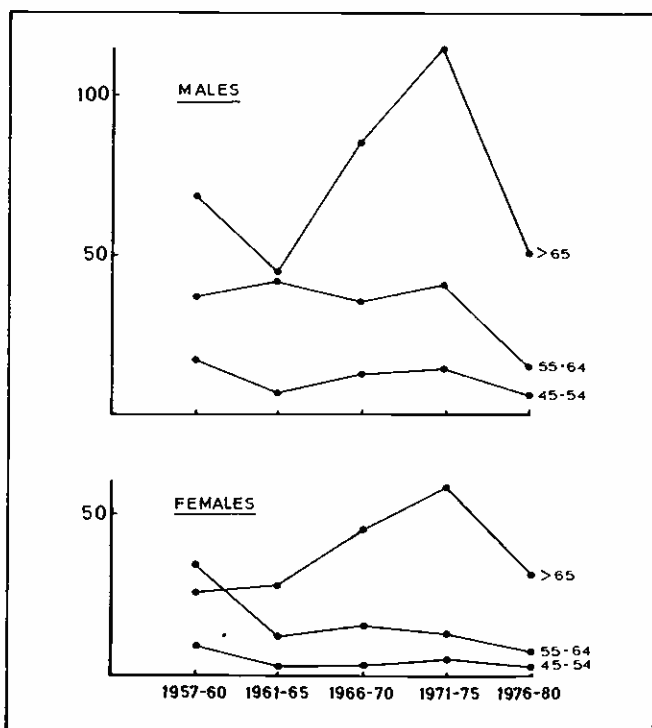


Figure 2: Age-sex specific mortality from peptic ulcer in Singapore.

Table 2: Deaths from Gastritis and Duodenitis 1941 — 1980

	1941-50	1951-60	1961-70	1971-80
Gastritis/duodenitis	460	183	157	22
Peptic ulcer	1154	767	771	1038
Gastritis/ Ulcer ratio	1:2.5	1:4.2	1:4.9	1:47.2

DISCUSSION

Studies from the United States, United Kingdom and West Germany have shown a decline over recent years in the mortality rates, hospital admission rates and morbidity due to peptic ulcer disease. In the United States (1), hospital admissions for duodenal ulcer fell during the period 1970 to 1978, although admissions for gastric ulcers remained stable. The decline in admission rates was greatest for male patients and those with uncomplicated ulcer disease. Death rates fell in both sexes for both gastric and duodenal ulcers over this period.

Coggan et al (2) found a decline in mortality rates and hospital admission rates for peptic ulcer in England and Wales from 1958 to 1977. The decline was, however, more marked in the younger age groups. The mortality and admission rates for duodenal ulcer in elderly women actually showed an increase. Morbidity from peptic ulcer disease fell over the two decades from 1953 to 1972 (3).

In Scotland, a decline in peptic ulcer admissions occurred from 1968 to 1975 (4). This decline involved patients with uncomplicated as well as perforated ulcers. It was particularly marked amongst male duodenal ulcer patients. Mortality rates fell sharply from 1950 but levelled out since 1968. MacKay (5) found that the incidence of ulcer perforations in the west of Scotland fell from the nineteen fifties. The overall incidence of perforation, however, did not change from 1961 to 1971. Since both the male-female and the duodenal ulcer-gastric ulcer ratios have fallen over this time, it seemed likely that the male duodenal ulcer perforations probably continued to fall over the period 1961 to 1971.

In West Germany (6), hospital admissions for peptic ulcer also fell over the period 1952 to 1979. Mortality rates dropped in males for both duodenal and gastric ulcers, but rose slightly in females. The ratio of ulcer to non-ulcer patients being on sick leave, likewise, dropped over this period.

Bonnevie (7) studied the incidence of gastric ulcer in Copenhagen over a five-year period from 1963 to 1968. He concluded after a review of the literature that the incidence of gastric ulcer in Northern Europe had been almost constant since the nineteen forties.

Two recent studies from Hong Kong (8) and Greece (9) had shown a rising trend. In Hong Kong, admission rates for the various sub-groups of peptic ulcer increased by between 23 and 73% over the period 1970 to 1980: although the mortality rates remained stable. In a study from three naval hospitals in Greece, the incidence of perforated duodenal ulcer as well as the total number of operations for duodenal ulcer were shown to have risen from 1961 to 1980. In Israel, mortality from peptic ulcers underwent a two-fold increase from 1949-50 to 1976-77 (10). The reasons for these different time trends are unknown (11). The general declining trend in mortality shown in this study paralleled those in the United States, United Kingdom and West Germany. The increased mortality for peptic ulcer in the male sex and with increasing age confirmed the experience elsewhere. The high incidence amongst the Chinese and the low incidence amongst the Malays has

also been noted previously. (12, 13)

The problems of using mortality statistics in the study of time trends was summarised by Lillienfeld and Lillienfeld (14). Briefly, mortality trends may be artifactual, due to changes in the accuracy of diagnosis and the procedures for registration or classification. Alternatively, mortality trends may be real, due to changes in the incidence or survival-ship of the disease, or a change in the age distribution of the population.

The diagnosis of ulcer disease is inaccurate without autopsy or sophisticated radiological or endoscopic procedures during life. As the use of diagnostic facilities vary, death certificate diagnoses on peptic ulcer may not always be accurate. This is a problem which applies to most studies using death certificate data

Deaths attributed to gastritis and duodenitis have undergone a dramatic decline. This could be the result of changing fashions in diagnosis. Some of the deaths certified as having occurred from gastritis or duodenitis in earlier years might have been deaths from peptic ulcer. In 1979 and 1980, gastrointestinal haemorrhage was listed as a separate cause of death. A recent hospital survey showed that only a minority of deaths from gastrointestinal haemorrhage was due to peptic ulcer disease (15). Even when the total combined incidence of mortality from peptic ulcer, gastritis and duodenitis, and gastrointestinal haemorrhage was considered the overall trend over time remained unchanged. (Fig 3.)

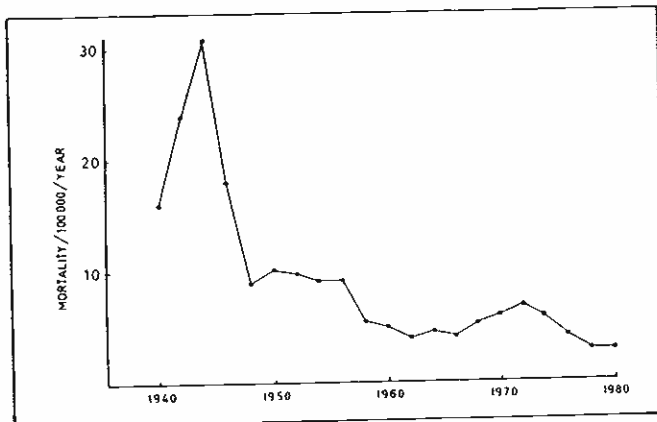


Figure 3 Total Mortality from peptic ulcer, gastritis, duodenitis and gastrointestinal haemorrhage in Singapore (for clarity two-yearly averages are shown).

Gastric carcinoma is another disease which, without sophisticated investigations or autopsy, may be confused with peptic ulcer disease. Mortality rates from gastric carcinoma averaged 10 per 100,000 per year until the early nineteen fifties. Since then it has gone up and stabilised at about 15 per 100,000 per year. When the combined mortality for peptic ulcer disease and gastric carcinoma was studied (Fig. 4) there appears to have been little change since 1946. It is quite possible that the apparent lowering of mortality from peptic ulcer is, in fact, due to the carcinoma patients in earlier years being erroneously diagnosed as peptic ulcer.

The high ulcer mortality during war years was previously noted (16) but an increase in ulcer mortality around 1970 has not been previously reported. In Singapore, the high mortality from peptic ulcer during the war followed a rise in total death rates. Mortality rates from many other diseases, for example, pulmonary tuberculosis and gastroenteritis, showed a similar trend over this period. Interestingly, deaths from gastric carcinoma and also deaths from "all cancers" showed a decline over the War years compared to pre- and post- War periods (Fig. 5).

It is not possible to determine from the present data whether there had been a genuine decline in peptic ulcer

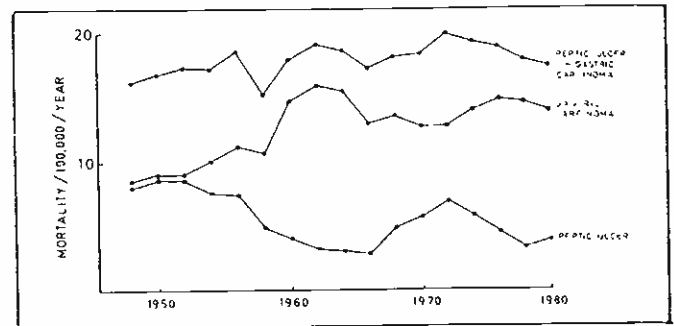


Figure 4 Mortality for peptic ulcer and gastric carcinoma in Singapore (for clarity, two-yearly averages are shown)

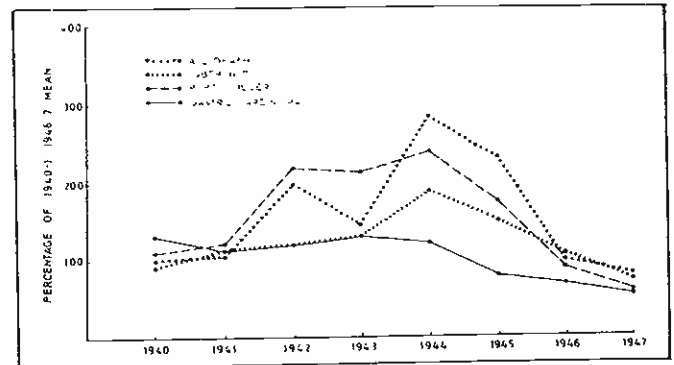


Figure 5 Mortality from peptic ulcer, gastric carcinoma, tuberculosis and all causes in Singapore 1940 — 1947.

mortality or incidence from 1950 to 1980, or whether the decline is an artefact caused by earlier missed diagnosis of gastric carcinoma patients. There is also no obvious explanation for the increase in the number of deaths from 1966 to 1975. A study of ulcer perforation rates over this period is in progress and will help to determine whether the mortality trends here demonstrated are artefactual or real. If the decline in mortality is genuine, it may be due either to a decline in the incidence of the disease or an improvement in the survival ship from improved treatment.

ACKNOWLEDGEMENT

The author would like to thank Professor C S Seah for his help in the preparation of the manuscript.

REFERENCES

1. Elashoff JD, Grossman MI: Trends in hospital admission and death rates for peptic ulcer in the United States from 1970 to 1978. *Gastroenterology* 1980; 78: 280-5.
2. Coggon D, Lambert P, Langman MJS: Twenty years of hospital admissions for peptic ulcer in England and Wales. *Lancet* 1981; i: 1302-4
3. Taylor P. Sickness Absence, facts and misconceptions. *J. Roy. Coll. Physcns, Lond.* 1974; 8:315-33.
4. "What has been happening to peptic ulcer in Scotland?" ISD occasional papers No 2, Scottish Health Service Common Services Agency 1979.
5. Mackay C. Prevalence of peptic ulcer and its complications. *Scot Med J* 1977; 22: 288-9.
6. Sonnenberg A, Fritsch A. Decrease of mortality and prevalence of peptic ulcer disease in Germany 1952 — 1979. *Gastroenterology* 1982; 82: 1185.
7. Bonnevie O. The Incidence of the Gastric Ulcer in Copenhagen County. *Scand J Gastroent* 1975; 10: 231-9
8. Koo J, Lam SK, Ngan NK, Ong GB: Rise in the incidence of peptic ulcer in Hong Kong. *Scand J Gastroent* 1982; 17: Suppl. 78, 147.
9. Nicolopoulos N, Vassilakis J, Mantidis A, Perperas A, Xinos E, Nonsis G: The perforation of duodenal ulcer during the last 20 years as an index of the incidence of duodenal ulcer in the

- Greek Navy. *Scand J Gastroent.* 1982; 17: Suppl. 78, 248.
10. Palgi A: Association between dietary changes and mortality rates; Isreal 1949 — 1977: a trend free regression model: *Am J Clin Nutr* 1981; 34: 1569-83.
 11. Sturdevant RAL: Epidemiology of peptic ulcer: *Am J Epidem.* 1976; 104: 9-14.
 12. Joske RA, Seah CS: The epidemiology of peptic ulcer in Singapore. *Singapore Med J* 1972; 13: 168-71.
 13. Alhady SA: The incidence of peptic ulceration in the three main races of Malaya. *Proceedings, Second Singapore — Malaysian Congress of Medicine* 1965; 2: 146-7.
 14. Lillienfeld AM, Lillienfeld DE: *Foundations of Epidemiology*, second edition, Oxford University Press, New York, Oxford 1980.
 15. Kang JY, Chua CL, Guan R, Lee CN, Mohan C., Ng HS, Ng SK, Teh LP: A six month study of gastrointestinal haemorrhage at Singapore General Hospital. *Sing med J.* 1983; 3: 124-127.
 16. Susser M, Stein. Z: Civilisation and peptic ulcer *Lancet* 1962; i: 115-9: