

Trends of Mortality Rates from Gastric Cancer and Colorectal Cancer in Romania, 1955-2003*

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Abstract

Background. Steady and persisting falls in gastric cancer (GC) mortality rates have been observed worldwide in the last 50 years, and in Romania too. Colorectal cancer (CRC) is presently the most frequent digestive neoplasia in the Western countries. An increase of CRC incidence and mortality rates has been reported recently in Eastern European countries, including Romania. **Methods.** Mortality data from GC and CRC, derived from population based mortality statistics, have been available on a national scale for 1955-2003. The data were identified from the statistics of the Ministry of Health (Bucharest, Romania) and of IARC/OMS (Lyon, France). GC and CRC mortality rates global and/or per gender were registered by time intervals. After 1995, only data on general mortality rates were available. **Results.** Between 1955-59 and 1990-92, GC mortality rates/100 000 decreased from 33.14 to 17.70 in males and from 18.77 to 7.00 in females. Between 1995 and 2003, general mortality rates/100 000 from GC remained stable (17.54 and 17.74, respectively). Between 1955-59 and 1990-92, CRC mortality rates/100,000/gender increased from 4.65 to 10.10 in males and from 4.57 to 7.40 in females. Between 1995 and 2003, CRC general mortality rates/100 000 increased from 14.90 to 19.20. **Conclusions.** Our study reports opposite trends in GC and CRC mortality rates in the period under study, with GC declining and CRC increasing. A male predominance was registered in both neoplasms under study, more obvious in GC (male/female ratio: 2-3/1) than in CRC (male/female ratio: 1.5/1).

Key-words

Gastric cancer - colorectal cancer - mortality

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Rezumat

Premize Mortalitatea prin cancer gastric (CG) a înregistrat un declin constant în lume în ultimii 50 de ani, aspect constatat și în România. Cancerul colorectal (CCR) este în prezent cea mai frecventă neoplazie digestivă în țările vestice. O creștere a incidenței și a mortalității prin CCR a fost observată recent și în țările Europei de Est, inclusiv în România. **Metode.** Datele privitoare la mortalitatea prin CG și CCR au fost extrase din statisticile de mortalitate ale populației și au fost disponibile, pe scară națională, pentru perioada 1955-2003. Datele au fost identificate din statisticile Ministerului Sănătății (București) și ale IARC (Lyon, Franța). Rata mortalității prin CG și CCR, generală și/sau pe sexe, a fost înregistrată în funcție de perioadă. După 1995 au fost disponibile numai datele referitoare la mortalitatea generală. **Rezultate.** În perioada 1955-59 și 1990-92, mortalitatea/100.000 loc/sex prin CG a scăzut de la 33,14 la 17,70 la bărbați și de la 18,77 la 7,00 la femei. Între 1995 și 2003, mortalitatea generală prin CG nu s-a schimbat semnificativ (17,54 și 17,74, respectiv). În perioada 1955-59 și 1990-92, mortalitatea/100.000 loc/sex prin CCR a crescut de la 4,65 la 10,10 la bărbați și de la 4,57 la 7,40 la femei. Mortalitatea generală prin CCR/100 000 a continuat să crească, la 14,90 în 1995 și la 19,20 în 2003. **Concluzii.** Studiul nostru raportează tendințe opuse în evoluția mortalității prin CG și CCR în perioada studiată, cu CG în declin și CCR în creștere. CG și CCR au predominat la bărbați. Predominanța a fost mai evidentă în CG (raport B/F: 2-3/1) decât în CCR (1,5/1).

Introduction

Malignancy is the second commonest cause of death after cardiovascular diseases in the majority of Western European countries. During recent decades, it has become a serious health problem also in Central and Eastern European countries (1-6).

Overall, cancer mortality has declined steadily since the mid-1980s in developed countries, including the European Union (EU), but not in the Accession Countries. In the

European Union, the trends analysed until 1996 showed that, in males, lung cancer and colorectal cancer (CRC) mortality decreased, and there was a steady decline in gastric cancer (GC) mortality. In women, lung cancer mortality increased, but breast cancer, CRC and uterine cancer mortality decreased (2,3). In 1999, overall mortality rates/gender were as follows: EU: 165.6/94.5; Accession Countries: 157.0 to 269.3/93.5 to 138.4 (4). In Romania, cancer mortality rates increased from 125.3 in 1975 to 200.0 in 1994. In the hierarchy of the general causes of mortality in our country, malignant tumours represented the third cause in 1984 (7), but the second cause, after cardio-vascular diseases, in 1995 (8,9).

The development of novel strategies for cancer control largely depends on epidemiological data which accumulated during the past decades. Collecting data on cancer incidence and mortality can serve to guide public institutions in cancer prevention and to generate hypotheses for analytical epidemiological studies. One of the most interesting features of cancer worldwide is the geographical difference in cancer incidence and mortality and their temporal trends. An equal exciting phenomenon is the observation of a temporal trends in cancer distribution, in terms of gender and age, race/ethnicity, but also in cancer histology (6).

Worldwide, GC was the second most common cancer until recently, but now it appears in fourth place. Mortality from GC is still high. The geographical distribution of GC shows a wide variation, with high-risk areas and low-risk areas. GC incidence and mortality rates have been declining for several decades in most populations (10-13).

Overall, CRC incidence is the fourth most common neoplasia in men and the third in women (10,11,13). Mortality is about half the incidence (11). There is a large variation in CRC prevalence worldwide. Incidence rates are highest in the developed countries (13). The study of temporal trends in CRC incidence and mortality shows a trend towards increasing or stabilizing (North and West Europe) and towards declining with time (North America) (11).

The aim of our study was to compare the mortality rates from GC and CRC in Romania during a period of almost half a century, i.e. from 1955 to 2003.

Methods

Mortality data concerning GC and CRC, derived from population based mortality statistics, have been available on a national scale for 1955-2003. The data were identified from the statistics of the Ministry of Health (Bucharest, Romania) (14-17) and from the IARC/OMS data (Lyon, France) (1,18-20). Gastric and colorectal cancer mortality rates/100,000, general and/or per gender, were registered by time intervals. After 1995, only data regarding general mortality rates were available. Even often truncated, a meta-analysis of these data could be relevant regarding the evolution of GC and CRC mortality rates in our geographic area.

Results

Between 1955-59 and 1990-92, GC mortality rates/100,000 decreased from 33.14 to 17.70 in males (47% decrease) and from 18.77 to 7.00 in females (38.5% decrease). Between 1995 and 2003, general mortality rates/100,000 from GC registered no more decrease (17.54 and 17.74, respectively). The decline in GC mortality rates was not constant. Between 1955-59 and 1960-64 and between 1990-92 and 1995 slight increases were recorded. Moreover, after 1995 the mortality rates from GC showed a more stable level (Table I, Fig. 1).

Table I Gastric cancer and colorectal cancer mortality rates between 1955-2003 in Romania (1,14-20)

Year	Gastric cancer Global mortality rate / 100,000	Mortality rate /100.000 M/F	Colorectal cancer Global mortality rate/ 100.000	Mortality rate/ 100,000 M/F
1955-59		33.14/18.77		4.65/4.57
1960-64		37.26/20.94		6.10/6.02
1965-69		32.61/16.32		8.61/5.55
1970-74	24.70	30.06/13.92		6.59/6.20
1975-79		27.65/12.56		7.45/6.46
1980-84	18.70	22.36/9.39		8.65/6.84
1983-87		20.10/8.20		8.80/6.90
1985-89		19.40/7.70		9.60/7.30
1990-92		17.70/7.00		10.10/7.40
1995	17.54	23.71/11.54	14.90	
2000	17.03		16.42	
2003	17.74		19.20	

Colorectal cancer mortality rates constantly increased, more evidently after 1990. Between 1955-59 and 1990-92, CRC mortality rates/100 000 increased from 4.65 to 10.10 in males (34% increase) and from 4.57 to 7.40 in females (38.3% increase). Between 1995 and 2003, CRC general mortality rates/100,000 increased from 14.90 to 19.20 (22.4% increase) (Table I, Fig. 1).

A male predominance was registered in both malignancies under study, more obvious in GC (male/female ratio: 2-3/1) than in CRC (male/female ratio: 1.5/1).

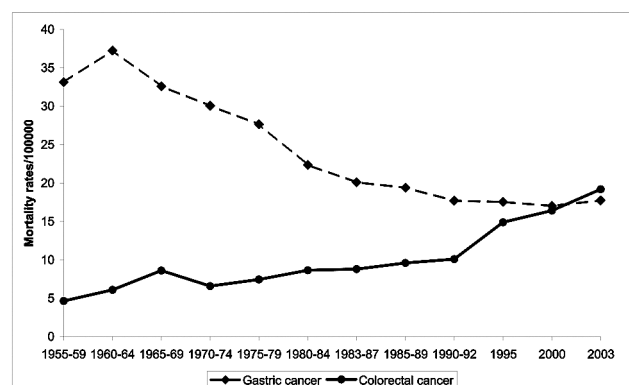


Fig.1 Gastric cancer and colorectal cancer mortality rates between 1955-2003 in Romania (for 1955-59 and 1990-1992, only mortality rates in males are represented) (1,14-20).

Discussion

Our study indicates opposite trends in GC and CRC mortality rates in the period under study, with GC rates declining and CRC increasing. This feature is not unique for Romania. Similar opposite trends were reported in all areas previously known as having high incidence and mortality rates from GC, such as Japan and Central and Eastern Europe.

Worldwide, GC was the second most common cancer until recently, but now it appears in fourth place after cancers of the lung, breast, and colorectum. But GC is still the second most common cause of death from cancer (11). Geographical distribution of GC is characterized by wide regional variations. High-risk areas (age-standardized rate in men $>20/100,000$) include East Asia (China, Japan), Eastern Europe and regions from Central and South America. Incidence rates are low ($<10/100,000$) in America, Australia, New Zealand, North and East Africa, Southern Asia (13).

The incidence of GC is strongly influenced by exogenous and endogenous factors. Areas with high prevalence of GC are likely to be those mostly influenced by exogenous factors, such as nutrition, food conservation and additives, *Helicobacter pylori* infection and low socioeconomic status (1-4, 11-13, 21-25). Changes in exogenous factors are expected to be the most important determinants of the worldwide declining trend in GC incidence (23,24). Areas with low levels of GC are likely to be less influenced by exogenous factors, but rather by known and unknown endogenous genetic or biological factors, such as a family history of GC, a family history of non-polyposis colon cancer syndrome, blood group A (23,24).

In Europe, a steady and persisting decline in rates of GC mortality were also observed. The decrease between 1980 and 1999 was $\sim 50\%$ in the European Union, 45% in Eastern Europe and 40% in Russia (3). The decrease was proportionally greater in the last decade for men (-3.83% per year in the EU) and in the last 25 years for women (-3.67% per year in the EU) than in the previous years (3). Eastern Europe still gathers an intermediate rate of GC mortality (1,2,4,12,20,23,25,26). In Romania, GC was until recently the most frequently diagnosed neoplasia (27-30). After 1995, GC was the second most frequent neoplasia in men (after lung cancer) and the third in women (after breast and uterine cervix cancer) (14,15). A decreasing trend in GC mortality rates was registered in our country too, and this probably started after 1964 (30).

The data of this study, covering a 48 year period, indicate an important decrease in GC mortality rate in our country. Between 1955 and 1990-92, GC mortality rates decreased by 47% in males and by 38.5% in females. The decrease was not linear in our area. Slight increases were registered between 1955 and 1964 and between 1990 and 1995. Curiously, between 1990-92 and 2003 no decrease was registered, CG general mortality rates being more stable in the last 13 years (Table I). Gastric cancer mortality rates have not yet been significantly influenced in our area, in spite of a changing socioeconomic pattern in risk factors

for GC and in health care access and use, including cancer screening.

Overall, CRC is the fourth most common cancer in men and the third in women (13). Incidence rates are highest in the developed countries of North America, Australia and New Zealand, intermediate in areas of Europe, and low in regions of Asia, South America, Africa (13). Worldwide, digestive cancers have actually the highest incidence and mortality. Among digestive cancers, CRC is the most frequent neoplasia in developed countries but only the fourth digestive neoplasia in the developing countries (after cancers of the stomach, liver and esophagus (31). Countries where CRC mortality was low before 1950 have reported substantial increases (13).

The incidence of CRC is thought to be strongly influenced by endogenous and exogenous factors. Family history of CRC in first-degree relatives is the best recognised risk factor, but accounts for less than 5% of cases in population level (13,32).

Time trends in CRC incidence and mortality rates in high-risk areas show a trend towards a slight increase or no change (North and West Europe), or towards decline (North America) (11). In the USA, CRC mortality rates peaked in the mid-1940s ($35/100,000$), were stable for the subsequent decades, before declining in the 1980s and 1990s ($26.1/100,000$). More recently, a decline in CRC incidence in the US has also been observed (33). An appreciable fall in mortality rate from CRC in the European Union was also registered. Between 1960-64 and 1995-99 mortality rate/100,000 of CRC decreased from 20.1 to 16.3 in men and from 14.0 to 10.4 in women (32). A favorable pattern in CRC mortality in both genders was observed in most Northern and Western European countries from the '90s onwards, or even earlier (32), as well as in Japan (34). Colorectal cancer mortality rates were still increasing in Eastern European countries, including Romania, as well as in some Mediterranean countries (32).

In countries where the overall risk was formerly low, incidence and mortality rates from CRC are increasing quite rapidly (11). In Europe, mortality rates from intestinal cancer in the early '80s were lower in the Accession Countries than in European Union. However, trends towards decline were registered in the EU and to increase in the Accession Countries over the last two decades (4). Consequently, in 1999, CRC rates were much higher in Accession Countries than in EU. Mortality rates from CRC/100,000/gender were as follows: EU: 18.8/11.7; Accession Countries: between 17 to 35.8/10.1 to 20.4 (4). Data regarding Romania were not available for this study.

In developed countries, time trends in CRC incidence differ markedly from trends in CRC mortality: mortality decreases, while incidence is increasing/stabilising. The most likely explanation is the increased awareness of the disease, which increases its recognition through screening, early diagnosis, identification of adenocarcinoma in polyps, and at the same time reduces mortality (35-37).

In Romania, in the 1990s, CRC incidence/100,000 was estimated at 10.1 for males and 7.3 for females (38,39). In

1999, CRC was the third neoplasia in men (after lung and stomach cancer) and in women (after breast and uterine cervix cancer) (40). Between 1989 and 1999, CRC incidence increased from 10.1 to 18.5/100,000 (40).

The present study reports the trends in CRC mortality rates over a long period - almost half a century. A constant increase in CRC mortality rates was observed. Between 1955-59 and 1990-92, CRC mortality rates/100 000 increased by 34% in males and by 38.3% in females. Between 1995 and 2003 a further increase in CRC mortality rates of 22.4% was registered.

EUROPREVAL study group defined the different cancer incidence patterns as Western, Eastern or mixed types (41). According to this definition, the incidence patterns of GC and CRC in our area are mixed, between the Western type (i.e. high global incidence, high incidence of CRC, breast cancer, melanoma and leukemia and low incidence of stomach cancer) and the Eastern type (i.e. high incidence of stomach, lung and cervix cancers and low incidence of cancer of the rectum, breast, prostate and melanoma). Similar patterns of cancer incidence have been recorded in Central and Eastern Europe (41).

The reasons for the time trends in GC and CRC mortality rates in our area remain difficult to prove. Both GC and CRC are thought to have a strong environmental influence, especially in terms of dietary and socio-economic status patterns. Geo-physical characteristics, including radioactivity and the effects of the industrialisation have not been studied in relation with GC and CRC. In our country, the prevalence of Hp infection in the adult population was 60-62% in an epidemiological study (42). Could be there an infectious counterpart in relation to CRC, by a direct or indirect influence? Genetic studies in our population could help to distinguish the participation of the heredity versus the environmental component in the development of GC and CRC.

Cancer incidence and mortality patterns reflect, to a certain extent, some basic characteristics of the society, such as life-style factors, population awareness, screening programmes, accessibility to health care and efficacy of health care system. High incidence rates of gastric and intestinal cancer were related to poorer and unfavourable dietary patterns, but also on account of inadequate screening and treatment. Consequently, the application of available knowledge on cancer prevention, diagnosis and treatment may substantially reduce the disadvantage now registered in cancer mortality in our country, as in other countries facing the same problem (4). A better system for collecting the data, including regional/national cancer registries, along with a system for collecting the risk behaviour related to chronic diseases (43) would allow more thorough analytical epidemiological studies.

Conclusion

Our data suggest intermediate mortality rates from GC and CRC in this area. Gastric cancer mortality rates decreased

until the 1990s, but stabilized thereafter. Colorectal cancer mortality rates increased constantly, more evidently during the last decade.

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