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Epidemiology and trend of stomach cancer mortality in Iran (2006-10)

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ABSTRACT

Background and aims: Stomach cancer is one of the most common cancers and the second cause of deaths among cancers worldwide cancer in the world. This study aimed to estimate the rate and trend of death from stomach cancer in Iranian population between 2006 and 2010.
Methods: This study was a cross-sectional conducted using mortality data in Iranian population between 2006 and 2010. The number of deaths, death rate, and sex ratio of mortality, mortality rates by age and gender groups, and trends of mortality from stomach cancer were calculated and reported. Cochrane Armitage test was used for linear trend by Winpepi software to study the trends of Stomach cancer mortality.
Results: The results showed that between 2006 and 2010, 34950 cases of death have been reported from stomach cancer. The mortality rate per 100,000 reached from 11.22 in 2006 to 11.06 in 2010. All years studied indicated that death due to stomach cancer were higher in males than females. Also, with increasing age, the mortality rate of stomach cancer was increased.
Conclusion: Our findings showed the decreasing trend of mortality due to stomach cancer may be due to increasing in lifespan and survival, enjoying the better diagnostic and therapeutic procedures for patients, and underestimation of the number of stomach cancer deaths. Since the cancer is the most frequent cause of death among cancers in Iran, additional investigation is necessary to determine the risk factors of the cancer to decline the mortality rate.

Keywords: Stomach cancer, Trend, Mortality, Iran.

Original article

INTRODUCTION

Cancer is considered as one of the most common causes of death worldwide because it's incidence and prevalence is increasing.[1-4] It is estimated that cancer prevalence increases up to 45% in developing countries by 2025.[5-9] Cancers are important in

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designing and planning health system programs due to irreparable consequences and staggering costs of diagnosis and treatment. More than half of the cancers and 60% of cancer deaths occur in less developed countries, and along with changing lifestyle, similar to the Western countries, cancer incidence is increasing in developing countries.[10]

Among the cancers, gastrointestinal cancer is prevalent in Iranian men while breast cancer is the most common cancer in Iranian women. Based on cancer registry reports in Iran stomach cancer is the most frequent, then the colon and rectum cancers are the most common gastrointestinal cancers.[10] Latest reports indicated that the incidence of stomach cancer is nearly 934,000 cases per year, and the cancer is considered the fourth most common cancer and after lung cancer, the second cause of deaths from cancer in the world.[5] In contrast with the declining trend of stomach cancer worldwide, new cases of the cancer are increasing every year.[11] It also has remained as a public health problem in 21 countries. This could be due to increasing in the human lifespan.[12]

Stomach cancer is one of the most important gastrointestinal tract cancers.[13] According to the estimations of the International Agency for Research on Cancer (IARC) in 2012; stomach cancer is the fourth most common cancer in the world. Half of the cases occur yearly in East Asia and mostly in China. Stomach cancer is third cancer mortality of both sexes in the worldwide. Moreover, in 2012 in Iran Stomach cancer accounted for 11.4% of all cases of cancer occurrence and was considered as the second most prevalent cancer. In the same year, Stomach cancer which accounted for 15.5 percent of all mortalities caused by cancers was in fact the most deadly cancer in Iran.[14-17] The current global trend of stomach cancer incidence has shown a substantial decline since 1975, when stomach cancer was the world's most common cancer.[18] Stomach cancer is much more common in certain Asian, Central European, Central American, and South American countries, especially Japan, Chile, Costa Rica, Hungary, and Poland. The highest incidence of stomach cancer occurs in Japan and Eastern Asia; by contrast, its incidence is relatively low in Western Europe.[19]

Smoking and chronic infections are the most important risk factors for all cancers, especially stomach cancer so that they cause 30% and 10% of all cancers, respectively.[1] Some studies expressed that Helicobacter pylori and poor diet are the most important determinant factor for stomach cancer. Helicobacter pylorus, as one of the most common human infections worldwide, has prevalence of 50% in the world and 90% in developing countries. The prevalence of bacterium is also high in Iran.[20] High-salt diet is another risk factor but a healthy diet, including fresh fruits and vegetables, may reduce the risk of disease.[21]

One of the most important steps in controlling cancer is collecting data on cancer mortality in any country. To evaluate activities for cancer control, monitoring trends in cancer mortality by demographic characteristics and time is necessary. This study aimed to estimate the rate and trend of death from stomach cancer in Iranian population between 2006 and 2010.

METHODS

The present study was a cross-sectional using data on mortality in Iran during 2006-10. Data were collected by Technology and Applied Research and Information Management Center of the Ministry of Health and Medical Education from various sources including National Organization for

Civil Registration, cemeteries, hospitals, and care homes. The necessary data integration has been performed in the Ministry of Health and Medical Education.[22]

In the present study, the data on the number of deaths from Stomach cancer during 2006-10 in 29 provinces of Iran were obtained based on mortality in Iran after removing empty codes, and were entered on a pre-designed form. Meanwhile, cancers were coded based on The International Classification of Diseases for Oncology ICD-O (second edition). The C16 code was given to Stomach cancer. Number of deaths, mortality rate, male/female mortality ratio, and mortality rates in the age and sex groups were calculated and reported. Moreover, a picture of the trend of changes in mortality due to Stomach cancer in Iran was drawn. Charts with excel 2010 software was performed.

Cochrane Armitage test was used for linear trend by Winpepi software 2.1 to study the trends in cancer mortality.

RESULTS

In this study, all data on mortality from stomach cancer was investigated in all sex and age groups between 2006 and 2010. Of 34, 950 deaths from stomach cancer reported, 22,695 cases occurred in men and 12,255 in women. The highest number of deaths in males (6105 cases) and females (4050 cases) was seen in 2010. Overall, the number of deaths was more in men than women and the sex ratio was 1.85.

The results obtained from calculation of mortality rates per 100,000 people showed that the death rates from stomach cancer reached from 11.22 in 2006 to 11.06 in 2010. Mortality rates in all years studied indicated stomach cancer prevalence was higher in males than females. As shown in Table1and Figure1, the mortality rate in males reached from 14.7 per 100,000 people in 2006 to 14.51 per 100,000 people in 2010, while the rate was 7.64 per 100,000 people in 2006 and 7.53 per 100,000 people in 2010 among females.

Table 1: Mortality from stomach cancer per hundred thousand people in the study group sex

Year of study	Mortality per hundred thousand			Crude mortality rate			Sex ratio
	Woman	Men	Total	Woman	Men	Total	
2006	7.64	14.70	11.20	2147	4260	6407	1.98
2007	7.92	15.47	11.75	2075	4159	6234	2.00
2008	7.43	15.09	11.31	1971	4103	6074	2.08
2009	7.49	14.78	11.17	2012	4068	6080	2.02
2010	7.53	15.51	11.06	4050	6105	10155	1.50
Total				12255	22695	34950	1.85

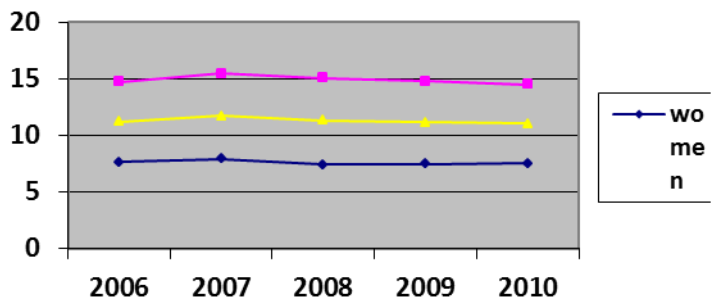

Figure 1: The rate of death from stomach cancer per hundred thousand people in the study group sex

As seen in Table 2 and Figure 2, results in all sex and age groups studied showed with increase in age, the mortality rate of stomach cancer also increases. The lowest mortality rate due to the cancer was observed in the age group of less than 5 years and between 5 to 14 years, but as age increases, the rate increased in people over 70 years. In other words, in men older than 70 years, the mortality rate was increased from 244.85 per 100,000 people in 2006 to 243.44 per 100,000 people in 2010, and in women, the rate was 118.71 per 100,000 in 2006 and 123.84 per 100,000 in 2010.

Table 2: The rate of death from stomach cancer per hundred thousand in the year under study, by sex and age group

Year of Study	Under 5 years			5-14			15-49			50-69			Above 70 years		
	W	M	T	W	M	T	W	M	T	W	M	T	W	M	T
2006	0	0	0	0	0	0	1.47	2.41	1.95	26.62	48.94	37.68	118.71	224.85	175.44
2007	0	0	0	0	0	0	1.66	2.79	2.23	25.14	49.81	37.30	129.49	241.78	189.22
2008	0	0	0	0	0	0	1.43	2.10	1.76	24.74	49.22	36.79	118.92	246.58	186.32
2009	0	0	0	0	0	0	1.20	2.19	1.70	23.15	47.81	35.28	129.07	242.14	188.30
2010	0	0	0	0	0	0	1.45	2.38	1.92	23.38	44.49	33.77	123.84	243.44	185.98

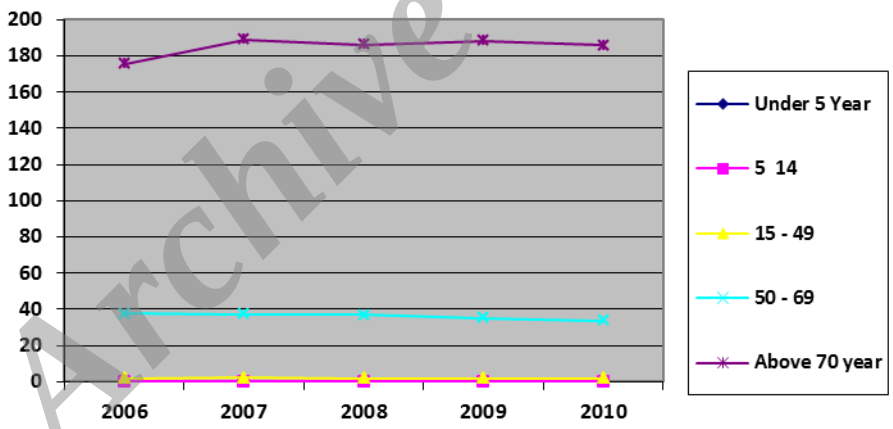

Figure 2: The rate of death from stomach cancer per hundred thousand in the year under study, by sex and age

DISCUSSION

Studies determined that stomach cancer is the most frequent cause of death among cancer from tumor mass in the world and the most frequent cause of death from cancer in Iran. The mortality rate from the cancer was 8.4 per100,000 in East Azerbaijan and north of Iran compared with 3.6 per 100,000 in south of Iran.[23,24] In comparison during the last decades,

the mortality due to the cancer has significantly decreased in most developed countries, in some Asian countries(China, Korea and Japan), East Europe, and South America there is a high prevalence.[25] According to the estimations of the International Agency for Research on Cancer (IARC) in 2012, stomach cancer is the fourth most common cancer in the world. Half of the cases occur yearly in East Asia and mostly in China. Stomach cancer is third cancer mortality of both sexes worldwide. Moreover, in 2012 in Iran Stomach cancer accounted for 11.4% of all cases of cancer occurrence and was considered as the second most prevalent cancer. In the same year, stomach cancer which accounted for 15.5 percent of all mortalities caused by cancers was in fact the most deadly cancer in Iran.[16,17,26] In Iran, while the northern and northwestern regions are high risk areas for gastric cancer, there are several intermediate and low risk populations in other geographical areas.[2] Stomach cancer is the second common cancer in Iranian men and the forth in Iranian women. Its incidence is more in males than females.[27] In Iran, most northern and north western areas are at high risk for stomach cancer, whereas the central and western provinces are at medium risk and the southern regions are at a low risk.[15] The highest incidence of Stomach cancer in the country was seen in Mazandaran, Golestan, and Ardabil provinces but the lowest was reported from the Kerman province.[28] Another study showed that the greatest rate was reported from the Ardebil province and the lowest was observed in Khuzestan and Chaharmahal and Bakhtiari provinces.[29]

Findings indicated that the mortality rate due to stomach cancer has been constant during years of the study. That is, the mortality rate reached from11.22to11.06. Another study revealed that stomach cancer mortality rate has increased from 1.64to9.67 per 100,000 between 1995 and 2003.[30] A study reported that in 2004 deaths from the cancer were 12.02 per100,000.[31] It is also shown that the mortality rate was 15 and 8.1 per 100,000 in men and women, respectively.[32]

In our study, deaths from the cancer were more in patients over 70 years. In other words, as age increases, the mortality rate increases. A study conducted in the Mazandaran province, North of Iran, also emphasized that the mortality rate was more in people over60 than other age groups. As well, the mean age at death was higher for men than women.[33] Our results; similar to some studies showed that sex ratio (male/female) for stomach cancer mortality was 1.85, unlike some studies that reported the sex ratio of males to females as doubled.[32-35]

Etiologic factors related to stomach cancer are unknown but many environmental factors, such as age, sex, blood group, heredity, poor diet, geographical area, smoking, and alcohol, are possible risk factors for developing the cancer.[35,36] Given the significant geographic and ethnic differences in the incidence of stomach cancer in various areas, it can be concluded that the cancer risk is specified to a large extent by environmental factors such as dietary factors and Helicobacter pylori infection.[28] Helicobacter pylori is considered as the most infectious agent for developing stomach cancer.[37,38] The prevalence of this infection is high in Iran.[39] The prevalence of Helicobacter pylori in the developing countries, including Iran, is more than 80% and in developed countries less than 30%.[38] In a population-based study, conducted in Ardebil (a province in West of Iran), 90% of the population at risk of the infection was known and the lowest prevalence of the bacterium was seen in the Sistan and Baluchistan province, south East of Iran, where there is the lowest incidence of stomach cancer.[40,41]

The results obtained from this study is different from other studies regarding mortality from stomach cancer because the findings showed that the mortality rate of the cancer is decreasing, while another study on the data of cancer registry reported an increasing trend related to deaths from the disease.[2,42-44] However, the decrease may be due to increasing lifespan and survival, enjoying the better diagnostic and therapeutic procedures for patients and underestimation of the number of death due to stomach cancer. Since the cancer has the most frequent deaths from cancers in Iran, additional investigation is necessary to determine risk factors of the cancer to reduce the mortality rate. Diagnostic interventions are required to reduce death from this cancer.

Data on cancer mortality can be used to guide policy makers in order to setup cancer

prevention programs. But this aim needs reliable death registry systems which reports death statistics annually. On the other hand, the analysis of death statistic subject to misclassification is a major problem in epidemiological analysis leading to biases estimates, and can therefore cause one to underestimate health risks.[45]

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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