

# Burden of Gastric Cancer: A Case Study of Iran

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## Abstract

**Introduction:** Cancers have come to be one of the most significant causes of mortality in human societies today. Gastric cancer is more likely to cause more disease and more costs to the patient and the health system of the community. The present study was aimed to evaluate the burden of gastric cancer in Iran, Kohgiluyeh & Boyer-Ahmad province in 2015.

**Methods:** The present descriptive cross-sectional study was conducted in Kohgiluyeh & Boyer-Ahmad Province of Iran in 2015. All 110 patients diagnosed with gastric cancer were studied. The patients' characteristics had been recorded in the Iran Cancer Registry System and records of patients with gastric cancer in the Health Department of Yasuj University of Medical Sciences. The required data was collected using a researcher-made data collection form and were analyzed using Excel 2013 software, assuming a zero discount rate and a steady-state weight of the patients' age.

**Results:** The results indicated that the number of disability adjusted life years (DALYs) in the province was 754.03 years (1.06 per 1000 people), which was higher in men (1.44 per 1000) and in the age group of 60-69 years (8.29 per 1000).

**Conclusion:** Considering the significant extent of valuable life years lost due to premature death or disability resulting from gastric cancer in the province, and the severe damage to both the family and the community, paying attention to adopting preventive policies, social and financial support for patients to prepare medicines and accommodation and establishing specialized medical centers in the cities are necessary.

**Key words:** Burden of disease, Gastric cancer, Kohgiluyeh and Boyer-Ahmad Province

## Introduction

The health of the society is persistently altering and is considered as the basis for social and economic development of a society(1). Maintaining and promoting human health is dependent on identifying the status quo and future priorities. Non-communicable diseases, in particular in developing countries, are rapidly replacing infectious diseases and malnutrition and are also at the forefront of the causes of disability and early mortality (2). The results of the leading and most current study of 32 types of cancer in 195 countries show that cancer, after cardiovascular disease, is the most important cause of mortality in the world. Its results indicate a significant rise in the prevalence of cancer from 2005 to 2015, most of which have occurred in underdeveloped countries, so that in these countries new cases of cancer have increased by 50% (3). Gastric cancer is one of the main causes of death from cancer in the present century. Gastric cancer is the second most prevalent cancer in the world, and is the leading cause of death due to cancer in Japan, and is the fourth leading cause of cancer death in European countries(4). Iran likewise has the highest rate of gastric cancer in the Middle East, which is the most common cancer among men(5). The prognosis of this illness and the 5-year survival of this disease is 10-40% in most countries(6). Amongst numerous cancers, gastric cancer imposes more burden of disease on the patients, their families and the health care systems(3).

On the other hand, healthcare managers need to have an indicator for the burden of diseases and injury in order to promote the health and distribution of appropriate health facilities in the community. The index of disability adjusted life years (DALYs) provided by the World Health Organization has this feature. The study of Global Burden of Diseases, for the first time, was the joint project of the World Health Organization, the World Bank and Harvard University, and began in 1988 and calculated the burden of diseases for 1990, and since then several studies have begun in various countries. Now it is repeated in many countries at regular intervals(4). DALY quantifies the total years of life lost (YLL) due to premature mortality and years of life lost due to disability (YLD), and is used for prioritizing health plans(5).

Since 2011, gastric cancer has become more prevalent in the Kohgiluyeh and Boyer-Ahmad province, southwest of Iran. According to the data recorded in the cancer registry system affiliated to the Health Department of Yasuj University of Medical Sciences, in 2015, the total number of cancer patients in the province was 446, of which 155 with gastric cancer, about one-third of all cancers(7). These statistics indicate the ascending trend of this type of cancer in the province, and the continuing trend in the death or disability of the active labor forces at their work ages and its negative outcomes for both the family and the community is very worrying.

There are limited studies on the burden of gastric cancer, which have been reported in some countries or some provinces of Iran, all of which reported a high burden of

gastric cancer (6, 8-10). However, as the researchers did not succeed in finding a study on the burden of gastric cancer in Kohgiluyeh and Boyer-Ahmad province, and in light of the rising trend of this type of cancer in the province, the present study was conducted to investigate the burden of gastric cancer in Iran, Kohgiluyeh and Boyer-Ahmad province in 2015.

## Method

This was a cross-sectional descriptive study conducted in Iran, Kohgiluyeh and Boyer-Ahmad province in 2015. The study population was patients with definite diagnosis of gastric cancer who had been registered in the Iran Cancer Registration. Of the 155 cases registered in this system, 45 cases were excluded due to their chart defects, therefore 110 cases were studied.

In order to collect the necessary data, a researcher-made data collection form was applied which included items associated to the patients' demographic data including gender, age, place of residence, occupation, marital status, year of disease onset, year of death, etc.. In order to estimate the burden of disease of disability adjusted life years (DALYs), the sum of Years of Life Lost due to Premature Mortality (YLLs) and Years of Life Lost due to Disability (YLDs) was calculated. Accordingly, a DALY is one year of life that should be spent in health has been lost due to a disability caused by diseases or injury or because of premature death(11).

To date, several methods have been used to determine the extent of lost years of life, the most prominent of which is the standard Life Expectancy. In this method, standard life expectancy at any age is used to estimate the lost years of life due to death at that age. The highest life expectancy in all nations, is 82.5 years of life expectancy for Japanese women, and has been considered as a standard. Moreover, the study of the Global Burden of Diseases (GBD) has considered the biological difference between women and men for survival as 2.5 years.

It is worth mentioning that, because there is no life table showing the life expectancy of men as 80 years, the life cycle table of the Coale and Demeny West Level for women was used to determine the life expectancy of men in different age groups; that is, the 80-year life expectancy for men is at the level of 25 in this model; therefore, in this study, the levels of 25 and 26 of the combined standard tables of this model were used in which the standard lifetime for all nations (undeveloped, developing and developed countries), has been shown.

Standard expected Years of Life Lost due to Premature Mortality (SEYLLs) is the subtraction of age at death and standard life expectancy for the same age in the same gender, and in fact the total of lives lost in a society is the sum of standard life expectancy for lives lost in that community(12).

In order to calculate the burden of diseases, for each level of disability associated with a disease or its outcome, a certain weight is set between zero and one, in which zero

means complete health and one means death. In order to calculate the YLDs, the length of time that a person lives with that disability is multiplied by the weight of that disability. Then, this is accumulated with the years YLLs due to the same cause and disease(12).

As mentioned above, the difference between the life expectancy of women and men in determining the burden of gastric cancer was 2.5 years(13).

YLDs and DALYs were estimated using Excel 2013, assuming a zero discount rate and a steady-weight of patients' age. This study was approved by the Medical Ethics Committee of Shiraz University of Medical Sciences (Project code: 95-01-07-11299). Written informed consent was obtained from all patients in order to participate in this study. Meanwhile, the confidentiality of their data and information was assured.

## Findings

The results showed that the majority of 110 patients diagnosed with gastric cancer were male (77.3%), in the age group of 55-65 (39.1%), married (99.1%), illiterate or had elementary education (77.3%), and had rural health insurance coverage (48.2%), no complementary insurance coverage (80.9%), malignant tumors (60%), and their disease started in 2015 (59.1%). It should be noted that of the 110 patients under study, 32 patients died in 2015.

Findings related to YLLs showed that total YLLs in male patients was 262 years (0.72 per 1000). The highest YLLs among men was 7.65 years per 1000 which was related to the 60-69 age group and the lowest one was related to the age group over 80 years (-3.18 per 1000). In the present study, the total YLLs in women patients was 115 years (0.33 per 1,000). The highest YLLs among women was related to the 45-59 age group (2.07 per 1,000), and the lowest was related to the age group over 80 years (1.23 per 1000). In general and in all patients studied, the total YLLs was estimated at 377 years (0.53 per 1000), and the highest and the lowest were related to the 60-69 age group (4.41 per 1000) and the age group over 80 years (-2.97 per 1000) (Table 1).

**Table 1: Years of Life Lost due to Premature Mortality (YLLs) in the studied patients by age and sex in Kohgiluyeh and Boyer-Ahmad province, 2015**

Age groups	Men				Women				Total			
	Population	Number of deaths	YLLs	YLL per 1000	Population	Number of deaths	YLLs	YLL per 1000	Population	Number of deaths	YLLs	YLL per 1000
0-4	3805	0	0	0	35642	0	0	0	73709	0	0	0
5-14	62208	0	0	0	59330	0	0	0	121538	0	0	0
15-29	99498	0	0	0	98155	0	0	0	197653	0	0	0
30-44	90499	0	0	0	89782	0	0	0	180281	0	0	0
45-59	44671	5	139	3.11	44298	3	91.5	2.07	88969	8	230.5	2.59
60-69	14116	7	108	7.65	14594	1	18.5	1.27	28710	8	126.5	4.41
70-79	7286	7	47	6.45	5826	0	0	0	13112	7	47	3.58
+80	5023	7	-32	-3.018	4057	2	5	1.23	9080	9	-27	-2.97
Total	361386	26	262	0.72	351666	6	115	0.33	713052	32	377	0.53

The total YLDs in male patients was estimated to be 258.663 years (0.715 per 1000). The highest and lowest YLDs were related to the 60-69 age group (6.65 per 1000) and the age group over 80 years (-0.216 per 1000). The total YLDs among women was estimated to be 117.28 years (0.33 per 1000) and the highest and lowest among the women were related to the 45-59 age group (2.1 in 1000) and 30-44 age group (0.09 per 1000). In general, the total YLDs among all studied patients was 377.03 years (0.53 per 1000) and the highest and lowest YLDs were related to the 60-69 age group (3.82 per 1000 people) and the age group over 80 years (-0.12 per 1000) (Table 2 - next page).

Finally, the total DALYs in men was estimated to be 520.66 years (1.44 in 1000) and the highest and lowest were related to the 60-69 age group (14.31 per 1000) and the age group over 80 years (-6.59 per 1000). The total DALYs among women was estimated to be 232.28 years (0.66 per 1000) and the highest and lowest were for the 45-59 age group (4.17 per 1000) and 30-44 age group (0.1 per 1000 people). In general, the total DALYs in Kohgiluyeh and Boyer-Ahmad province was estimated to be 754.03 years (1.06 per 1000), with the highest and lowest among the patients in the 69-60 age group (8.22 out of 1000) and the age group over 80 years (-3.09 per 1000) (Table 3).

**Table 2: Years of Life Lost due to Disability (YLDs) in patients by sex and age group in Kohgiluyeh and Boyer-Ahmad province, 2015**

Age groups	Sex	Men				Women				Total			
		Pop.	Occ.	YLDs	YLD per 1000	Pop.	Occ.	YLDs	YLD per 1000	Pop.	Occ.	YLDs	YLD per 1000
0-4		3805	0	0	0	35624	0	0	0	73709	0	0	0
5-14		62208	0	0	0	59330	0	0	0	121538	0	0	0
15-29		99498	0	0	0	98155	0	0	0	197653	0	0	0
30-44		90499	2	16.93	0.187	89782	1	8.57	0.09	180281	3	25.5	0.14
45-59		44671	25	143.654	3.21	44298	14	93.093	2.1	88969	39	236.75	2.66
60-69		14116	26	93.96	6.65	14594	4	15.62	1.07	28710	30	109.58	3.82
70-79		7286	4	5.208	0.71	5826	0	0	0	13112	4	5.208	0.4
+80		5023	2	-1.085	-0.216	4057	0	0	0	9080	2	-1.085	-0.12
Total		361386	59	258.663	0.715	351666	19	117.28	0.33	713052	78	377.03	0.53

\*: Weight of disability=0.217; Pop.: Population; Occ.: Occurrence

**Table 3: DALYs in the studied patients by age group and sex in in Kohgiluyeh and Boyer-Ahmad province, 2015**

Age groups	Men			Women			Total		
	Population	DALYs	DALYs per 1000	Population	DALYs	DALYs per 1000	Population	DALYs	DALYs per 1000
0-4	3805	0	0	35642	0	0	73709	0	0
5-14	62208	0	0	59330	0	0	121538	0	0
15-29	99498	0	0	98155	0	0	197653	0	0
30-44	90499	16.93	0.19	89782	8.57	0.1	180281	25.50	0.14
45-59	44671	285.65	6.33	44298	184.59	4.17	88969	467.25	5.25
60-69	14116	201.96	14.31	14594	34.12	2.34	28710	236.08	8.22
70-79	7286	52.21	7.17	5826	0	0	13112	52.21	3.98
+80	5023	-33.09	-6.59	4057	0	0	9080	-28.09	-3.09
Total	361386	520.66	1.44	351666	232.28	0.66	713052	754.03	1.06

## Discussion

In the present study, the majority of patients were male, in the 55-65 age group, married, and had malignant tumors. These results are consistent with the findings of similar studies in the country, including those of Khasi et al. (2016)(10) , Rajaeifard et al. (2009)(12) , Ramesht et al. (2015) (13), and Bazyar et al.'s (2011)(2).

Also, the results indicated that YLLs in men was higher than women (262 versus 115 years). The highest and lowest YLLs among men were in the 60-69 age group and the age group over 80 years, and among women in the 45- 59 age group and in the age group over 80 years. In general and in all the studied patients, YLLs was estimated to be 377 years, the highest and lowest of which were related to the 69-60 age group and the age group above 80 years.

The YLDs in men was higher than women (258.663 versus 117.28 years). The highest and the lowest YLDs among men were in the 60-69 age group and in the age group over 80

years, and among women were related to the 45-59 age group and the 30-44 age group. In general, the YLDs among all studied patients was 377.03 years. The highest and lowest ones were related to the 60-69 age group and the age group over 80 years.

Finally, according to the results, the DALYs among men was higher than women (520.66 vs. 232.28 years), and the highest and lowest DALYs among men were related to the 60-69 age group and the age group over 80 years, and among women were related to the 45-59 age group and the 30-44 age group. Overall, in the total population studied, the DALYs was estimated to be 754.03 years, with the highest and lowest related to the 60-69 age group and the age group over 80 years.

In the study of Haji Vandy et al. (2011)(1) , which was conducted in Bushehr province with the aim of calculating YLLs of different diseases, the results showed that the YLLs per 1000 for cancers was 4.5 years(7). In a study conducted by Faghihi et al. (2015)(4), the YLLs per 1000 in

Qazvin province for all cancers in 2004 to 2008 were 574.42, 549.99, 513.69, 657.8 and 678.2 years. In the González-León et al.'s study (2016)(6), with the exception of breast and prostate cancers for which YLDs were greater than 50% of DALYs, the highest share of DALYs in other cancers was associated with YLLs, so that in some cases were more than 90% of DALYs(12).\

The results of these three studies are not consistent with the results of the present study. One reason for these differences can be due to the calculation of the burden of diseases in these three studies for various cancer diseases, while in the present study only gastric cancer has been considered. Also, the differences in the prevalence of cancerous diseases, especially gastric cancer, and the patients' ages in the studied regions in these three studies were different from those in the present study. In addition, the observed differences can be due to differences in geographical, economic and social conditions in the studied regions and provinces.

## Conclusions

According to the findings, the DALYs in the Kohgiluyeh and Boyer-Ahmad province was 754.03 years (1.06 per 1000 people), which was higher in men and in the 60-69 age group than others. Considering the high amount of DALYs due to gastric cancer in this province and the irreparable damage to both patients and their families and the community, health managers and health planners should minimize the damage through providing preventive policies and holding related workshops. Also, they should reduce the costs and economic burdens imposed on the patients and their families and improve their quality of life by offering social and financial support of patients for preparing medicines and accommodation and establishing the specialized medical centers in the cities.

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