



Cancer Data, Case Increase Rates and Future Prospects in the Northeastern Anatolia Region of Türkiye, a Special Region for Gastric and Esophageal Cancers in 2018-2023

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Abstract

Aim: Cancer is a major cause of death. Globocan data shows 20 million new cancer cases and 9.7 million cancer deaths a year. Lung cancer is the most common cancer globally, followed by breast, colorectal, prostate and stomach cancers. Cancer types vary by age, gender, race, and region. Documenting regional cancer data is crucial for screening, early diagnosis, and treatment of common cancers, as well as understanding the underlying causes. Despite the high incidence of upper gastrointestinal (GI) cancers in eastern Türkiye, there is little documented evidence on specific cancer types in these regions.

Material and Method: In order to investigate the incidence of cancer in our region, the medical records of 6,603 patients diagnosed with cancer and subsequently treated in our clinic between 2018 and 2023 were analysed and specific cancer sites were recorded.

Results: It has been demonstrated that cancers of the upper GI tract, represent the most prevalent cancer site, accounting for 21.2% (n=1403) of all cases. This equates to one in every five patients diagnosed with cancer. Additionally, significant findings were yielded with respect to other forms of cancer.

Conclusion: It is imperative to document these data to highlight the necessity for investigating and preventing the underlying causes of upper GI cancer in our region. Furthermore, the establishment of screening programs for early diagnosis and intensified research on treatment modalities are crucial steps in combating this disease.

Keywords: Cancer data in Northeast Anatolia, stomach and oesophageal cancer in Northeast Anatolia, Asian belt

INTRODUCTION

The incidence of cancer has reached a level that represents a significant public health and economic concern, largely due to the growth of the elderly population and the multiplicity of potential etiologic factors. Cancer currently accounts for the second-highest mortality rate, trailing only that of cardiovascular diseases (1). According to Globocan data, there will be 20 million new cancer cases, including non-melanoma skin cancers, and 9.7 million cancer-related deaths in 2022 (2). Among all cancer cases worldwide, lung cancer is the most common cancer with 12.4%, followed by breast (11.6%), colorectal (9.6%), prostate (7.3%) and stomach (4.9%) cancers (2). The incidence of specific cancer types may vary according to age, gender, ethnicity, and geographical region (3). It is of great importance to have access to regional cancer statistics and to be able to calculate the estimated future incidence and prevalence in order to meet the

needs for screening, early diagnosis, and treatment of regionally common cancers and to elucidate the etiologic factors. The East-Northeast Anatolia region of Türkiye is notable for its elevated incidence of cancers of the upper gastrointestinal (GI) tract (stomach, gastroesophageal junction, and esophagus). These cancers represent the most common malignancies in the region, yet the underlying etiologic factors remain unclear (4,5). The analysis of cancer statistics at the regional level can inform the development of an effective regional cancer policy and facilitate the investigation and elucidation of potential etiological causes.

Purpose

The objective of our study was to document cancer data, demonstrate the changes in the incidence of cancer types over the past five years, and calculate the estimated number of cases in the future in our region, where upper GI cancers are highly prevalent.

CITATION

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MATERIAL AND METHOD

For this purpose, it was planned to retrospectively record the cancer sites of a total of 6,603 patients who applied to our center between 2018 and 2023, according to years and gender. It was not possible to obtain informed consent from the patients, as the data were obtained retrospectively by means of a file review. Ethics committee approval dated 27.09.2024 and numbered B.30.2.ATA.0.01.00/538 was obtained for our study. The medical records of patients between the ages of 18 and 80 years were reviewed, and the locations of the cancers were documented. Hematologic malignancies were excluded from the analysis. The data were statistically analyzed using the IBM SPSS Statistics 20 program.

RESULTS

A review of the data from the previous five years revealed that lung cancers constituted the most prevalent cancer type, accounting for 17.02% (n=1124) of the total 6603 cancer cases. This was followed by breast cancers (16.7%, n=1108), stomach cancers (13.07%), and colorectal cancers (9.7%, n=643), esophageal (5.8%, n=384), prostate (5.0%, n=331) and ovarian (3.83%, n=253) cancers. Upper GI cancers (stomach and esophagus) were the most prevalent, accounting for 21.2% (n=1403) of the total cases (Figure 1).

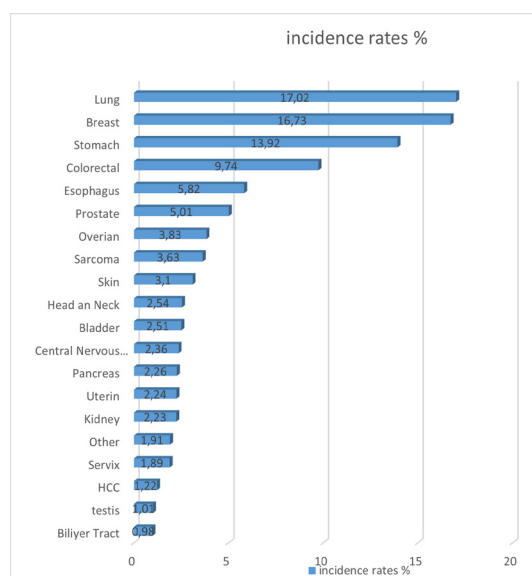


Figure 1. The most common types of cancer in 2018-2023

Over the past five years, 52.8% of all cases were diagnosed in males, while 47.2% were diagnosed in females. Amongst the male population, lung cancer was the most prevalent form of cancer, accounting for 28.27% of cases (n=966). Subsequently, stomach (17.4%, n=595), colorectal (10.39%, n=355), prostate (9.69%, n=331), and esophageal cancers (4.86%, n=166) were the next most prevalent. Upper GI cancers constituted 22.27% (n=761) of all cases (Table 1).

Table 1. Ranking of the most common cancers in women and men in the last 5 years

Women (n=3060)			Men (n=3417)		
	n	%		n	%
Breast	1093	35.72	Lung	966	28.27
Stomach	324	10.59	Stomach	595	17.41
Colorectal	288	9.41	Colorectal	355	10.39
Overian	253	8.27	Prostate	331	9.69
Ezophagus	218	7.12	Ezophagus	166	4.86
Lung	158	5.16	Bladder	148	4.33
Uterin	148	4.84	Head&Neck	146	4.27
Servix	125	4.08	Sarcoma	137	4.01
Sarcoma	103	3.37	Skin	128	3.75
Skin	77	2.52	Kidney	104	3.04
Central Nervous	73	2.39	Pancreas	84	2.46
Pancreas	65	2.12	Central Nervous	83	2.43
Kidney	43	1.41	Testis	67	1.96
Biliyer Tract	32	1.05	HCC	59	1.73
Head&Neck	22	0.72	Biliyer Tract	33	0.97
HCC	20	0.65	Breast	15	0.44
Bladder	18	0.59			

Among women, breast cancers constituted more than one-third of all cases, with a rate of 35.72% (n=1093). The next most common cancers were gastric (10.59%, n=324), colorectal (9.41%, n=288), ovarian (8.27%, n=253), esophageal (7.12%, n=218), and lung cancers (5.16%, n=158) (Table 1). Upper GI cancers constituted 17.71%

(n=542) of all cases.

The male-to-female ratios within cancer types, changes in the number of cases over time, and projected future case rates were assessed. The evaluation of upper GI cancers over the past five years revealed that approximately two-

thirds (64.7%) of gastric cancer cases were males and one-third (35.3%) were females. In contrast, the majority of oesophageal cancers were female (56.8%). The total number of cases, the proportion of cases between the male and female sexes, and the distribution in the coming years are illustrated in the graph below (Figure 2).

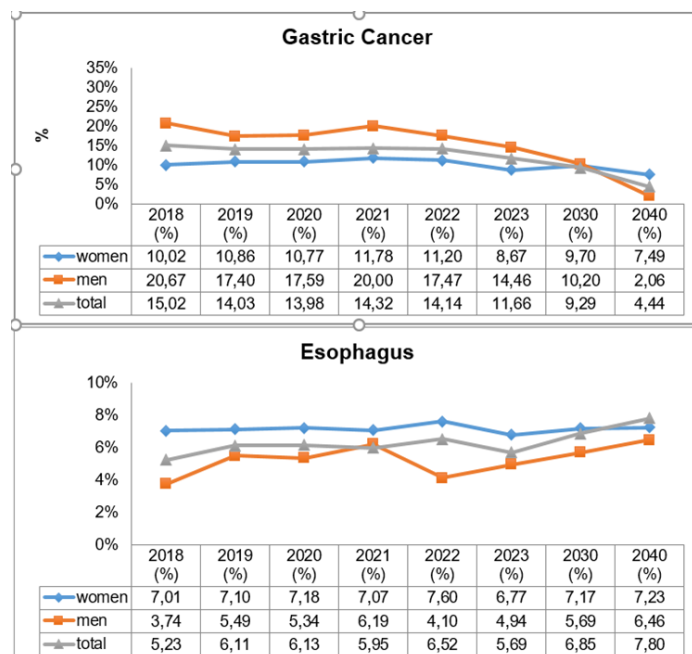


Figure 2. Changes in the ratios of male to female rates of upper GI cancers by years and estimated case rates in the future

Over the past five years, 14.1% of lung cancer cases were diagnosed in women, while 85.9% were diagnosed in men. When analysed by year, the rates remained consistent. There was no significant change in the number of cases or rates between 2018 and 2023, and it was predicted that similar rates would be observed in the coming years (Figure 3).

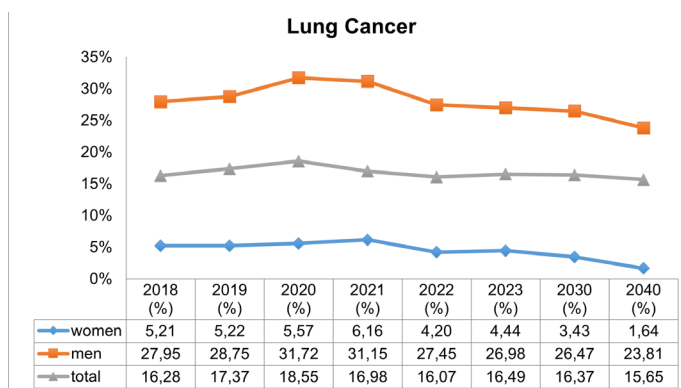


Figure 3 Changes in the ratios of male to female rates of lung cancers by years and estimated case rates in the future

A review of data on other cancers revealed a twofold increase in the number of prostate cancer cases in men between 2018 and 2023. Similarly, there was an approximately two-fold increase in cervical cancer cases in women. The table below (Table 2) provides a detailed overview of the number of cases in all cancers according to years and future predictions.

Table 2. Estimated expected case rates in 2030-2040 based on total female to male ratios, annual number of cases, five-year incidence change and rate of increase in all cancers

	2018		2019		2020		2021		2022		2023		2030 (%)*	2040 (%)*
	n	%	n	%	n	%	n	%	n	%	n	%		
Lung														
Women	26	5.2	25	5.2	31	5.6	34	6.2	21	4.2	21	4.4	3.43	1.64
Men	142	28.0	157	28.8	184	31.7	176	31.2	154	27.5	153	27.0	26.47	23.81
Total	168	16.3	182	17.4	215	18.6	211	17.0	175	16.1	174	16.5	16.37	15.65
Stomach														
Women	50	10.02	52	10.86	60	10.77	65	11.78	56	11.20	41	8.67	9.70	7.49
Men	105	20.67	95	17.40	102	17.59	113	20.00	98	17.47	82	14.46	10.20	2.06
Total	155	15.02	147	14.03	162	13.98	178	14.32	154	14.14	123	11.66	9.29	4.44
Ezophagus														
Women	35	7.01	34	7.10	40	7.18	39	7.07	38	7.60	32	6.77	7.17	7.23
Men	19	3.74	30	5.49	31	5.34	35	6.19	23	4.10	28	4.94	5.69	6.46
Total	54	5.23	64	6.11	71	6.13	74	5.95	71	6.52	60	5.69	6.85	7.80
Colorectal														
Women	38	7.62	38	7.93	54	9.69	56	10.14	55	11.00	47	9.94	15.16	21.23
Men	53	10.43	74	13.55	57	9.83	63	11.15	57	10.16	51	8.99	6.33	1.74
Total	91	8.82	114	10.88	111	9.58	119	9.57	112	10.28	98	9.29	9.88	10.04
Breast														
Women	207	41.48	169	35.28	190	34.11	181	32.79	170	34.00	176	37.21	28.62	21.04
Men	2	0.39	0	0.00	3	0.52	7	1.24	1	0.18	2	0.35	0.73	1.04
Total	209	20.25	169	16.13	193	16.65	188	15.12	171	15.70	178	16.87	11.43	5.80

* These predictions were made using the Linear Regression Model

Table 2. Estimated expected case rates in 2030-2040 based on total female to male ratios, annual number of cases, five-year incidence change and rate of increase in all cancers

	2018		2019		2020		2021		2022		2023		2030	2040
	n	%	n	%	n	%	n	%	n	%	n	%	(%)*	(%)*
Prostate														
Men	39	7.7	60	11.0	44	7.6	73	12.9	58	10.3	57	10.1	14.06	18.41
Total	39	3.8	60	5.7	44	3.8	73	5.9	58	5.3	57	5.4	7.42	9.98
Ovarian														
Women	45	9.02	43	8.98	49	8.80	38	6.88	39	7.80	39	8.25	5.76	3.10
Total	45	4.36	43	4.10	49	4.23	38	3.06	39	3.58	39	3.70	2.20	0.48
Uterin														
Women	21	4.21	26	5.43	28	5.03	24	4.35	23	4.60	26	5.50	5.71	6.57
Total	21	2.03	26	2.48	28	2.42	24	1.93	23	2.11	26	2.46	2.39	2.54
Servix														
Women	14	2.81	16	3.34	21	3.77	25	4.53	28	5.60	21	4.44	8.34	12.82
Total	14	1.36	16	1.53	21	1.81	25	2.01	28	2.57	21	1.99	3.63	5.48

* These predictions were made using the Linear Regression Model

DISCUSSION

According to Globocan 2022 data, lung cancers are the most common all over the world. Together with lung cancers, breast, colorectal, prostate and stomach cancers constitute the five most common cancer types (2). Similarly, in our study, lung and breast cancers were in the first two ranks, gastric cancer was in the third, colorectal cancers were in the fourth and oesophageal cancers were in the fifth. It has been shown that gastric cancer and especially oesophageal cancer are more common in our region compared to the average of Türkiye and the world. While oesophageal cancers ranked 11th with a rate of 2.6% among the most common cancers in the world, it ranked 5th with a rate of 5.82% in our region. It is established that the prevalence of specific cancers exhibits geographic and racial disparities (2). Gastric cancer is a neoplasm with a complex aetiology, involving both environmental and genetic factors (6). It is more prevalent in developing countries globally, with the highest incidence rates observed in Central-South America, Eastern Europe, and Eastern Asia (7). Additionally, it is two to three times more common in males than in females (2). The aetiology of gastric cancer is multifactorial, with a complex interplay between genetic predisposition, dietary habits, tobacco consumption, alcohol intake, infection with the bacterium *Helicobacter pylori* (HP) and the Epstein-Barr virus (EBV). Approximately 10% of gastric cancer cases have a family history, with the majority of cases being sporadic (8). With regard to dietary characteristics, it is established that the Mediterranean diet, characterised by a high consumption of vegetables, fruits and fish, is protective against gastric cancer. Conversely, the consumption of meat, smoked and pickled foods has been identified as a risk factor (9). HP infection is one of the most important causes of non-cardia gastric cancers in developing societies (10). Our findings align with existing literature, indicating that gastric cancer

occurs approximately two times more frequently in males. When considering the aforementioned etiological factors, the high consumption of red meat and low consumption of vegetables, fruits, and fish in our region may contribute to the elevated incidences of gastric cancer. In addition, in a study conducted in our region, the prevalence of HP infection was found to be 58%, similar to developing countries (11). It is thought that the frequency of HP infection is among the reasons increasing the incidence of gastric cancer.

The incidence of oesophageal cancer is particularly high in East Asia, East Africa and Northern Europe (12). While the oesophageal squamous cell carcinoma (SCC) subtype is prevalent in developing countries, the adenocarcinoma (AC) subtype has been on the rise in developed countries in recent years. The etiological causes of SCC include smoking, alcohol consumption, hot drinks and the ingestion of foods containing nitrosamines. In contrast, the main risk factors for AC are obesity and Barrett oesophagus (13-15). The gender distribution of oesophageal cancers indicates that these malignancies are more prevalent in males globally, although they are more common in females in certain regions (16). In our region, 56.8% of cases involved female patients. It is postulated that the high prevalence of oesophageal cancer in our region is attributable to heavy smoking, the consumption of hot tea, and dietary factors.

CONCLUSION

The eastern Turkish is situated at the western end of the Asian belt, a region where upper GI cancers are prevalent. Gastric cancer represents the seventh most prevalent form of cancer in our country. Oesophageal cancers are the 20th most common form of cancer. The findings of our study indicate that gastric cancers represent the third most prevalent cancer type, while oesophageal cancers constitute the fifth most common cancer type. The most

common cancer region was identified as the upper GI tract, with one in every five patients admitted to the clinic having been diagnosed with an upper GI cancer. It was imperative to document these data in order to demonstrate the necessity for investigating and preventing the underlying causes of upper GI cancer in the region, establishing screening programmes for early diagnosis and intensifying studies on treatment. The utilisation of data extracted from the medical records of 6,603 cancer patients, rather than relying solely on ICD-10 codes, was a crucial factor in ensuring the accuracy and reliability of the data. In addition to the aforementioned strengths of our study, the limitations include the exclusion of haematological malignancies, inability to differentiate disease subtypes, inability to access demographic characteristics of the patients and inability to document risk factors.

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