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ORIGINAL ARTICLE /ORİJİNAL MAKALE

Clinical and epidemiological characteristics of cancer cases reported between 2013-2017 in Amasya

Amasya ilinde 2013-2017 yılları arasında bildirimi yapılan kanser olgularının klinik ve epidemiyolojik özellikleri

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Abstract

Objective: In order to determine the region-specific risk factors of cancers, it is necessary to examine the distribution according to the characteristics of person, place and time. In the current study, it was aimed to determine the distribution of cancer diagnoses reported between 2013 and 2017 in Amasya province and these diagnoses in terms of clinical features and various sociodemographic variables.

Methods: The population of this descriptive study was composed of the cases who were diagnosed with cancer, which the Middle East Cancer Consortium deems necessary to be reported, in various health institutions between 2013 and 2017 and were registered in the Cancer Registry Center. The codes in ICD-O-3 were used in the classification of cancer diagnoses. In order to eliminate the confounding effect of the age variable in the presentation of cancer rates, age-standardized rates were calculated using the World Standard Population.

Results: The three most common cancers between 2013 and 2017 were trachea/bronchus/lung, colorectal and stomach cancers. The three most common cancers in men were trachea/bronchus/lung, prostate and stomach cancers. This was ranked as breast, colorectal and thyroid cancers in women. It was found that between 2013 and 2017, age-standardized rates of all cancers were found to increase from 151.3 to 184.1 per 100,000 population.

Conclusion: The incidence rate of all cancers for both genders between 2013 and 2017 is below Turkey's average. Gastrointestinal system malignancies, especially gastric cancer, have an incidence rate higher compared to Turkey for both genders. Intervention studies should be planned using the results of the current study.

Keywords: Cancer, Incidence, Epidemiological studies

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Öz

Amaç: Kanserlerin bölgeye özgü risk faktörlerini belirlemek için dağılımını kişi, yer ve zaman özelliklerine göre incelemek gerekmektedir. Bu çalışmada Amasya ilinde 2013-2017 yılları arasında bildirimi yapılan kanser tanılarının dağılımının ve bu tanıların klinik özellikler ve çeşitli sosyodemografik değişkenler yönünden incelenmesi amaçlanmıştır.

Yöntem: Tanımlayıcı tipte planlanan bu çalışmanın evrenini 2013-2017 yılları arasında çeşitli sağlık kurumlarında kanser tanısı konularak Kanser Kayıt Merkezi'nde kayıt altına alınmış Orta Doğu Kanser Konsorsiyumu'nun rapor edilmesini gerekli gördüğü olgular oluşturdu. Kanser tanılarının sınıflandırılmasında ICD-O-3'te yer alan kodlar kullanıldı. Kanser hızlarının sunumunda yaş değişkeninin karıştırıcı etkisini ortadan kaldırmak için Dünya Standart Nüfusu kullanılarak yaşa standardize hızlar hesaplandı.

Bulgular: 2013-2017 yılları arasında en fazla görülen ilk üç kanser trakea/bronş/akciğer, kolorektal ve mide kanseri olarak belirlendi. Erkeklerde en sık görülen ilk üç kanser trakea/bronş/akciğer, prostat ve mide kanseri; kadınlarda ise meme, kolorektal ve tiroid kanseri sıralamasına sahipti. 2013-2017 yılları arasında, tüm kanserlerin yaşa göre standardize edilmiş hızlarının yüz bin nüfusta 151.3'ten 184.1'e yükseldiği bulundu.

Sonuç: Her iki cinsiyet için tüm kanserlerin insidans hızı Türkiye genelinin altındadır. Gastrointestinal sistem maligniteleri özellikle de mide kanseri her iki cinsiyette Türkiye verilerinin üstünde bir insidans hızına sahiptir. Mevcut çalışmanın bulgularından faydalanarak müdahale çalışmaları planlanmalıdır.

Anahtar Kelimeler: Kanser, İnsidans, Epidemiyolojik çalışmalar

INTRODUCTION

Cancer causes a significant disease burden in societies, which is seen with increasing frequency due to changing living conditions. It is estimated that 19.3 million new cancer cases and 10 million deaths from cancer occurred in 2020[1]. While the most frequently diagnosed cancers are breast, lung and colorectal cancers, respectively; the most common causes of cancer deaths are lung, colorectal and liver cancer worldwide[2]. Cancer is in the first and second leading causes of premature deaths, occurring in the population aged 30-69, in 134 of 183 countries[3]. Due to demographic changes such as population aging and growth, cancer cases are expected to continue to rise worldwide over the next 50 years. Assuming that the latest incidence trends for major cancer types continue, by 2070 the incidence of all cancers is predicted to double compared to 2020[4]. Many factors such as smoking, oncogenic viruses, hereditary transmission, environmental exposure with various chemical and physical factors, dietary habits, obesity and lack of physical activity play a role in the etiology of cancer[3].

The first step of cancer control is to have accurate, complete and reliable data. The International Agency for Research on Cancer (IARC) recommends a population-based approach to

obtaining cancer data. The whole process of collecting information from all relevant institutions for all cancer cases that occur in a particular society and fully recording these data together with the clinical and pathological indicators of cancer is called population-based cancer registry[5]. Cancer Registry Center is the unit where all patients diagnosed with cancer are registered. A population-based cancer registry collects data from many hospitals and non-hospital sources in a defined geographic area and serves to show incidence trends of cancers of different localities over time or among subsections of the population. It is important to record cancer data accurately and completely in order to know the epidemiology of the disease, to determine the policies to be applied, to evaluate the effectiveness of the interventions and to carry out the necessary improvement studies in a timely manner[5].

Like other chronic diseases, cancer is more common with increasing age. Considering that the elderly dependency ratio of Amasya is 23.6% for 2021, which is above Turkey's average (14.3%), cancer control is one of the priority health problems for Amasya province[6]. In order to determine the region specific risk factors with analytical studies, it is first necessary to examine the distribution of cancer cases according to person, place and time characteristics. In the current study, it was aimed to examine the distribution of cancer diagnoses reported by Cancer Registry Center between 2013 and 2017 in Amasya province and these diagnoses in terms of clinical features and various sociodemographic characteristics.

METHODS

The population of this descriptive study consisted of the cases in all age groups who were diagnosed with cancer in various health institutions between 2013 and 2017 and were registered in the Cancer Registry Center. These cases, which the Middle East Cancer Consortium deems necessary to register, included all diagnoses with a behavior code of "2" or "3" in ICD-O-3 as well as papillary, basal and squamous cell carcinomas of the skin; carcinoma in situ and CIN III of the cervix. The entire population was included in the study. In order to make a proper comparison, since non-melanoma skin cancers are not included in the reports published by organizations such as IARC, a total of 613 cases of non melanoma skin cancer were excluded from a total of 4.838 cancer cases over a five-year period, and 4.225 cases were analyzed. The data were obtained through export from the program called CanReg-4 used in the Cancer Registry Center after obtaining the necessary permissions from Ethics Committee (No: 2022/25) and Provincial Health Directorate. This study was conducted following the principles of the Declaration of Helsinki revised in 2013.

For the study, besides sociodemographic data such as age, gender, and district of residence, information about the last follow-up status, the health institution that diagnosed cancer, the areas of specialization that made the diagnosis, the method of diagnosis, the types of treatment applied, the dates of diagnosis and treatment were collected. The codes in ICD-O-3 were used in the classification of cancer diagnoses. ICD-O is the coding system used by cancer registrants with data obtained from pathology reports. In this system, there

are two main sections: topography (location of the tumor) and morphology (histology). The topography code refers to a 4-digit code located between C00.0-C80.9, as in ICD-10. On the other hand, morphology code includes 4-digit numbers between 8000 and 9989 codes. Ultimately, 10 digits are required to fully define a tumor, including 4 digits in the topographic region, 4 digits in the morphological type, 1 digit in the biological behavior, and 1 digit in the grade or differentiation of the neoplasm[7].

Personal information was not shared with any person or organization other than the Cancer Registry staff and researchers in order to ensure the confidentiality of personal data.

Age-standardized rates were calculated using the World Standard Population to eliminate the confounding effect of the age variable in the presentation of cancer rates. The data were analyzed with the SPSS (Version 22 for Windows, SPSS Inc, Chicago, IL, USA) package program. Since continuous variables did not show normal distribution, they were expressed as median (interquartile range) and categorical data were expressed as frequency and percentage. The conformity of the continuous variables to the normal distribution was evaluated with the Kolmogorov-Smirnov test. Mann-Whitney U and Chi-square tests were used for comparisons between groups. Statistical significance level was accepted as $p<0.05$ for all tests.

RESULTS

Between 2013-2017, 59.3% of 4,225 cases diagnosed with cancer across the Amasya province were male and 49.8% were aged 65 and over. It was determined that 37.7% of the patients were residing in the city center and 49.8% were alive at the last follow-up (Table 1). The median age at diagnosis was 64 (IQR 55-73) years in total. The median age at diagnosis of men (66 years, IQR 58-74) was higher than the age of diagnosis of women (61 years, IQR 51-72) ($p<0.001$). It was observed that the first diagnoses of cancer patients were mostly made outside the province (65.1%) in the five-year period. The department that made the most of the diagnoses was general surgery (30.2%), the most common diagnostic method was histological examination (91.6%), while the rate of cases that were first diagnosed after death was 1.8%. The degree of cell differentiation was most frequently found to be moderate (38.2%). It was found that at least one type of treatment was applied to 83.8% of all cancer cases. Surgical treatment was found to be the most common type of treatment modality both as the first treatment (69.6%) and among those who received at least one treatment (71.3%). The median time between the date of diagnosis and the onset of treatment was 8 (IQR 0-34) days. The median of this period was found to be longer in males (9 days, IQR 0-37) than in females (7 days, IQR 0-29) ($p=0.003$). Considering the timeliness of cancer registries, it was found that 83% of the cases in the database were recorded in the first 12 months, and 98.6% in the first 24 months. The rate of unknown data was 13.3% in the diagnostic method and 67.1% in the degree of differentiation feature.

Table 1. Distribution of sociodemographic characteristics of cancer cases, 2013-2017

Sociodemographic characteristics	n	%
Gender		
Male	2.505	59.3
Female	1.720	40.7
Age groups (Years)		
0-14	31	0.7
15-24	32	0.8
25-49	578	13.7
50-64	1.479	35.0
65 and over	2.105	49.8
Settlement (District)		
Central	1.594	37.7
Merzifon	896	21.2
Suluova	621	14.7
Gümüşhacıköy	441	10.4
Taşova	457	10.8
Göynücek	157	3.7
Hamamözü	57	1.3
Unknown	2	0.1
Last follow-up		
Alive	2.104	49.8
Dead	2.121	50.2
Total	4.225	100.0

The most common cancers between 2013 and 2017 were trachea/bronchus/lung (15%), colorectal (12%) and stomach (10%) cancers, respectively. The most common cancers in men were trachea/bronchus/lung (23%), prostate (13%) and stomach (12%) cancers; and in women these were breast (23%), colorectal (12%) and thyroid (10%) cancers (Figure 1).

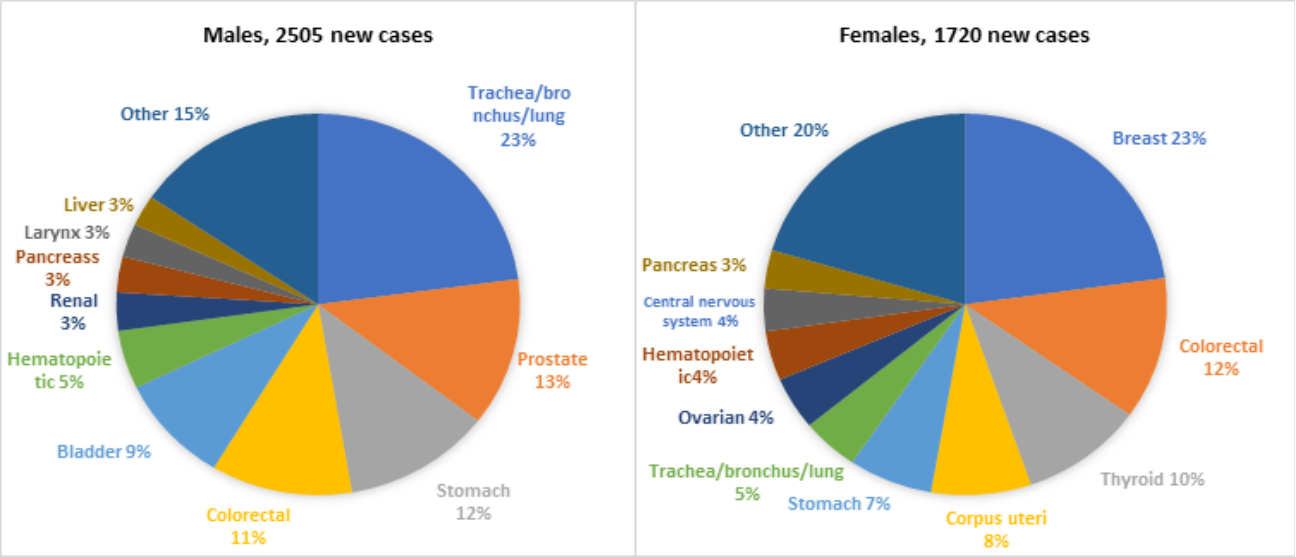

Figure 1. Distribution of cancers diagnosed between 2013 and 2017 by gender

In Amasya province, the age-standardized rates of all cancers increased from 151.3 to 184.1 per 100,000 population, and the cancer rate in men was higher than in women in all years between 2013 and 2017 (Figure 2).

For 2017, excluding gender-specific cancer types, the five cancer types with the highest incidence rate in a total of 100,000 people were trachea/bronchus/lung (24.8), colorectal (19.8), stomach (14.0), bladder (14.0) and thyroid (12.4) cancers. Age-standardized rates of the most common cancers by gender are presented in Figure 3.

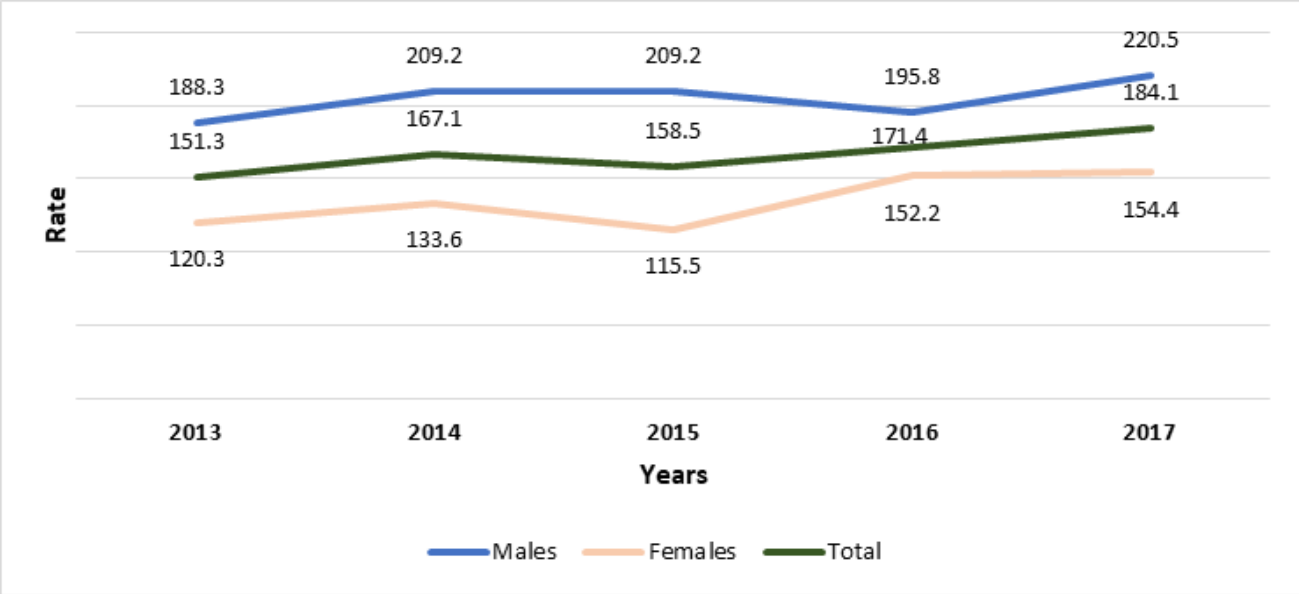

Figure 2. Age-standardized rates of all cancers for 2013-2017 (World Standard Population, per 100,000 people)

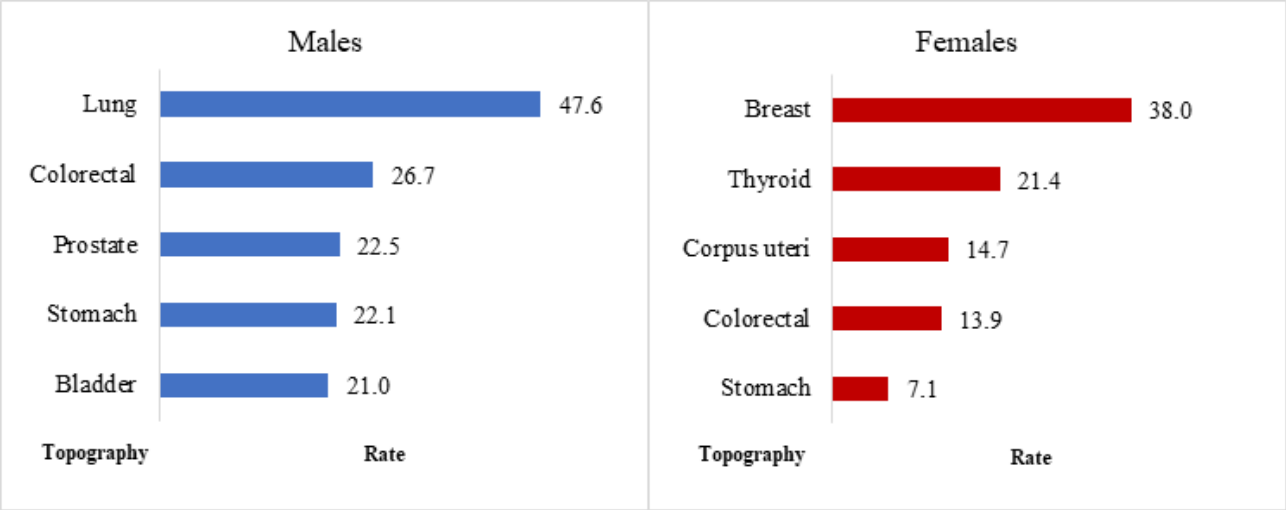

Figure 3. Age-standardized rates of the five most common cancer types by gender, 2017 (World Standard Population, per 100,000 people)

When the distribution of age-standardized rates for all cancers by districts was analyzed, the district with the highest cancer rate was Suluova for the first three years (176.4, 191.8 and 199.9 per 100,000 population, respectively), and Gümüşhacıköy for the last two years (216.2 and 199.3 per 100,000 population, respectively). Age-specific cancer rates increased with increasing age in all years. The cancer rate in the population aged 65 and over varied between 784.6 and 1011.5 per 100,000 people.

Regarding the three cancer types within the scope of the screening program by the Ministry of Health, colorectal cancer rates were higher in men in all years (Figure 4). It was found that the rate of breast cancer increased from 26.0 in 2013 to 41.7 in 2016 and decreased to 38.0 in 2017 per 100,000 women. The age-standardized rate of cervical cancer varied between 1.6 and 6.3 per 100,000 women over a five-year period (Figure 5).

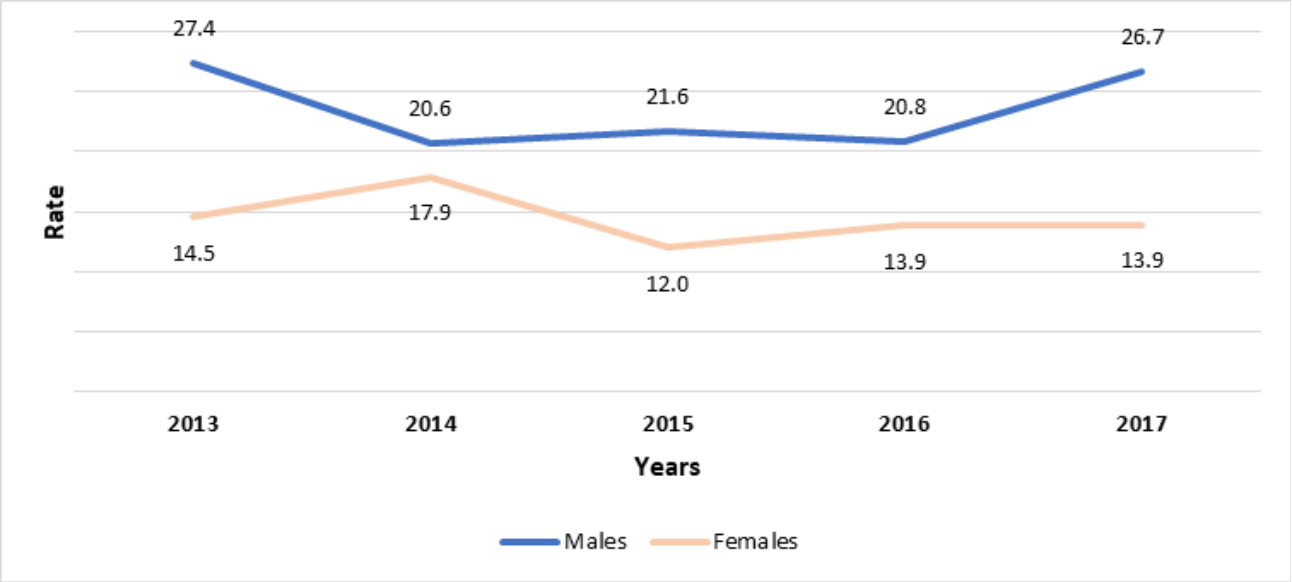

Figure 4. Age-standardized rates of colorectal cancer, 2013-2017 (World Standard Population, per 100,000 people)

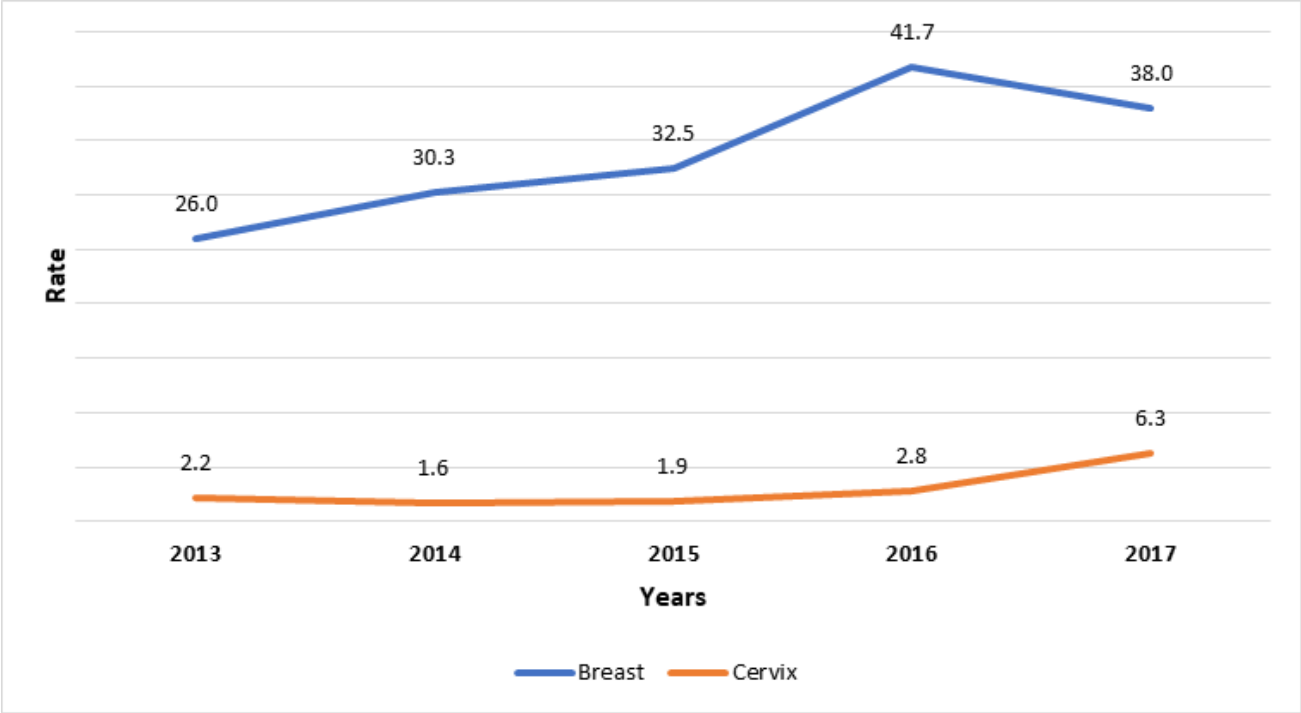

Figure 5. Age-standardized rates of breast and cervical cancers in women, 2013-2017 (World Standard Population, per 100,000 people)

Among the 2,337 cases whose summary stage information was recorded at the time of diagnosis, the age at diagnosis was higher in those with distant metastasis (p=0.004), and distant metastasis was higher in males (p<0.001). Among all cancer types, the first diagnosis was mostly made in the localized stage (41.1%) and 28.7% of them showed distant spread at the time of diagnosis. It was found that cervical cancer was diagnosed mostly in situ (33.3%) and regional (33.3%) stage, while colorectal and breast cancers were diagnosed mostly in the regional stage (40.7% and 49.0%, respectively) (Figure 6).

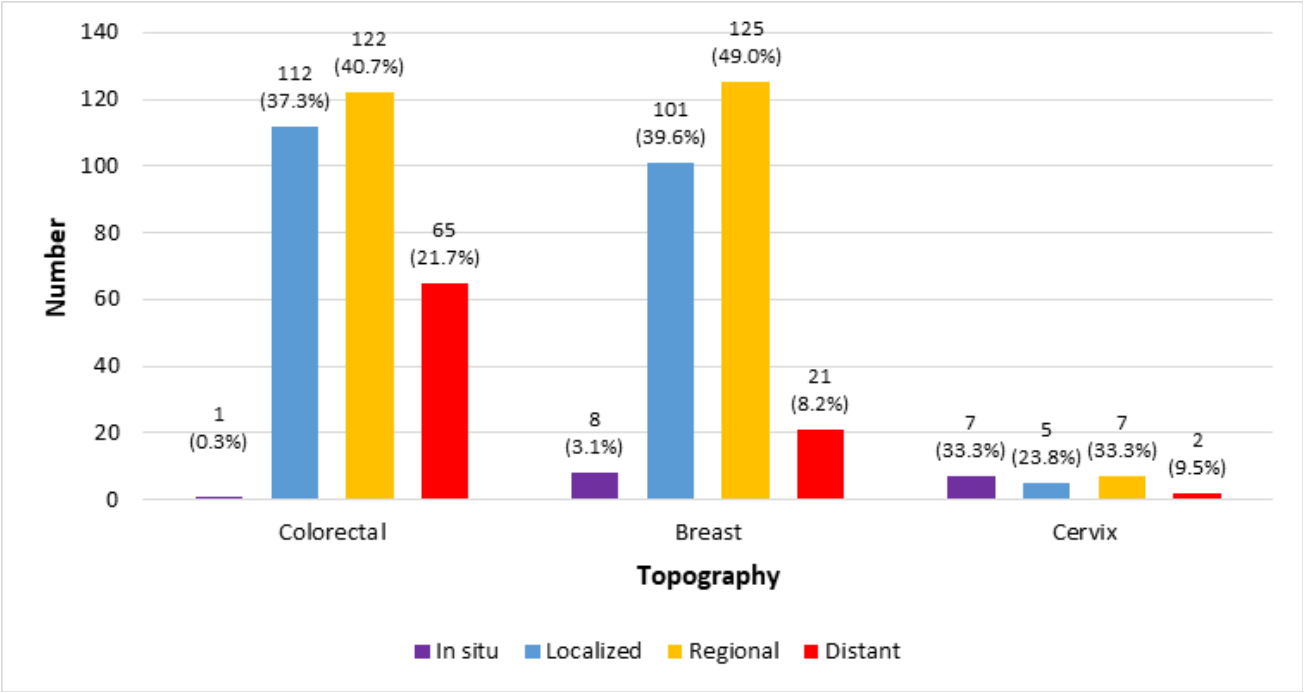

Figure 6. Summary stage distribution of cancer types in the screening program at the time of diagnosis, 2013-2017

Age-standardized rates of childhood cancers between 0-14 years were found to be 55.4, 95.1, 136.1, 55.8, and 149.3 per 1,000,000 children over the five-year period, respectively. The age-standardized rate of trachea/bronchus/lung cancer, one of the cancers directly related to tobacco, was higher in men in all years. For 2017, the rate of lung cancer was found to be 47.6 in men and 4.2 in women, per 100,000 people.

DISCUSSION

The current study is important in terms of descriptive and analytical cancer statistics in Amasya and comparing them with global and Turkey data. Thus, it provides a preliminary assessment of regional differences and epidemiological factors in cancer types. According to our results, it has been shown that the total incidence rate of all cancers for both sexes in Amasya between 2013-2017 was lower than Turkey's, and the cancer rates fluctuated over the years. On the other hand, the incidence of gastrointestinal system malignancies, especially stomach cancer, was higher than the incidence in Turkey for both genders.

According to the data provided by the International Agency for Research on Cancer (IARC), the incidence for all cancers apart from skin cancers other than melanoma in the world is 206 in men and 178 in women per 100,000 population in 2020[8]. The current cancer report of the Ministry of Health belongs to 2017, the age-standardized cancer incidence rate, excluding skin cancers other than melanoma, was reported as 233 in men, 170 in women, and 202 in total per 100,000 population[9]. The age-standardized incidence rate of all cancers in Amasya province in 2017 was calculated as 220 in men, 154 in women and 184 in total per 100,000 population. When all cancers were evaluated, cancer rates in Amasya were lower than in Turkey. This difference may be due to the difference in cancer screening coverage rate. According to Turkish Cancer Control Program 2016,

the coverage rate of opportunistic and population-based breast cancer screenings in Turkey was 30-35% in 2016[10]. Nevertheless, the coverage rate of breast cancer screening was 8% in Amasya in 2016[11]. Between 2013-2017, 59.3% of all cancer cases diagnosed in Amasya were men. In the same period data for Turkey, cancer incidence rates are higher in men for all years. Similarly, in Amasya, cancer rates in men were higher than in women for all years. In the trend between 2013 and 2017, there was a noticable increase in the rate of cancer in women in 2016. We can attribute this increase to the results of cancer screening studies in this period. The number of breast cancer screenings in primary health care services in Amasya was 2,814 (4.8% of the target population) in 2015 and increased to 4,791 (8.0% of the target population) in 2016[11]. In 2016, the increase in the rate of breast cancer, which is the most common cancer in women, also supports that. These results once again show the importance of cancer screening studies in terms of early detection and intervention of cancers.

In the current study, it was shown that 49.8% of all cancer cases were 65 years and older. In the study conducted by Özdemir et al. in Yozgat, it was observed that cancers in both genders were most common in the age of 60-69 years[12]. In many previous studies, it has been reported that cancers are mostly diagnosed in this age range[13-15]. In Amasya, the median age at diagnosis in men was higher than the age at diagnosis in women. This difference may be related to the fact that breast cancer screening is applied from the age of 40 within the scope of Turkey's national screening program and early diagnosis opportunities. In a study conducted with cancer records between 1992 and 2017 in İzmir, it was shown that the cancers were diagnosed in women in earlier age and in earlier stages.[16]. In the current study, it was observed that 41.1% of the cancer patients were firstly diagnosed in localized stage and 28.7% of them showed distant spread at the time of diagnosis. The age at diagnosis was higher in patients with distant spread at the time of diagnosis, and distant spread was higher in men at the time of diagnosis. In the study of Haydaroglu et al., the rate of metastasis was 24.0% in women and 38.7% in men similarly[16].

Lung cancer is the most common cancer in men, and its mortality and morbidity rate is approximately two times higher in men than in women[8]. Lung cancer is usually diagnosed at the late stages. According to the Turkey 2017 report, it has been shown that 56.5% of lung cancers have distant metastases[9]. It ranks first in cancer-related deaths in men (21.5%)[8]. Considering these data, the results of the current study regarding the higher age of diagnosis and higher rates of distant spread at the time of the diagnosis in men are consistent with the data of Turkey and the literature. When the spread of the three cancer types which are within the scope of screening at the time of diagnosis is evaluated, cervical cancer was diagnosed mostly at in situ (33%) and regional (33%) stage; colorectal and breast cancers were mostly diagnosed at the regional stage (41% and 49%, respectively). The highest rate of the diagnosis at metastatic stage was seen in colorectal cancer (22%) among these three cancer types similar with Turkey 2017 data (24%)[9]. In the study of Yücel et al. in Sivas, the rate of diagnosing the colorectal cancer at the metastatic stage was 33%[17]. For cervical cancer, the rate of

diagnosing at the local stage was 55% in Turkey, while it was 24% if in situ lesions were included and 35% if they were not in Amasya. In the study of Yücel et al., this rate was 73%[17]. Cancer screening should be done at regular intervals, especially in sexually active women, starting from the age of 30 to detect cervical cancer at an early stage.

The most common cancers in men all over the world and in Turkey in 2020 are lung, prostate and colorectal cancers, respectively[8, 9]. In Turkey Cancer Statistics 2017 Report, the incidence of trachea/bronchus/lung (56.7), prostate (35.7), colorectal (25.1), bladder (25.1) and stomach (14.3) cancers in men per 100,000 populations[9]. In Amasya, the incidence of trachea/bronchus/lung cancer in men is lower (47.6), but it ranks first in concordence with Turkey, but the rate of colorectal cancer (26.7) is higher compared to Turkey, and it ranked second. Another remarkable result is that the rate of stomach cancer (22.1) was much higher compared to Turkey and is higher ranked. Bladder (21.0) and prostate (22.5) cancer rates were much lower that of Turkey[9]. While the most common cancer types in women worldwide are breast, colorectal and lung cancers, respectively, in Turkey 2017 data, the highest cancer rates in women per 100,000 population are listed as breast (47.7), thyroid (22.6), colorectal (14.7), trachea/bronchus/ lung (11.1), and uterus (10.7) cancers[8]. In Amasya, breast cancer (38.0) had the highest rate in women even if it was lower than that of Turkey. Breast cancer was followed by thyroid (21.4), uterus (14.7), colorectal (13.9) and stomach (7.1) cancers for women. Stomach cancer and uterine cancer rates were higher compared to Turkey. It is an important finding that the incidence of stomach cancer for both genders was higher compared to Turkey. It is known that upper gastrointestinal system cancers, including stomach cancer, show regional differences depending on environmental factors[8, 18]. However, stomach cancer is more common in men all over the world and in Turkey[8, 9]. In a study conducted in Zonguldak, a province in a similar geographic region, stomach cancer is among the most common cancers, ranking second in men and fourth in women[19]. Storage and cooking methods of foods such as salting, pickling and smoking, which are among the dietary habits in the Black Sea Region of Turkey, and high consumption of animal fat play important role in the etiology of stomach cancer[20]. In Amasya, it was shown that, stomach cancer (9.8%) was the third most common cancer after trachea/bronchus/ lung (15.4%) and colorectal (11.6%) cancers between 2013 and 2017. Stomach cancer rate was higher (11.9%) especially in men. The fact that the rate of stomach cancer in Amasya is higher compared to Turkey brings to mind the precarcinogenic H. pylori agent. Half of the world population is infected with H. pylori, and development of gastric cancer can be observed in 1% of individuals infected with H. pylori[21]. While H. pylori positivity was found to be 49.5% in a study conducted in Ankara[22], it was found to be 81.3% in a recent study in Yozgat[23]. In a population-based study conducted at the national level in Turkey, H. pylori positivity was found to be 82.5% and the frequency was higher in men[24]. In the current study, the increase in stomach cancer rate was more prominent in men, and this relationship needs to be evaluated.

There are approximately 2.2 million new cases of breast cancer in women worldwide[2]. In this

context, breast cancer is the most common cancer type with the highest mortality rate among women in all regions of the world and in Turkey[2]. The rate of breast cancer among all cancers diagnosed in women is 24.5%, and breast cancer-related deaths constitute 15.5% among all cancer-related deaths[8]. In Amasya, the rate of breast cancer in women was 22.8%. It was found that the rate of breast cancer increased from 26.0 per 100,000 women in 2013 to 41.7 in 2016, and decreased to 38.0 in 2017. The age-standardized rate of cervical cancer varied between 1.6 and 6.3 per 100,000 women over a five-year period. Changes over the years may be due to the inclusion of both cancers in the screening program of Turkey. In Amasya, the closest incidence rate to Turkey regarding to breast cancer, which has shown an increasing trend since 2014, was reached in 2016. The lower incidence rates in other years may be due to deficiencies in diagnosis associated with changes in the number and competency of physicians in departments diagnosing cancer.

Regarding to the distribution of age-standardized rates for all cancers by districts between 2013-2017, Suluova district had the highest cancer rate for the first three years and Gümüşhacıköy for the last two years. When the cancer screening data of Amasya province was examined, the screening rate of the target population of Gümüşhacıköy district in recent years was higher than other districts. The high incidence rate of cancer may be explained by this.

Limitations and Strengths

The current study is the first to evaluate cancer registry in Amasya province and it is thought that it will contribute to the literature and guide the future analytic studies. Since the research data was obtained from population based cancer registry, the risk of bias that can be seen in studies conducted in hospitals was minimized. When the database of the province is evaluated in terms of active cancer registry data quality; it is quite strong according to the criteria of completeness, validity and timeliness. Almost all of the new cases in the target population were found in the database of the registry center. The frequency of cancer data obtained from the death notification only was 1.8%, which was the same as Turkey. Histological confirmation was found as 91.6% for all cancers and it was similar with Turkey (90.8%)[9]. The fact that the histological confirmation ratio in the database is not close to 100% indicates that the diagnoses were probably made also by clinical/laboratory and imaging methods and the cases that did not require surgical intervention were not missed. In terms of timeliness; it was determined that 83% of the cases in the Amasya database were recorded in the first 12 months, and 98.6% in the first 24 months. In the Turkey 2017 database, these ratios were 55.1% and 85.9%, respectively[9]. However, the fact that the unknown data rate in Amasya was higher compared to Turkey in terms of diagnosis method (13.3%) and differentiation (67.1%) is a limitation of the study.

CONCLUSION

Consequently, the total incidence rate of all cancers for both genders in the province of Amasya between 2013 and 2017 was lower compared to Turkey 2017 statistics. Although there was a general increase trend over the years, it showed fluctuations especially depending on cancer screening activities. In Amasya compared to Turkey 2017 statistics,

the rates of respiratory system cancers and prostate cancer were lower, colorectal cancer and stomach cancer were higher in men; the rates of breast cancer and colorectal cancer were lower and stomach cancer was higher in women. In Amasya, gastrointestinal system malignancies, especially stomach cancer, had higher incidence rates compared to Turkey data for both genders. In this context, there is a need for epidemiological studies to be conducted in the region regarding eating habits and *H pylori* positivity. Public education activities should be increased to transform and improve the eating habits in the region. Epidemiological and intervention studies should be planned using the results of the current study. In addition, the reapplicaiton of the study in the future years will provide an opportunity to compare with current results, and will enable us to see the developed and underdeveloped aspects in the struggle against cancer.

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Conflict of Interest:

The authors declare no conflict of interest.

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Ethical Declaration:

This study was Amasya University Clinical Research Ethics Committee approved by Ethics Committee (No: 2022/25) and Provincial Health Directorate (Date-number: 03/03/2022 – E-68724985-044).

Author Contribution

Concept: BT, BK, NY, Design: BT, BK, NY, Supervising: BK, NY, Financing and equipment: BT, BK, NY, Data collection and entry: BT, BK, Analysis and interpretation: BT, NY, Literature search: BT, BK, NY, Writing: BT, NY, Critical review: BT, BK, NY.

REFERENCES

1. Ferlay J, Colombet M, Soerjomataram I, et al. Cancer statistics for the year 2020: An overview. Int. J. Cancer 2021; 149(4):778-89.
2. Sung H, Ferlay J, Siegel RL, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. Ca Cancer J Clin 2021; 71(3): 209-49.
3. Cao B, Soerjomataram I, Bray F. The burden and prevention of premature deaths from noncommunicable diseases, including cancer: A global perspective. In: Wild CP, Weiderpass E, Stewart BW, editors. World cancer report cancer research for cancer prevention. Lyon, France: International Agency for Research on Cancer; 2020. p.16-23.
4. Soerjomataram I, Bray F. Planning for tomorrow: Global cancer incidence and the role of prevention 2020–2070. Nat. Rev. Clin. Oncol 2021; 18(10):663-72.
5. Young JL, Ward KC. Kanser kayıtçılığında standartlar için el kitabı. Çeviri Ed: Eser S, Ozalan S. Ankara; 2013.
6. TÜİK (Turkish Statistical Institute). Population and Demography. Available at:https://data.tuik.gov.tr/Kategori/GetKategori?p=nufus-ve-demografi-109&dil=1. Accessed: Feb 10, 2022

7. Fritz A, Percy C, Jack A, et al. International classification of diseases for oncology (ICD-O)–3rd edition, 1st revision. World Health Organization 2013.

8. IARC. Cancer Fact Sheets 2020 . Available at:https://gco.iarc.fr/today/fact-sheets-cancers. Accessed: Feb 11, 2022

9. Kara F, Keskinkılıç B. Türkiye kanser istatistikleri. TR Ministry of Health General Directorate of Public Health, Ankara. 2017;19-44.

10. Keskinkılıç B, Gültekin M, Karaca AS et al. Türkiye Kanser Kontrol Programı. TR Ministry of Health Turkish Public Health Institution Cancer Department, Ankara. 2016; 18-28.

11. Amasya Provincial Health Directorate. Cancer Statistics Report, Amasya. 2018.

12. Tuğba Özdemir Z, Akyüz Özkan E. Cancer Map of The Yozgat City. Bozok Medical Journal 2016;6(1):27-33.

13. Yanik S, Yilmaz F, Özdemir ZT, et al. The analysis of 8-year data (2002-2010) of the tumor cases based on the pathology records of Abant Izzet Baysal University medical faculty department. Int. J. Clin. Exp. 2014;7(8):2273.

14. Kuzey MA. Düzce Tıp Fakültesi Hastanesi Patoloji arşivindeki 10 yılık (1999-2008) kanser olgularının genel değerlendirmesi (Epidemiyolojik bir çalışma). [Thesis in medicine]. 2009.

15.İzmirli M, Altin S, Dernek B, Ünsal M. SSK Okmeydani Education and Research Hospital, Centre of Oncology in 1999-2004 cancer statistics. Turk J Oncol. 2007;22(4):172-82.

16. Haydaroğlu A, Fatma S, Caner A. Epidemiological and overall survival characteristics of cancer patients in Ege University Hospital database. Ege Journal of Medicine 2019:1-9.

17. Yücel B, Akkaş EA, Okur Y, Tezer ES, Kılıçkap S. Demographic distribution and survival data of patients with cancer admitted to Department of Oncology, Cumhuriyet University Medical Faculty Cumhuriyet Medical Journal 2014;36(2):184-96.

18. Aguilar I, Compés L, Feja C, Rabanaque M, Martos C. Gastric cancer incidence and geographical variations: The influence of gender and rural and socioeconomic factors, Zaragoza (Spain). Gastric Cancer 2013;16(2):245-53.

19. Engin H, Ozdamar S, Gun B, et al. Epidemiological data of cancer of the only cancer center of the western Black Sea region of Turkey. Journal of Clinical Oncology 2006;24(18_ suppl):16041-16041.

20. Correa P. The epidemiology of gastric cancer. World journal of surgery 1991;15(2):228-34.

21. Fukase K, Kato M, Kikuchi S, et al. Effect of eradication of Helicobacter pylori on incidence of metachronous gastric carcinoma after endoscopic resection of early gastric cancer: an open-label, randomised controlled trial. The Lancet 2008;372(9636):392-7.

22. Korkmaz M, Sadıç M, Koca G, et al. The relationship of Helicobacter pylori infection with demographic, socioeconomic and environmental factors: Ankara Hospital experience. Kafkas Med Sci 2013;(2):74-9.

23. Yıldırım T, Dursun M. Analysis of Helicobacter pylori positiveness and upper gastrointestinal system endoscopy results of Yozgat region in Turkey. J Health Sci Med 2021;4(6):901-6.

24. Ozaydın N, Turkyilmaz SA, Cali S. Prevalence and risk factors of helicobacter pylori in Turkey: a nationally-representative, cross-sectional, screening with the 13 C-Urea breath test. BMC Public Health 2013;13(1):1-12.