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Evaluation of cancer-related deaths in Turkey between 2009-2018: An epidemiological study

2009-2018 yılları arasında Türkiye'de kansere bağlı ölümlerin değerlendirilmesi: Bir epidemiyolojik çalışma

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Abstract

Aim: Determination of cancer incidence and mortality data for all countries is essential for cancer control. These data can affect public health and clinical service planning. In this study, we aimed to examine the variability of cancer deaths in Turkey in terms of age groups, gender, geographic region, and years according to the cancer types between 2009-2018.

Methods: In this epidemiological study, cancer-related mortality statistics data presented at the website of Turkey Statistical Institute (TSI) were used. Cancer-related deaths between 2009-2018 were evaluated in terms of ratio to total deaths, age groups, cancer types, geographical regions, and gender. Data were presented as percentages.

Results: Cancer-related deaths were observed to increase between 2009-2018. The highest cancer-related mortality rate was seen in the Marmara Region, while it was lowest in the Southeastern Anatolia Region. Cancer-related death rate was higher in males than females, and it was highest in the 65-74 years age range. The most common cause of death in males is lung cancer, and in females, breast cancer.

Conclusion: Cancer is responsible for 1/6 of all deaths in the world. Similarly, cancer-related deaths are responsible for approximately 1/5 of all deaths in our country. The risk of cancer in >60 years age group is higher in males than in females. In our country, all kinds of cancers, except female cancers, cause more deaths in males than females.

Keywords: Cancer, Mortality, Pathology, Death

Öz

Amaç: Tüm ülkeler için kanser insidansı ve mortalite verilerinin belirlenmesi; kanserin kontrolü için esastır. Bu veriler halk sağlığına ve klinik hizmet planlamasına etki edebilmektedir. Bu çalışmada 2009-2018 yılları arasında Türkiye'de kansere bağlı ölümlerin yıllara göre değişimini, yaş gruplarına, cinsiyete ve coğrafi bölgelere göre farklılıklarını, kanser türlerine göre değişkenlikleri incelemeyi amaçladık.

Yöntemler: Çalışmada Türkiye İstatistik Kurumu (TÜİK) web sitesinde sunulan kanser ilişkili ölüm istatistik verileri kullanıldı. 2009-2018 yılları arasında kansere bağlı ölümlerin coğrafi bölgelere göre toplam ölümlere oranı değerlendirildi. 2009-2018 yılları arasında yaş gruplarına ve cinsiyete göre kansere bağlı ölümler değerlendirildi. 2009-2018 yılları arasında kanser türlerine ve cinsiyete göre kansere bağlı ölümler değerlendirildi. Veriler yüzde olarak sunuldu. Çalışma epidemiyolojik olarak tasarlanmıştır.

Bulgular: Kansere bağlı ölümlerin 2009-2018 yılları arasında arttığı görülmüştür. Toplam ölümlere kıyasla kansere bağlı ölüm oranının en yüksek olduğu bölge Marmara Bölgesi iken en düşük olduğu bölge Güneydoğu Anadolu Bölgesidir. Tüm yaş gruplarında; erkekler, kadınlara göre kanser nedeniyle daha fazla ölmektedir. Kansere bağlı ölümler en yüksek seviyesine 65-74 yaş aralığında ulaşmaktadır. Erkeklerde ölüme en çok neden kanser türü akciğer, kadınlarda ise meme kanseridir.

Sonuç: Kanser dünyada meydana gelen tüm ölümlerin 1/6'sından sorumludur. Benzer şekilde ülkemizde kansere bağlı ölümler, tüm ölümlerin yaklaşık 1/5'inden sorumludur. 60 yaşın üzerinde erkeklerde kanser riski kadınlara oranla daha fazladır. Ülkemizde kadın kanserleri dışında her türlü kanserin erkeklerde daha fazla ölüme neden olduğu tespit edilmiştir.

Anahtar kelimeler: Kanser, Mortalite, Patoloji, Ölüm

Introduction

Investigation of rates, numbers, and causes of death is important for the development of health systems, preventive medicine, understanding the effects of diseases on people and the effective use of treatment resources [1-3]. Cancer is a group of diseases characterized by uncontrolled proliferation and spread of abnormal cells. If the spread cannot be controlled, it can result in death [4]. Cancer is the leading cause of death for all levels of income and socioeconomic groups worldwide [5]. Determination of cancer incidence and mortality data is essential for the control of cancer in all countries. These data may affect public health and clinical service planning [6]. Ratings and measurements made according to age groups are not affected by population size and structure. Changes in incidence rates are the main indicator of changes in prevalence [7]. In 2018, it was estimated that there were 18 million cancer cases worldwide, and 9.8 million people died of cancer [6,8]. Age, alcohol, familial predisposition, cancer-causing substances, chronic inflammation, diet, hormones, immunosuppression, infectious agents, obesity, radiation, sunlight, and tobacco are the most frequently researched cancer risk factors. Although some of these risk factors can be avoided, some are unavoidable [9]. Today, there are changes in behavior and habits of society due to industrialization and rapid urbanization, which shows that cancer risk factors may change over time [10]. With the increase in urbanization and development, cancer risk factors, such as the adoption of a sedentary lifestyle, increase in the elderly population, decrease in fertility, diet, and environmental pollution, change. However, with the development of healthcare and imaging methods, early diagnosis and effective treatment have become more possible [11]. Cancer risk factors and treatment options are affected by the regions and socioeconomic status [12,13]. By evaluating cancer mortality and incidence from a socioeconomic and regional perspective, inequalities in the healthcare system can be recognized, and beneficial health arrangements can be made [14,15]. In this study, we aimed to investigate the changes by years, age group, gender, geographic region according to the types of cancer seen in Turkey between 2009-2018.

Materials and methods

In this epidemiological study, we used the death statistics data shared by Turkey Statistical Institute (TSI) on its website [16]. TSI allows the use of their data for research. The causes of death, mortality rates, and population data between 2009 and 2018 were collected, analyzed, classified in terms of age, gender, geographical region, and disease groups, and evaluated with descriptive statistics using the Statistical Package for Social Sciences (SPSS) 22.0 software to be presented in percentage (%).

Results

Cancer-related deaths are more frequent in males than in females. It is observed that deaths due to cancer regularly increased among both genders between 2009 and 2018. Compared to 2009, cancer-related deaths had increased by 28.6% in total, by 27.5% among males, and 30.5% among females by

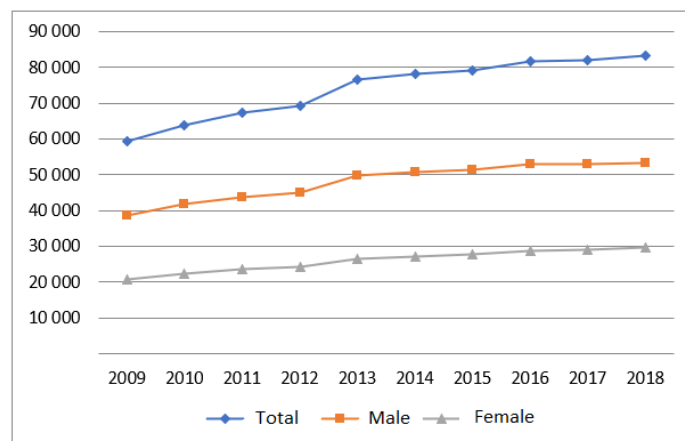2018. Deaths due to cancer by gender between 2009-2018 are shown in the figure 1.

Figure 1: Cancer-related deaths between 2009 and 2018

The highest cancer-related mortality rate was seen in the Marmara Region, while it was lowest in the Southeastern Anatolia Region. In all regions but the Southeastern Anatolia, cancer-related deaths are responsible for 1/5 of all deaths (Table 1).

Table 1: The ratio of cancer-related deaths to total deaths between 2009-2018 by geographical regions

Geographical Regions	Total Death	Cancer-related deaths	%
Marmara	1070733	249186	23.3
Aegean	574355	116268	20.2
Mediterranean	412813	76908	18.6
Black Sea	470107	92003	19.6
Eastern Anatolia	215586	42894	19.9
Southeastern Anatolia	214454	31864	14.9
Central Anatolia	597801	124559	20.8

The cancer-related mortality rate is higher in males than females across all age groups. It reaches its highest level between the ages of 65-74 years. Cancer-related mortality rates are close to each other among males and females from birth until the age of 44 years; however, after 45 years of age, male predominance is observed (Table 2).

Table 2: Cancer-related deaths by age groups and gender between 2009 and 2018

Age groups	Total	%	Male	%	Female	%
0 – 14	6235	0.8	3149	0.7	3086	1.2
15 – 24	6191	0.9	3747	0.8	2444	0.9
25 – 34	10824	1.5	5843	1.2	4981	1.9
35 – 44	30597	4.1	15184	3.2	15413	5.9
45 – 54	89017	12.0	55643	11.5	33374	12.9
55 – 64	174697	23.6	123136	25.7	51561	19.9
65 – 74	202035	27.3	139350	29.1	62685	24.1
75 – 84	171138	23.2	108309	22.6	62829	24.2
85+	48435	6.6	25168	5.2	23267	9.0
Total	739169	100	479529	100	259640	100

Deaths due to all cancer types, except breast and gynecological cancers, are more frequent in males. The most common cancer types are lung, bronchus, larynx, and trachea cancer among both genders. Breast cancer was the most common cause of cancer-related mortality in females. Other common cancers included the lung, larynx, and trachea cancers (Table 3).

Table 3: Cancer-related deaths by cancer types and gender between 2009 and 2018

Cancer types	Cancer related deaths	%	Male	%	Female	%
Lip, Oral cavity, Pharynx	7965	1.3	5293	68.8	2672	31.2
Esophagus	7746	1.2	4544	58.7	3202	41.3
Stomach	62488	10.0	40970	65.6	21518	34.4
Column	51316	8.2	29311	57.1	22005	42.9
Rectum and anus	12218	2.0	7276	59.6	4942	40.4
Liver and bile ducts	27608	4.4	17775	64.4	9833	35.6
Pancreas	41351	6.6	24124	58.3	17227	41.7
Lung, larynx, trachea	225726	36.1	192410	85.2	33316	14.8
Skin	4457	0.7	2589	58.1	1868	41.9
Breast	35627	5.7	758	2.1	34869	97.9
Cervix	4703	0.8	0	0	4703	100
Other areas of the uterus	8241	1.3	0	0	8241	100
Over	13599	2.2	0	0	13599	100
Prostate	33042	5.3	33042	100	0	0
Kidney	9785	1.6	6661	68.1	3124	31.9
Bladder	19240	3.1	15993	83.1	3247	16.9
Lymphoid and hematopoietic	59738	9.6	34898	59.4	24839	40.6
Total	624850	100	415644	66.6	209206	33.4

Discussion

Old age is the most important risk factor for many types of cancer [17]. It is known that the proportion of elderly population has increased gradually in our country since 1935 [18]. Life expectancy in Turkey was 50 years in 1970, and it has risen to 78 years according to 2018 data. It is predicted that along with the ratio of elderly population, cancer cases will also increase. The number of cancer patients is growing due to the escalation of risk factors in underdeveloped and developing countries and due to the advances in diagnosis and treatment methods in developed countries. The increase in the number of cancer patients and the decrease in infection-related deaths because of the use of more effective antibiotics compared to the past also lead to a higher cancer-related mortality rate. In our country, cancer-related deaths increased by 28.6% in 2018 compared to 2009, and we think that this is due to the increase in the elderly population.

Cancers are the second most common causes of death in the world after cardiovascular diseases. It is also reported that cancer is responsible for 1/6 of all deaths worldwide [19]. Similarly, in our study, deaths due to cancer constituted approximately 1/5 of all deaths in all regions, except Southeastern Anatolia (Table 1). According to a study conducted by the National Cancer Institute in 2015, 25.4% of cancer cases were detected between the ages of 65-74 years (16). In our study, 27.3% of cancer-related deaths were seen in the 65-74 year-age group (Table 2). In Turkey, another study conducted by the Ministry of Health reported that breast cancer in women and lung cancer in men were increasing [20]. Currently, lung cancer is the most lethal type of cancer worldwide [19]. The most prominent reason is that tobacco use is more common among males. In European countries, the prevalence of lung cancer in females has approached that of males in the recent years [7]. A study conducted at a center in the eastern Anatolia region of Turkey examining lung biopsy reports showed that lung cancer has increased within the last decade [21].

In our study, the most common mortality-causing types were respiratory system malignancies among males and breast cancer among females (Table 3). Turkey's young population resides in Southeastern Anatolia the most and in Black Sea and Marmara regions the least [22]. Cancer risk increases with age [9]. In our study, in accordance with the above findings, we determined that cancer-related mortality rate was lower in the

Southeastern Anatolia Region, where the proportion of the young population was higher. Expectedly, it was higher in the Marmara Region, where the rate of the elderly population was higher (Table 1). We think that the increase in some cancer risk factors such as diet, decrease in physical activity, obesity, and decrease in fertility rate may also contribute to the increase in cancer mortality rate in Marmara region. In general, it is known that the risk of cancer and cancer-related mortality are higher in males compared to that in females over the age of 60 years [22]. This may be caused by the fact that males consume more alcohol, cigarettes, are more exposed to the sun, and prone to various risk factors such as obesity [23]. Our study shows that all cancer types, except gynecological cancers, cause more deaths in men (Table 3). Classification according to geographical regions is especially important in terms of determining different risk factors, evaluating access to diagnosis and treatment, and healthcare planning. Although the most common type of cancer varies from country to country, different types of cancer can be predominant in different regions of the same country. While a decrease in lung cancer incidence is expected due to the tobacco ban in developed countries, it is still increasing in developing countries. Similarly, in terms of female cancers, while breast, ovarian and endometrial cancers increase with the decrease in fertility in developed countries, cervical cancer associated with HPV and multiparity is more common in developing countries [24-27]. In addition, liver cancer due to hepatitis B and C infections is more common because of inadequate hygiene in underdeveloped and developing countries, and rate of gastric cancer is relatively high because of contamination with *Helicobacter pylori* [28,29].

Around 85% of cancer risk factors are changeable and preventable. For this reason, risk factors, and their distribution according to regions, gender, and socioeconomic status can be revealed through statistics and studies. Thus, the necessary study for the target community will be performed more easily. In Turkey, 'Early Cancer Detection Screening and Training Centers' (KETEM) perform mammography for breast cancer. Family health centers perform fecal occult blood tests for colon cancer screening to those over the age of 50 years. It is also possible to detect cancer at an early stage and treat it effectively by recommending endoscopy and colonoscopy screening for patients with a family history of colon and stomach cancer. In 2008, the smoking ban in closed areas took effect in Turkey for the fight against cancer, reducing exposure to tobacco smoke. The government's publications about the harms of smoking and warnings about the relationship between tobacco and cancer on cigarette packages are positive developments in terms of fighting against cancer. Including the hepatitis A and B vaccines in the routine vaccination program will also likely reduce the risk of liver cancer in Turkey. Similarly, in some countries where HPV infection is prevalent, the routine use of the HPV vaccine is a preventive health plan for cervical cancer. Obesity is also an important problem associated with cancer in our era. It is predicted to increase the risk of many cancers such as those of the esophagus, colon, gallbladder, kidney, and breast. Obesity is a preventable disorder because it is associated with excessive calorie intake and reduced physical activity. By encouraging healthy and natural nutrition, raising awareness about obesity by

health institutions can reduce the incidence of cancer and contribute to the prevention of various diseases, such as cardiovascular diseases and diabetes [30]. We believe that inability to evaluate mortality rates of cancer types due to the lack of continuous reporting of annual new cancer case statistics is the primary limitation of our study. The distribution and mapping of cancer types according to geographical regions will help determine focus areas for the healthcare planning. In that regard, since mesothelioma is more frequent in Nevsehir, Turkey, the region's soil was examined, and it was found that soil comprises an excess amount of asbestos mineral. Therefore, some villages were relocated. Regarding geography, it is thought that some types of cancer, such as leukemia and thyroid cancer have increased in the Black Sea region after the Chernobyl disaster in 1986. In terms of cancer, differences in geographical regions may also be related to diet. In the eastern regions of Turkey, esophageal and stomach cancers are more common, and colorectal cancers predominate in the western regions. This is likely related to eating habits. It is known that pickled and smoked foods cause stomach cancer. In addition, excessively hot food consumption is a predisposing factor for esophageal cancer. A decrease in the incidence of stomach cancer is predicted due to easier access to fresh vegetables and better food preservation methods. Smoking also varies over time, according to the regions. While smoking rates decrease in developed countries, it continues to increase in underdeveloped and developing ones [31]. As a result, these countries, which are already challenged economically, will be in a difficult position against the global economic forces because of the cancer burden due to smoking [5]. Grouping new cancer cases according to their age of occurrence, reporting the time from the detection of the disease to death, and similar statistics will be important for decreasing cancer-related mortality and morbidity.

Limitations

As a result of incomplete reporting of data on cancer statistics, institutional errors can be considered as the limitation of our study.

Conclusions

We think that our study is notable since it covers a 10-year period and reveals differences according to age groups, gender, cancer types, and geographical regions. Cancer statistics are important in terms of developing health policies, bringing preventive healthcare to the fore, increasing cancer screening rates in risky individuals, and conducting studies for early cancer diagnosis. Early diagnosis of cancer will reduce the treatment costs of countries.

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