

## Original Research Article

# Cancer frequency: Kars province

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### ABSTRACT

**Background:** Malignant tumors are important causes of mortality and morbidity in the world. It is known that the incidence of tumors- in which a large number of etiologic agents are identified and continued to be investigated-varies according to age, gender and geographical location. This study aimed to determine the prevalence and localization distributions of malignant tumors in Kars.

**Methods:** The study included 17012 patients whose biopsy materials were evaluated in the Department of Pathology of Kafkas University Health Research and Practice Hospital between 2014-2017.

**Results:** The mean age of all cancer cases was  $63.3 \pm 14.8$  and the median age was 63. The cancer frequency was detected 22.6% in 2014, 23.3% in 2015, 26.9% in 2016 and 27.2% in 2017 with general slight male dominance.

**Conclusions:** The incidence of cancer in our country is found to be lower compared to the world data. It is necessary to examine and take into account the regional and city-based cancer statistics that serve as an important key stone in the planning of health policies and health investments in our country. Regional data is not only important for treatment services, but also for preventive health services and early diagnosis.

**Keywords:** Cancer, Frequency, Kars, Statistics, Tumor

### INTRODUCTION

Malignant tumors are important causes of mortality and morbidity in the world. These tumors are the leading causes of death in developed countries and they are the second most common cause deaths after cardiac diseases in developing countries.<sup>1</sup> The incidence of tumors in which a large number of etiologic agents are identified and continued to be investigated, varies according to age, gender and geographical location. These differences in the world stand out among the countries and even cities. Turkey is located in West Asia region when the world is divided into 22 regions based on cancer frequency and

mortality rates considering the geographical characteristics and living conditions.<sup>2</sup> Despite the increase in cancer registry comprehensibility in our country, there are still shortcomings in the reports even though the rates are more accurate compared to previous years. It is important to determine the frequency of cancer for many reasons, especially for the mortality, morbidity, reduction of quality of life, negative effects on personal and national economy. Assessment of overall cancer incidence in Turkey, it is reported to be 221.5 per hundred thousands, and most frequent cancer seen among women is breast and lung among men.<sup>3</sup> When the studies conducted in different cities within the country are

evaluated; İzmir and Konya showed similar results to overall Turkey's data with highest rates of breast cancer among women and lung among men.<sup>4,5</sup> In a study conducted in Van, the most common cancer among women is reported to be esophagus cancer and prostate cancer among men, and in Corum, the most common cancer among both men and women has been reported as skin cancer.<sup>6,7</sup> In this present study, it was aimed to determine the prevalence, age, sex and localization distributions of malignant tumors in Kars, which is one of border cities in Eastern Anatolia region.

## METHODS

The study included 17012 patients whose biopsy materials were evaluated in the Department of Pathology of Kafkas University Health Research and Practice Hospital between 2014-2017. Cases with suspected diagnosis and cases with only cytology material were excluded from the study. Frequency analyzes and statistical evaluations of the data obtained by scanning the pathology reports in the hospital information management system were performed with SPSS 15.0 package program. Patients with tumor recurrence were

evaluated with the first biopsy diagnoses. Incisional and excisional biopsy reports were evaluated together for final data analysis in cases who have both. Gender, age, organ and system distributions of 663 cases diagnosed with cancer were determined.

## RESULTS

The mean age of all cancer cases was  $63.3 \pm 14.8$  and the median age was 63. The mean age of the cases in 2014 was  $65.5 \pm 13.4$ , in 2015:  $63.4 \pm 16.9$ , in 2016:  $60.9 \pm 15.9$  and in 2017:  $63.8 \pm 12.8$ . When the age distribution of the cases was analyzed according to years, it was observed that the mean of 2014 was statistically higher than that of 2016 ( $p = 0.011$ ), but there was no difference between the other years ( $p > 0.05$ ). Of all the cases, 291 (43.9%) were female and 372 (56.1%) were male. When the general tumor frequency was evaluated with chi-square test between male and female cases, it was found that the frequency of tumors in male cases was statistically higher than female cases ( $p = 0.002$ ).

**Table 1: Distribution of cancer cases by years and the cancer frequency in women and men.**

Year	Number of biopsies (N/%)	General (N/%)	Women (N/%)	Men (N/%)
2014	3851 (22.6)	206 (31.1)	69 (33.5)	137 (66.5)
2015	3958 (23.3)	138 (20.8)	54 (39.1)	84 (60.9)
2016	4582 (26.9)	167 (25.2)	84 (53.3)	83 (49.7)
2017	4621 (27.2)	152 (22.9)	84 (55.3)	68 (44.7)
Total	17012 (100)	663 (100)	291 (43.9)	372 (56.1)

**Table 2: General and yearly distribution of cancer cases by organ.**

Localization (organ)	General (N/%)	2014 (N/%)	2015 (N/%)	2016 (N/%)	2017 (N/%)
Stomach	95 (14.3)	10 (19.4)	17 (12.3)	17 (10.2)	21 (13.8)
Colorectum	86 (13.0)	27 (13.1)	15 (10.9)	24 (14.4)	20 (13.2)
Esophagus	22 (3.3)	9 (4.4)	4 (2.9)	4 (2.4)	5 (3.3)
Skin	75 (11.3)	28 (13.6)	18 (13.0)	11 (6.6)	18 (11.8)
Soft tissue	5 (0.8)	1 (0.5)	3 (2.2)	0 (0)	1 (0.7)
Prostate	79 (11.9)	28 (13.6)	13 (9.4)	21 (12.6)	17 (11.2)
Urinary bladder	55 (8.3)	17 (8.3)	14 (10.1)	12 (7.2)	12 (7.9)
Breast	80 (12.1)	8 (3.9)	14 (10.1)	38 (22.8)	20 (13.2)
Thyroid	92 (13.9)	29 (14.1)	19 (13.8)	26 (15.6)	18 (11.8)
Kidney	9 (1.4)	1 (0.5)	4 (2.9)	3 (1.8)	1 (0.7)
Nasopharynx	3 (0.5)	3 (1.5)	1 (0.7)	1 (0.6)	0 (0)
Lymphoid	8 (1.2)	2 (1.0)	3 (2.2)	1 (0.6)	1 (0.7)
Brain	4 (0.6)	3 (1.5)	2 (1.4)	0 (0)	0 (0)
Bone	4 (0.6)	4 (1.9)	1 (0.7)	0 (0)	0 (0)
Lung	8 (1.2)	1 (0.5)	3 (2.2)	1 (0.6)	0 (0)
Endometrium	19 (2.9)	3 (1.5)	2 (1.4)	3 (1.8)	13 (8.6)
Uterine cervix	4 (0.6)	1 (0.5)	0 (0)	1 (0.6)	0 (0)
Salivary gland	5 (0.8)	1 (0.5)	1 (0.7)	1 (0.6)	2 (1.3)
Ovary	5 (0.8)	0 (0)	1 (0.7)	1 (0.6)	3 (2.0)
Larynx	2 (0.3)	0 (0)	2 (1.4)	0 (0)	0 (0)
Gallbladder	1 (0.1)	0 (0)	1 (0.7)	0 (0)	0 (0)
Testis	1 (0.1)	0 (0)	0 (0)	1 (0.6)	0 (0)
Adrenal	1 (0.1)	0 (0)	0 (0)	1 (0.6)	0 (0)
Total	663 (100)	206 (100)	138 (100)	167 (100)	152 (100)

**Table 3: General and yearly distribution of cancer cases by system.**

Localization (System)	General (N/%)	2014 (N/%)	2015 (N/%)	2016 (N/%)	2017 (N/%)
Gastrointestinal	204 (30.8)	76 (36.9)	37 (26.8)	45 (26.9)	46 (30.3)
Urogenital	144 (21.7)	46 (22.3)	31 (22.5)	37 (22.2)	30 (19.7)
Head-neck	10 (1.5)	2 (1.0)	4 (2.9)	2 (1.2)	2 (1.3)
Skin	75 (11.3)	28 (13.6)	18 (13.0)	11 (6.6)	18 (11.8)
Soft tissue-bone	9 (1.4)	4 (1.9)	4 (2.9)	0 (0)	1 (7)
Female genital	28 (4.2)	4 (1.9)	3 (2.2)	5 (3.0)	16 (10.5)
Lymphoid	8 (1.2)	3 (1.5)	3 (2.2)	1 (0.6)	1 (0.7)
Breast	80 (12.1)	8 (3.9)	14 (10.1)	38 (22.8)	20 (13.2)
Endocrine	93 (14.0)	29 (14.1)	19 (13.8)	27 (16.2)	18 (11.8)
Lung	8 (1.2)	4 (1.9)	3 (2.2)	1 (0.6)	0 (0)
Brain	4 (0.6)	2 (1.0)	2 (1.4)	0 (0)	0 (0)
Total	663 (100.0)	206 (100)	138 (100.0)	167 (100)	152 (100)

**Table 4: General and yearly distribution of cancer cases by organ in women.**

Localization (organ)	General (N/%)	2014 (N/%)	2015 (N/%)	2016 (N/%)	2017 (N/%)
Stomach	27(9.3)	9 (13.0)	3 (5.6)	3 (3.6)	12 (14.3)
Colorectum	40 (13.7)	13 (18.8)	6 (11.1)	11 (13.1)	10 (11.9)
Eosophagus	7 (2.4)	2 (2.9)	2 (3.7)	1 (1.2)	2 (2.4)
Skin	23 (7.9)	7 (10.1)	7 (13.0)	4 (4.8)	5 (6.0)
Soft tissue	2 (0.7)	0 (0)	2 (3.7)	0 (0)	0 (0)
Urinary bladder	8 (2.7)	1 (1.4)	0 (0)	2 (2.4)	5 (6.0)
Breast	77 (26.5)	8 (11.6)	12 (22.2)	38 (45.2)	19 (22.6)
Thyroid	68 (23.4)	21 (30.4)	14 (25.9)	19 (22.6)	14 (16.7)
Kidney	3 (1.0)	1 (1.4)	2 (3.7)	0 (0)	0 (0)
Lymphoid	3 (1.0)	1 (1.4)	2 (3.7)	0 (0)	0 (0)
Brain	1 (0.3)	1 (1.4)	0 (0)	0 (0)	0 (0)
Bone	1 90.3)	1 (1.4)	0 (0)	0 (0)	0 (0)
Lung	1 90.3)	0 (0)	0 (0)	1 (1.2)	0 (0)
Endometrium	19 (6.5)	1 (1.4)	2 (3.7)	3 (3.6)	13 (15.5)
Uterine Cervix	3 (1.0)	2 (2.9)	0 (0)	1 (1.2)	0 (0)
Salivary gland	2 (0.7)	1 (1.4)	0 (0)	0 (0)	1 (1.2)
Ovary	5 (1.7)	0 (0)	1 (1.9)	1 (1.2)	3 (3.6)
Gallbladder	1 (0.3)	0 (0)	1 (1.9)	0 (0)	0 (0)
Adrenal	1 90.3)	0 (0)	0 (0)	0 (0)	0 (0)
Total	291 (100)	69 (100)	54 (100)	84 (100)	84 (100)

**Table 5: General and yearly distribution of cancer cases by system in women.**

Localization (System)	General (N/%)	2014 (N/%)	2015 (N/%)	2016 (N/%)	2017 (N/%)
Gastrointestinal	75 (25.8)	24 (34.8)	12 (22.2)	15 (17.9)	24 (28.6)
Urogenital	11 (3.8)	2 (2.9)	2 (3.7)	2.4 (2.4)	5 (6)
Head-neck	2 (0.7)	1 (1.4)	0 (0)	0 (0)	1 (1.2)
Skin	23 (7.9)	7 (10.1)	7 (13.0)	4 (4.8)	5 (6.0)
Soft tissue-bone	3 (1.0)	1 (1.4)	2 (3.7)	0 (0)	0 (0)
Female genital	27 (9.3)	3 (4.3)	3 (5.6)	5 (6.0)	16 (19.0)
Lymphoid	3 (1.0)	1 (1.4)	2 (3.7)	0 (0)	0 (0)
Breast	77 (26.5)	8 (11.6)	12 (22.2)	38 (45.2)	19 (22.6)
Endocrine	68 (23.4)	21 (30.4)	14 (25.9)	19 (22.5)	14 (16.7)
Lung	1 (0.3)	0 (0)	0 (0)	1 (1.2)	0 (0)
Brain	1 (0.3)	1 (1.4)	0 (0)	0 (0)	0 (0)
Total	291 (100)	69 (100)	54 (100)	84 (100)	84 (100)

**Table 6: General and yearly distribution of cancer cases by organ in men.**

Localization (organ)	General (N/%)	2014 (N/%)	2015 (N/%)	2016 (N/%)	2017 (N/%)
Stomach	68 (18.3)	31 (22.6)	14 (16.7)	14 (16.9)	9 (13.0)
Colorectum	46 (12.4)	14 (10.2)	9 (10.7)	13 (15.7)	10 (14.5)
Eosophagus	15 (4.0)	7 (5.1)	2 (2.4)	3 (3.6)	3 (4.3)
Skin	52 (14.0)	21 (15.3)	11 (13.1)	7 (8.4)	14 (20.3)
Soft tissue	3 (0.8)	1 (0.7)	1 (1.2)	0 (0)	1 (1.4)
Prostate	79 (21.2)	28 (20.4)	13 (15.5)	21 (25.3)	17 (24.6)
Urinary bladder	47 (12.6)	16 (11.7)	14 (16.7)	10 (12.0)	7 (10.1)
Breast	3 (0.8)	0 (0)	2 (2.4)	0 (0)	1 (1.4)
Thyroid	24 (6.5)	8 (5.8)	5 (6.0)	7 (8.4)	4 (5.8)
Kidney	6 (1.6)	0 (0)	2 (2.4)	3 (3.6)	1 (1.4)
Nasopharynx	3 (0.8)	1 (0.7)	1 (1.2)	1 (1.2)	0 (0)
Lymphoid	5 (1.3)	2 (1.5)	1 (1.2)	1 (1.2)	1 (1.4)
Brain	3 (0.8)	1 (0.7)	2 (2.4)	0 (0)	0 (0)
Bone	3 (0.8)	2 (1.5)	1 (1.2)	0 (0)	0 (0)
Lung	7 (1.9)	4 (2.9)	3 (3.6)	0 (0)	0 (0)
Salivary gland	3 (0.8)	0 (0)	1 (1.2)	1 (1.2)	1 (1.4)
Larynx	2 (0.5)	0 (0)	2 (2.4)	0 (0)	0 (0)
Testis	1 (0.3)	0 (0)	0 (0)	1 (1.2)	0 (0)
Adrenal	1 (0.3)	0 (0)	0 (0)	1 (1.2)	0 (0)
Total	372 (100)	137 (100)	84 (100)	83 (100)	68 (100)

**Table 7: General and yearly distribution of cancer cases by system in men.**

Localization (System)	General (N/%)	2014 (N/%)	2015 (N/%)	2016 (N/%)	2017 (N/%)
Gastrointestinal	129 (34.7)	52 (38.0)	25 (29.8)	30 (36.1)	22 (31.9)
Urogenital	133 (35.8)	44 (32.1)	29 (34.5)	35 (42.2)	25 (36.2)
Head-neck	8 (2.2)	1 (0.7)	4 (4.8)	2 (2.4)	1 (1.4)
Skin	52 (14.0)	21 (15.3)	11 (13.1)	7 (8.4)	14 (20.3)
Soft tissue-bone	6 (1.6)	3 (2.2)	2 (2.4)	0 (0)	1 (1.4)
Lymphoid	5 (0.3)	2 (1.5)	1 (1.2)	1 (1.2)	1 (1.4)
Breast	3 (1.3)	0 (0)	2 (2.4)	0 (0)	1 (1.4)
Endocrine	25 (6.7)	8 (5.8)	5 (6.0)	8 (9.6)	4 (5.8)
Lung	7 (1.9)	4 (2.9)	3 (3.6)	0 (0)	0 (0)
Brain	3 (0.8)	1 (0.7)	2 (2.4)	0 (0)	0 (0)
Total	372 (100)	137 (100)	84 (100)	83 (100)	68 (100)

The distribution of cancer cases by years and their frequency in females are presented in Table 1. According to the statistics done by Mann Whitney U test for years, it was found that cancer cases were statistically higher in 2014 than in 2015, 2016 and 2017 (p values were 0.000, 0.043, 0.004, respectively). No significant difference was observed between the other years ( $p > 0.05$ ).

The distribution of all cancer cases according to the general and yearly based on organ is given in Table 2 and the distribution of based on system is given in Table 3.

The mean age of the women cases was  $58.9 \pm 15.2$  and the median age was 5 years. The mean age of women in the year 2014 was  $60.4 \pm 14.9$ , 2015 was  $57.2 \pm 18.1$ , 2016 was  $55.6 \pm 15.3$ , and in 2017 it was  $62.1 \pm 12.5$ . Table 4 shows

the general and yearly distribution in terms of organ and Table 5 shows distribution according to organ basis in women.

The mean age of men was  $66.7 \pm 13.5$  and median was 68 years. The mean age of the year 2014 was  $68.0 \pm 11.9$ , 2015 was  $65.7 \pm 15.3$ , 2016 was  $66.3 \pm 14.7$ , and 2017 was  $66.1 \pm 13.1$ . Table 6 shows the general and yearly distribution in terms of organ and Table 7 shows distribution according to organ basis in men.

## DISCUSSION

There are 25 million cancer cases and 12.4 million new cases of cancer in the world according to the World Health Organisation's (WHO) 2010 data.<sup>8</sup> It is known that

cancer incidence is increasing all over the world. The main reason for this situation is the increase in diagnostic facilities and increase in the access to the diagnostic facilities. Likewise, cancer survival is also increased due to the advance in diagnostic facilities as well as treatment options and success of treatment. In Turkey in 2013, according to Ministry of Health statistics, cancer incidence is reported as 281.6 per 100000.<sup>9</sup> Table 8 shows five most frequent tumors detected in our study and other study's results conducted in different provinces

of Turkey. As it is understood from the Table 8, the different sequence of tumor frequencies in different cities suggests that many factors effect tumor diversity. One of them is socioeconomic status and cultural differences. The probable cause of the higher incidence of breast cancers in women in Istanbul may be considered as socio-culturally the cosmopolitan structure of Istanbul and the relative altitude at the level of education. Another important reason is the effect of climatic factors which is related to skin carcinomas as it is observed in Hatay.

**Table 8: The most frequent tumors that were detected in our study and various studies from different cities in Turkey (\*our study, \*\* CNS: Central nervous system).**

City	1	2	3	4	5
Kars*	Stomach	Thyroid	Colorectum	Breast	Prostate
Konya <sup>5</sup>	Lung	Stomach	CNS**	Hematologic	Colon
Çorum <sup>7</sup>	Skin	Prostate	Stomach	Urinary bladder	Breast
Van <sup>10</sup>	Stomach	Eosophagus	Breast	Colorectum	Lung
İstanbul <sup>11</sup>	Breast	Colorectum	Stomach	Lung	Prostate
Hatay <sup>12</sup>	Skin	Breast	Urinary bladder	Colorectum	Prostate
Şırnak <sup>13</sup>	Skin	Thyroid	Colorectum	Breast	Stomach

Similar to our study, Van is another city where stomach cancers are common, and is also one of the cities where cold winter months pass due to geographical location and hot drinks are consumed at high frequency and high temperature. In a study evaluating gastric endoscopic biopsies performed in Kars province, the presence of *Helicobacter pylori* (Hp) was detected in 72.1% of biopsies.<sup>14</sup> Therefore, we suggest that the incidence of high Hp also plays a role in the etiopathogenesis of stomach cancers which is most common cancer in Kars.

When world-wide data are analyzed, the most common cancers in women can be counted as breast, colorectal,

uterine cervix; and in men, lung, prostate and colorectal.<sup>15</sup> According to US data of 2012, the 3 most common tumors in women were breast, lung, colorectal carcinomas; and in men prostate, lung colorectal carcinomas.<sup>15</sup> A study in year 2000 revealed that head and neck cancers were the first in both women and men, while colon cancer was the second in both sexes in France.<sup>16</sup> Breast cancer in women and lung cancer in men has been reported in third place in the same study. According to 2013 data from Turkey, breast, thyroid and colorectal carcinomas are the most common cancers in women and lung, prostate and bladder cancers in men.<sup>9</sup>

**Table 9: 3 most common type of cancer in men and women in Kars and different cities in Turkey (\*our study, \*\* CNS: Central nervous system).**

	Women 1	Men 1	Women 2	Men 2	Women 3	Men 3
Kars*	Breast	Prostate	Thyroid	Stomach	Colon	Skin
İzmir <sup>4</sup>	Breast	Lung	Skin	Skin	Endometrium	Larynx
Konya <sup>5</sup>	Breast	Lung	CNS**	Stomach	Hematological	Hematological
Van <sup>6</sup>	Eosophagus	Prostate	Stomach	Skin	Skin	Lung
Çorum <sup>7</sup>	Skin	Skin	Breast	Prostate	Thyroid	Urinary bladder
İstanbul <sup>11</sup>	Breast	Colorectum	Colorectum	Lung	Gynecological	Stomach
Hatay <sup>12</sup>	Skin	Skin	Thyroid	Colorectum	Breast	Stomach
Eskişehir <sup>17</sup>	Breast	Skin	Skin	Larynx	Colorectum	Lung
Sivas <sup>18</sup>	Skin	Skin	Breast	Urinary bladder	Endometrium	Prostate
Şanlıurfa <sup>19</sup>	Breast	Urinary bladder	Stomach	Lung	Thyroid	Larynx
Diyarbakır <sup>20</sup>	Skin	Skin	Breast	Lymphoid	Lymphoid	Lung



Table 9 shows the most common cancer types among women and men of our study and various studies from different cities of Turkey. When the data of the table are evaluated, even there are differences between the cities in male and female patients similar to general cancer frequencies; breast cancers are the most common cancers in women in most cities. As in the general cancer data, one other similarity observed between Van and Kars is that the most common male cancer is prostate cancer. Although thyroid lesions are more common in women in general, it is not considered to be a coincidence that the second most common type of cancer in Kars is thyroid. Kars is located on the border with Armenia due to its geographical location. The "Metsamor" nuclear power plant is still working and it is one of the oldest nuclear power plants in the world. This nuclear power plant does not have a protection basin to protect nuclear fuel in the same way as the nuclear power plant in Chernobyl. Therefore, high frequency thyroid cancers detected in Kars are thought to be associated with radiation. Gastric cancers in men are thought to be associated with hot drink consumption and Hp as in general tumor incidence. It is thought that fiber-poor nutrition may play a role in the etiology of colorectal carcinomas which are observed in women in the third place. Another study in Kars also revealed the relative high incidence (10.4%) in colorectal carcinoma in women while evaluating the colonoscopic biopsy results.<sup>21</sup> Basal cell carcinoma and squamous cell carcinoma constitute the majority of skin cancers in men which takes the third place in men in Kars. This situation can be explained by the sun exposure of the local people engaged in animal husbandry.

Since 1982, cancer is one of the mandatory diseases in our country. In Turkey in 2013, according to Ministry of Health statistics, cancer incidence is reported as 281.6 per 100000.<sup>9</sup> The incidence of cancer in our country is found to be lower compared to the world data, however it is doubtful whether this decrease represents a reality or not. Although the cancer registry system was first established in 1992, it is known that there are still some deficiencies and limitations in the notification of the cases. It can be argued that this situation is caused by the rural populations and inadequacy of medical controls as well as the inability of the registry system to be active due to the inadequate application of patients in primary health care institutions.

## CONCLUSION

It is necessary to examine and take into account the regional and city-based cancer statistics that serve as an important key stone in the planning of health policies and health investments in our country. Regional data is not only important for treatment services, but also for preventive health services and early diagnosis. In this context, it is thought that the publications which include

the annual city based data from all cities should be increased in Turkey as well as the whole world.

This study has several limitations. The study data were collected from Health Research and Application Hospital in Kars between 2014-2017. The fact that the State Hospital data could not be included is an important limitation of the study. Between 2014-2017 some departments such as pulmonary diseases department did not actively served time to time. Moreover the lack of treatment facilities for leukemia/lymphoma and brain tumors lead patient's attendance to larger health centers for diagnosis. These and similar conditions cause false negativities in the proportion of related tumors

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