# Cancer Prevalence and Risk Factors in a Province in the Mediterranean Region, Turkey

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**OBJECTIVE**
This study aims to reflect the latest information about cancer frequencies and involving factors in Mersin province, Turkey.

**METHODS**
A questionnaire with 40-item consisting of 18 questions regarding demographic characteristics, the behavior of lifestyle and health issues, 12 questions regarding health status, and 10 questions about the health of nearby was applied by interviewers using face to face method to 9547 participants.

**RESULTS**
Out of 9547 participants, 122 of them (1.3%) was cancer patients, while 9425 (98.7%) were not diagnosed with cancer. Average time since cancer diagnosis was 6.4±4.9 years. Out of 122 people that had cancer, 24 people (19.7%) did not receive any cancer treatment. The most common incident sites of cancer were breast, prostate and lung. There was a significant relation between cancer and smoking, alcohol consumption, having a chronic disease, having a relative died from cancer and ever being have a cancer scan.

**CONCLUSION**
Concentrating in regions that need more service and risky areas and increasing cancer training and screening activities should be done. In the light of this research, similar studies in the future will help to track cancer status and varying service needs.

**Keywords:** Cancer; prevalence; risk factor; mediterranean; Turkey.
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## Introduction

Cancer is a major cause of morbidity and mortality, with approximately 14 million new cases and 8 million cancer-related deaths in 2012, affecting populations in all countries and all regions. These estimates correspond to age-standardized incidence and mortality rates of 182 and 102 per 100.000, respectively.[1]

Prevalence estimates for 2012 indicate that there were 8.7 million people (older than 15 years) alive who had had cancer diagnosed in the previous year, 22.0 million with a diagnosis in the previous three years and 32.6 million with a diagnosis in the previous five years. The worldwide estimate for the number of cancers diagnosed in childhood (ages 0–14 years) in 2012 is 165 000 (95 000 in boys and 70 000 in girls).[2,3]

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Kurt et al.
Cancer Prevalence and Risk Factors in Mersin

381

In Turkey, cancer incidence is calculated as 180-200 in 100.000 according to existing data, and this figure is half that of the EU States. An important reason for such a difference in incidence between Turkey and the European Union Member States is the age distribution of the population. Cancer is essentially a middle-elder age disease and 90% of the newly diagnosed individuals with cancer are 45 years old or older. In Turkey, in accordance with 2000 data, individuals 45 years old or older make up 20.6% of the population, while the same year in France individuals 45 years old or older make up 39.2% of the population.[4] The most common 10 cancer types in both sexes are shown in Figure 1 and 2.

With a population of seventy-eight million and an incidence of 200 in 100.000, every year, 156.000 new cancer cases are expected in Turkey.[6]
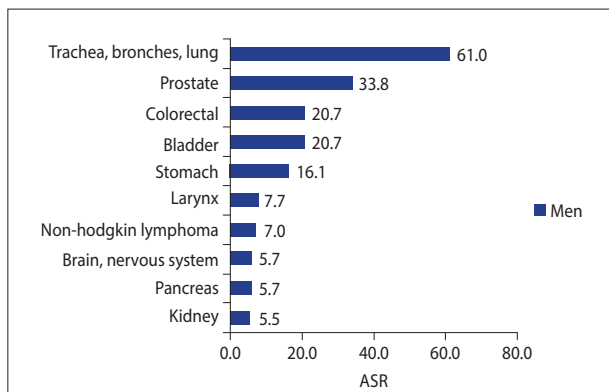


**Fig.1.** Age-standardized rates of most common 10 cancers in males (Turkey United Database, 2010) (world standard population, 100.000 people) [5].
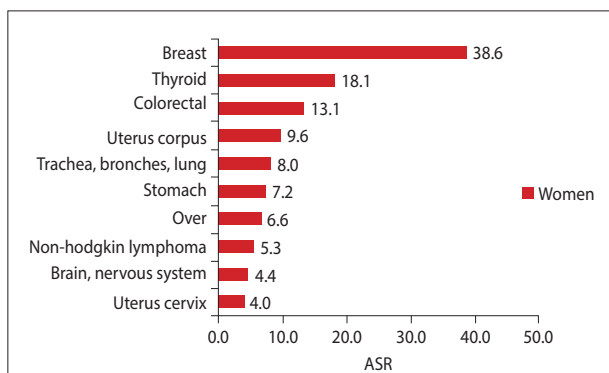


**Fig.2.** Age-standardized rates of most common 10 cancers in females (Turkey United Database, 2010) (world standard population, 100.000 people) [5].

Cancer prevention in Turkey is managed under certain programmes related to different subjects. These programmes are: Tobacco Control Programme, Alcohol Control Programme, Nutritional Health and Physical Activity Program, Reduction of Excessive Salt Consumption Program, Strategic Asbestos Control Program and Radon Mapping and Control Program. These are all nationwide programs. Also, there are ongoing studies, registry and control programs related to region-specific cancer problems within certain areas.[7]

Population-based screening and public training programs about breast, cervix and colorectal cancers are being organized within these centres. Public service related to cancer early diagnosis, screening and treatment is presented to the public free of charge.[8]

Breast and cervical cancer screening have begun within the framework of a national programme, and efforts to expand them to 81 provinces have been successful. At least one Cancer Early Diagnosis, Screening and Training Centre (KETEM) has been opened in each particular city in Turkey. The total number of these centres has now reached 134.[9]

In this context, surveying and analysis studies should be performed to reach reliable data for use in combating cancer, determine the priority of struggle, understand cancer burden, estimate new cases, see cancer prevalence and create cancer patient profile. This study was carried out in line with these goals.

## Materials and Methods

This is a descriptive type, cross-sectional base study about cancer prevalence and risk factors in Mersin province, Turkey.

The total population over the age of 18 across the province were identified as 1.217.563. In the Epi Info program, 95% confidence level, 1% confidence limit and as we wanted to reach maximum people, 50% expected frequency was calculated and the survey was planned to apply to 9547 people.

The distribution of participants was clustered according to the population density of the districts (Table 1) and age groups (Table 2).

After training the interviewers about the survey, 30 people pre-applied the questionnaire and necessary corrections were made.

By 18 questions regarding demographic characteristics, behavior of lifestyle and health issues; 12 questions regarding health status; and 10 questions about the health of nearby, 40-item questionnaire was applied by interviewers with face to face method to 9547 par-

**Table 1**    Distribution of the participants by district

| District name | n | % |
|---|---|---|
| Tarsus | 1791 | 18.8 |
| Toroslar | 1554 | 16.3 |
| Akdeniz | 1525 | 16.0 |
| Yenişehir | 1290 | 13.5 |
| Mezitli | 908 | 9.5 |
| Erdemli | 735 | 7.7 |
| Silifke | 642 | 6.7 |
| Anamur | 353 | 3.7 |
| Mut | 344 | 3.6 |
| Bozyazı | 147 | 1.5 |
| Gülnar | 144 | 1.5 |
| Aydıncık | 62 | 0.6 |
| Çamlıyayla | 52 | 0.5 |
| Total | 9547 | 100.0 |

**Table 2**    Sociodemographic characteristics of the participants

| Sociodemographic characteristics | n | % |
|---|---|---|
| Gender | | |
| Female | 4806 | 50.3 |
| Male | 4741 | 49.7 |
| Age groups (Year) | | |
| 18-27 | 2756 | 28.9 |
| 28-37 | 2145 | 22.5 |
| 38-47 | 1933 | 20.2 |
| 48-57 | 1382 | 14.5 |
| 58-67 | 844 | 8.8 |
| Over 67 | 487 | 5.1 |
| Marital status | | |
| Married | 5782 | 60.6 |
| Single | 3238 | 33.9 |
| Divorced or widowed | 527 | 5.5 |
| Education | | |
| Illiterate | 253 | 2.7 |
| Literate | 164 | 1.7 |
| Primary school | 2460 | 25.8 |
| Secondary school | 1258 | 13.2 |
| High school | 3282 | 34.4 |
| University | 2130 | 22.3 |
| Monthly household income | | |
| Below 900 Turkish Liras | 1352 | 14.1 |
| 901-1800 Turkish Liras | 3375 | 35.4 |
| 1801-2700 Turkish Liras | 1382 | 14.5 |
| Over 2701 Turkish Liras | 1679 | 17.6 |
| No answer | 1759 | 18.4 |
| Social security status | | |
| Have a social security | 8237 | 86.3 |
| Don't have a social security | 1310 | 13.7 |
| Total | 9547 | 100.0 |

ticipants after they accepted informed consent. This study was carried out in all 13 regions of Mersin province between July-September 2015.

Data were evaluated using SPSS 19.0 software packages and Pearson Chi-Square tests were used. $P<0.05$ was considered significant.

This research was started after obtaining the necessary approvals from all government agencies. Mersin Public Health Directorate granted Ethical approval to carry out the study within its facilities (Ethical Application Ref: 15622316/604.01.02).

**Results**

Survey work was completed by applying in 9547 people. Four thousand eight hundred six respondents (50.3%) were female, 4741 (49.7%) were male. The average age of the participants was 39.1±15.5 (min=18 max=88). The average age of the males was 39.9±15.9, while women had an average age of 38.1±15.1. While most of the participants were in the age group of 18-27, 487 (5.1%) were in the group aged over the age of 67. High school were the majority of participants' education status (3282, 34.4%) (Table 2).

One hundred and twenty-two people (1.3%) were cancer patients, while 9425 (98,7%) were not diagnosed with cancer. Average time since cancer diagnosis was 6.4±4.9 years (min: 1 month, max: 32 years ago). Sixty-five patients (53.3%) was diagnosed in State Hospital, 41 patients (33.6%) in University Hospital, 15 people (12.3%) in a private hospital, and one patient (0.8%) received the diagnosis in a military hospital. Out of these 122 patients, 49 (40.2%) patients

received chemotherapy, 10 (8.2%) patients received radiation therapy, 22 (18.0%) patients underwent surgical treatment. Twenty-four patients (19,7%) did not receive any treatment. None of the cancer patients used alternative treatment. Most cancer patients were 48-57 years old. Characteristics of cancer patients are shown in Table 3.

Thirty-seven males and 85 females were diagnosed with cancer. Significantly different, females had more cancer than males (p<0.001). Thirty-seven of cancer patients were smoking, 63 patients were not and 22 patients have given up smoking. Smokers had more cancer than non-smokers (p=0.002), and patients who have given up smoking had even more cancer than smokers (p<0.001) and non-smokers (p<0.001). While 38 of cancer patients were alcohol consumers,

Kurt et al.
Cancer Prevalence and Risk Factors in Mersin

383

| Table 3 | Characteristics of the cancer patients | | |
|---|---|---|---|
| | | n | % |
| Gender | | | |
| Male | | 37 | 30 |
| Female | | 85 | 70 |
| Age groups | | | |
| 18-27 | | 3 | 2.4 |
| 28-37 | | 21 | 17.3 |
| 38-47 | | 29 | 23.7 |
| 48-57 | | 30 | 24.6 |
| 58-67 | | 12 | 9.8 |
| Over 67 | | 27 | 22.2 |
| Organ of cancer | | | |
| Breast | | 43 | 35.4 |
| Prostate | | 12 | 9.8 |
| Lung | | 11 | 9.1 |
| Thyroid | | 10 | 8.2 |
| Skin | | 10 | 8.2 |
| Larynx | | 9 | 7.4 |
| Uterine+cervix | | 8 | 6.6 |
| Lymph | | 5 | 4.1 |
| Over | | 2 | 1.6 |
| Stomach | | 2 | 1.6 |
| Blood | | 2 | 1.6 |
| Gallbladder | | 2 | 1.6 |
| Eye | | 2 | 1.6 |
| Pituitary | | 2 | 1.6 |
| Colon | | 1 | 0.8 |
| Kidney | | 1 | 0.8 |
| Treatment type | | | |
| Chemotherapy | | 49 | 40.2 |
| Radiation therapy | | 10 | 8.2 |
| Surgical | | 22 | 18.0 |
| Chemotherapy+radiotherapy | | 3 | 2.4 |
| Chemotherapy+surgery | | 3 | 2.4 |
| Chemotherapy+radiotherapy+surgery | | 11 | 9.1 |
| Not taking any treatment | | 24 | 19.7 |
| Total | | 122 | 100.0 |

84 patients were not. Alcohol consumers had significantly more cancer than those who did not consume (p=0.001). While 52 of cancer patients had a chronic disease, 70 did not have. Significantly different, patients who had chronic diseases had more cancer than patients who did not have (p<0.001). Seventeen of cancer patients had a relative with cancer as 105 patients did not have. There was no significant difference between these two groups. While 47 of cancer patients had a relative died from cancer, 75 did not have. Significantly different, patients who had a relative died from cancer had more cancer than patients who did not have (p=0.002). Ninety-six of cancer patients had a cancer

scan while 25 had not. Significantly different, patients who had cancer scans had more cancer than patients who did not have (p<0.001) (Table 4).

## Discussion

This study tried to reflect the latest information about cancer frequencies and involving factors in Mersin province, Turkey. Advancing age is the most important risk factor for cancer overall and for many individual cancer types. According to the most recent statistical data from NCI's Surveillance, Epidemiology, and End Results program, the median age of a cancer diagnosis is 65 years in the USA, which suggests that half of the cancer cases occur in people below this age and half in people above this age. One-quarter of new cancer cases are diagnosed in people aged 65 to 74.[10] In our study, the mean age of the patients diagnosed with cancer was 45. It is thought to be because the number of young people included in the study is larger than the elderly.

Cancer cases by type of cancer were also coherent with the literature. We found the most three common incident sites of cancer to be 1. Breast, 2. Prostate and 3. Lung. GLOBOCAN shows 1. Lung 2. Breast 3. Colorectum 4. Prostate as the most seen types of cancer in the world. When we look at Europe, the breast is the number one cancer type of Europe, as colorectum comes second, prostate comes third and lung comes fourth.[2] According to Turkish statistics, most seen cancers were 1. Lung, 2. Breast and 3. Prostate.[11] There was only one research about cancer statistics in Mersin. Aydin et al. found the most common cancers in Mersin as 1. Skin, 2. Gastrointestinal system, 3. Respiratory system and 4. Breast. This was histopathological research made in hospitals.[12]

In our study, 40.2% of cancer patients received chemotherapy, 18.0% underwent surgical treatment, and 8.2% received radiation therapy. In another field study in Çorum/Turkey, 53.4% received surgery, 17.1% radiation therapy and 0.4% radiation therapy.[13] As the distribution of cancer types was different in two cities, this result was found to be normal. In that study, 28.5% of the patients did not receive any treatment. Similarly, in our study, 19.7% patients did not take any treatment. Advanced stage and advanced age are related to non-treatment rates.[14]

Based on extensive reviews of research studies, there is a strong scientific consensus of an association between alcohol drinking and several types of cancer.[15,16] Alcohol is associated with head and neck cancer,[17,18] esophageal cancer,[16] liver cancer,[19]

**Table 4**   Comparison of the cancer availability and characteristics of the participants

| Risk factor | Diagnosed with cancer | | | | | | χ² and p |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | Yes | | No | | Total | | |
| | Number | %* | Number | %* | Number | %** | |
| Smoking | | | | | | | |
| Yes | 57 | 1.5 | 3717 | 98.5 | 3774 | 39.5 | p<0.001 |
| No | 43 | 0.8 | 5168 | 99.2 | 5211 | 54.6 | χ²=33.814 |
| Given up | 22 | 3.9 | 540 | 96.1 | 562 | 5.9 | |
| Alcohol consumption | | | | | | | |
| Yes | 38 | 2.0 | 1844 | 98.0 | 1882 | 19.7 | p=0.001 |
| No | 84 | 1.1 | 7581 | 98.9 | 7665 | 80.3 | χ²=10.209 |
| Doing sports regularly | | | | | | | |
| Yes | 28 | 1.2 | 2248 | 98.8 | 2276 | 23.8 | p=0.817 |
| No | 94 | 1.3 | 7177 | 98.7 | 7271 | 76.2 | χ²=0.054 |
| Has chronic disease | | | | | | | |
| Yes | 52 | 2.4 | 2138 | 97.6 | 2190 | 22.9 | p<0.001 |
| No | 70 | 1.0 | 7287 | 99.0 | 7357 | 77.1 | χ²=27.086 |
| Has a relative with cancer | | | | | | | |
| Yes | 17 | 1.7 | 983 | 98.3 | 1000 | 10.5 | p=0.209 |
| No | 105 | 1.2 | 8442 | 98.8 | 8547 | 89.5 | χ²=1.578 |
| Has a relative died from cancer | | | | | | | |
| Yes | 47 | 1.9 | 2441 | 98.1 | 2488 | 26.1 | p=0.002 |
| No | 75 | 1.1 | 6984 | 98.9 | 7059 | 73.9 | χ²=9.963 |
| Ever made a cancer scan | | | | | | | |
| Yes | 96 | 6.5 | 1361 | 93.5 | 1487 | 15.6 | p<0.001 |
| No | 26 | 0.3 | 8034 | 99.7 | 8060 | 84.4 | χ²=374.343 |
| Total | 122 | | 9395 | | 9547 | 100 | |

*Percentage of row; **Percentage of column

breast cancer [20,21] and colorectal cancer.[22] Our study also showed an association between alcohol consumption and cancer.

Smoking causes cancer of the oral cavity, larynx, esophagus, lung and pancreas. Moreover, daily cigar smokers, particularly patients who inhale, are at increased risk for developing heart disease and other types of lung disease. The more smoke, the greater the risk of disease is.[23] Smoking was associated with cancer in our study.

About 5 to 10 percent of cancers arises from harmful mutations that are inherited from a person's parents. In families with an inherited cancer-causing mutation, multiple family members will often develop the same type of cancer. These cancers are called "familial" cancers.[24] Our study also showed an association between having a relative dead from cancer and being cancer.

Population-based screening has been shown to be effective in reducing cancer-specific mortality, complementing early symptomatic detection of breast, cervical, and colorectal cancers.[25-27] Early treatment of invasive lesions, including surgical removal of early invasive breast cancer or endoscopic resection of early colorectal cancer, can be less detrimental than the treatment of symptomatic disease.[28,29] In our study, people who had cancer screening had more diagnosed with cancer, which suggests the effectiveness of screening.

**Strengths of This Study**

Reaching close to 10.000 people, this study contributes a lot to current literature about cancer prevalence and risk factors in this region. The studies in this region are a few and limited in sample size.

**Limitations of This Study**

This study has some limitations. Firstly, the age group of the participants was not equally distributed. The reason for this was that some of the previously conducted surveys in the region were fraudulent and targeted to older people. Therefore, some seniors were reluctant to

Kurt et al.
Cancer Prevalence and Risk Factors in Mersin

385

participate in this study. Secondly, the time window of risk factors could not be specified clearly as there were some lacking questions in the survey.

## Conclusion

This community-based study will base further research in Mersin and Mediterranean region and significant for tracking preventive approaches. All of these findings will likely to help the planning of required services in primary health care. Concentrating in regions that need more service and risky areas and increasing cancer training and screening activities should be carried out. In the light of this research, similar studies in future will help to track cancer status and varying service needs.

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