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Epidemiology and Trend of Cancer in Yazd, a Central Province of Iran, 2005-2009

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ABSTRACT

Background: Cancer incidence rate is increasing in the world particularly in developing countries. The awareness regarding cancer incidence and distribution helps policy makers and researchers to design comprehensive plan for controlling cancer. The aim of this study was to determine the incidence rate and trend of cancer in Yazd Province, center of Iran.

Methods: Data from Yazd cancer registry were derived from 2005 to 2009. Direct standardization through world standard population produced by the world health organization was used and Age- Standardized Incidence rate (ASR) was calculated. Data were analyzed using ASR, by EXCEL and SPSS software.

Results: The new cases of cancer were 4631 patients from 2005 to 2009. Mean age of these patients was 57.98±27.49 years and 53.5% were male. Female patients were approximately 5 years younger than males. The most frequent cancer was breast in women followed by skin, colorectal, hematologic system and stomach. The 5 most frequent cancers in men were skin, bladder, colorectal, stomach and prostate. The ASR in 2005 to 2009 was respectively 85.2, 86.1, 92.6, 102.2 and 104.7 per 100,000 populations.

Conclusions: ASR of cancer is increasing rapidly in Yazd Province. It is necessary to have a comprehensive health policy for prevention and control of this problem.

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Introduction

Cancer is the second leading cause of death in developing countries¹. In Iran located in epidemiologic transition, cancer is the third cause of death after coronary heart disease and accidents². Incidence of cancer is increasing in developing countries as a result of population aging and cancer-associated lifestyle such as smoking, physical inactivity, obesity, stress and so on. It is expected to increase the number of new cases of cancer from 10 million per year in 2000 to 15 in 2020, and nearly 60% of them occurred in developing countries³.

Iran among developing countries has experienced an increase in population in the last decades as well as changes in lifestyle and socioeconomic status. Incidence rate of cancer is 98-100 per 100,000 population in Iran⁴.

Given that there was no information about the trend of cancer incidence in recent years in Yazd, the main goal of this study was to describe the distribution of cancer incidence rate and 5 year trends (2005-2009) in order to provide evidence for policy makers to plan primary prevention and control programs.

Methods

Yazd Province is one of the 31 provinces of Iran. It is in center of the country and its administrative center is the city of Yazd. It lies in the suburb of deserts and has one of the driest climates in Iran due to its location east of the Zagros Mountains, making much of Yazd subject to the rain shadow effect. Low precipitation and a high rate of evaporation in summer months due to high summer temperatures are among the factors make of this province one of the driest region in Iran. Therefore results derived from this study could be different and valuable because there is a significant geographical difference between this area and other regions of Iran⁵.

This cross-sectional study was performed in Yazd Province. The data were collected from Cancer Registry Center of health deputy which is based on Iran ministry of health guidelines⁶.

Data were included demographic characteristics like age, sex residency, date of diagnosis and histopathology diagnoses which were coded based on International Classification of Diseases for Oncology (ICD-O)⁷. Codes C43-44, C50, C18-21, C67, C16, C91-95, C82-85, C61, C34, C15 were considered for skin, breast, colorectal, bladder, stomach,

leukemia, lymphoma, prostate, lung and esophagus cancers, respectively.

After referring data to National Cancer Registry (NCR) in Tehran reclassification was done based on recorded patient addresses therefore Yazdi patient data was classified in this province even if in other province of Iran was detected and recorded. Duplicated cases were removed manually; patients with a residence address outside of the province were excluded.

The data were computerized using SPSS software version 19.0 and MS EXCEL. We calculated crude incidence rate and annual Age- Standardized Incidence rate (ASR) per 100,000 persons. We applied direct standardized method using standard population coefficient from WHO. Chi square for trend analysis in EPI- Info2007 software was used for cancer trend analysis. Significant level was determined as $P < 0.05$.

Results

During 5-year period (2005-2009), 4631 new cases of cancer were registered in Yazd Cancer Registry Center, among which 2151(46.5%) patients were female and 2480(53.5%) were male. The mean age for all cases was 60.07 ± 19.49 yr for men and 54.93 ± 18.03 yr for women. The average of age differed between male and female significantly and male patients were nearly 5 years older than females ($P < 0.001$). Figure 1 shows frequency of all cancers in 5-years age groups for men and women. After direct standardization it was demonstrated that the ASR of cancer is significantly increasing in Yazd Province (Figure 2 and table 1). ASR was significantly increased in two sexes separately in this period, in women increased from 84.6 to 94.8 per 100,000 and in men from 85.9 to 113.8 per 100,000. This trend is shown for the most common cancers for men and women in Table 2. The most common cancers for men was skin (17.4%), bladder (11.7%), colorectal (8.2%) and for women was breast (21.8%), skin (14.8%) and colorectal (7.6%) respectively. The most prevalent cancers for two sex were skin (16.2%), breast (10.6%), colorectal (8%) and bladder (7.5%). Figure 3 shows frequency of 10 common cancers by organs.

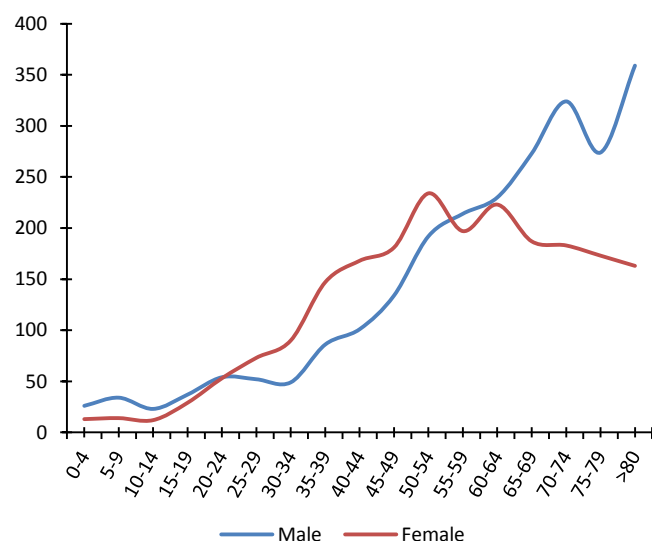


Figure 1: Frequency of cancers by 5 years age groups in two sexes in Yazd Province, 2005-2009

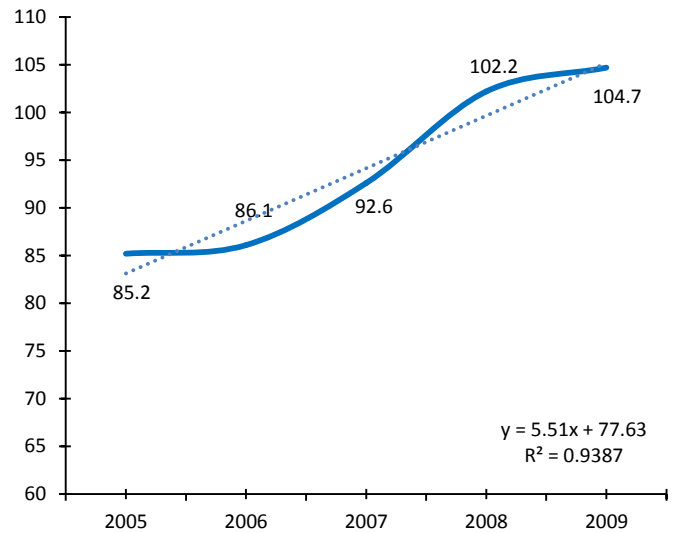


Figure 2: Trend of cancer incidence in Yazd Province, from 2005 to 2009 (standardized incidence rate per 100,000 populations)

Table 1: Annual incidence rate ratio of cancer from 2005 to 2009

Calendar time	Odds ratio	95% CI	P value
2005-2006	1.00		
2006-2007	1.01	0.92, 1.11	0.849
2007-2008	1.12	1.02, 1.23	0.022
2008-2009	1.25	1.14, 1.37	0.000
2009-2010	1.28	1.17, 1.40	0.000

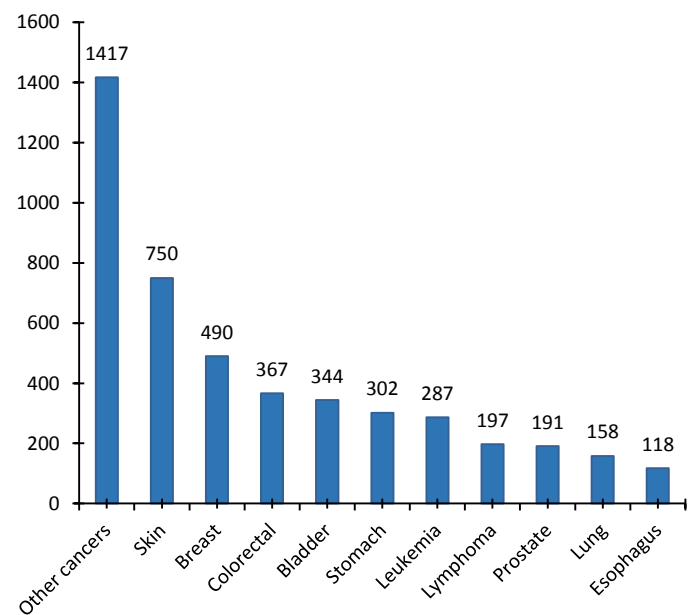


Figure 3: Frequency of 10 common cancers by organs in Yazd Province from 2005 to 2009

Table 2: Age-standardized incidence rate (ASR) of the most common cancers incidence for men and women in Yazd Province from 2005 to 2009 (ASR incidence per 100,000 populations)

Cancer type	2005	2006	2007	2008	2009
Women					
Breast	16.4	21.0	16.7	15.6	23.6
Skin	16.3	11.2	14.4	12.9	11.7
Colorectal	5.2	5.1	7.5	10.4	6.0
Leukemia	3.9	4.6	3.8	5.1	5.2
Stomach	3.3	4.8	4.2	4.6	4.3
Men					
Skin	17.4	14.3	12.3	20.7	19.5
Bladder	10.0	10.2	12.6	9.8	15.9
Colorectal	6.1	6.9	7.9	9.6	9.9
Stomach	7.2	8.2	7.5	9.4	8.5
Prostate	5.7	5.9	6.3	10.4	12.4

Discussion

The information presented in this paper was about global patterns of cancer incidence in Yazd Province during a five-year period (2005-2009). Findings of this study showed that incidence of cancer have been increasing in recent years in this province.

Most people were involved in middle ages with mean age of 57 years. The mean age of cancer patients was around 56-57 years old in other reports in Iran⁸. The results show 70-74 years age group has the most frequency of cancer. Other studies in Iran revealed this result but in developed countries the peak age of cancer is 80-84⁹. This difference may be due to higher life expectancy in developed countries than Iran.

In this study the mean age of men was about 5 years higher than women, in Esfahan Province this difference was about 7 years⁸. Data from other countries also revealed this result⁹.

The five most prevalent cancers in Yazd was skin, colorectal, stomach and prostate in men and breast, skin, colorectal, leukemia and stomach in women. These data were different from last country data reported in 2009 in which stomach, prostate, lung, bladder, and lymphoma were the most frequent in men and breast, stomach, ovary and lymphoma in women respectively¹⁰.

The skin and breast cancer were the most common cancers in this area as well as some other province in Iran. The world population data shows the most prevalent cancer is respiratory system and gastrointestinal (GI) cancers in men, but breast and GI cancers in women. In Iran the most frequent cancer is stomach in men and breast in women¹¹. There were many differences and similarities in our findings in comparison with incidence rates from different study in Iran and the world^{8,10-13}. In Yazd the most prevalent cancer was skin in men. One of differences in Yazd in contrast to other regions in the world was skin cancers. Probably one of the most important risk factors for skin cancer is sunlight which is intense in Yazd. There was difference in respiratory system cancer incidence which was less common in Yazd. This result was similar to other findings in different regions of Iran; but it is different from other parts of the world. There are some probable reasons for it: at first smoking pattern in Iran seems to be lower than other countries. The most important reason was that many cases with lung cancer were undiagnosed and some of them did not have any biopsy therefore they were not registered. Bladder cancer in men was the second most common cancer in Yazd. Yazd is an industrial area and there are a large number of factories in this province and bladder cancer is job dependent. In women breast cancer was the most common cancer. This finding was similar to countrywide and the world data^{10, 14-17}. More attention is needed for screening and prevention programs in breast cancer given that this cancer affects women and an early detection has an important role in treatment and prognosis in this cancer.

ASR which was predicted for central- east region of Asia is 104.5 per 100,000 according to the world data in 2008¹⁴. Iran is located in this region, and ASR in Yazd increased from 85.2 to 104.7 and In Isfahan from 107 to 124.9 in 2005 to 2009⁸. National data from Iran showed an increasing trend in recent years¹⁰. In some developed countries the incidence and mortality of cancers were decreased in last decade^{16, 18-19}.

This difference may be due to rapid changes in lifestyle²⁰, increasing exposure to risk factors and aggregation of carcinogens and pollution in air and environment in Iran. The most important key of this reverse trend is that the control of cancer is possible and maybe a trigger for health administrators and policy makers and for decision making about cancer prevention and control programs seriously in future plan in Iran.

There were some limitations in our study. Data in our registry were limited to pathology, residency, sex, and age while other related variables like feeding pattern, job, and other lifestyle and socioeconomic factors have an important role in susceptibility to cancer. Additionally registration in that period of time was limited to the pathology system so a large number of cancers were missed.

Conclusions

The pattern observed from the analysis of the Yazd cancer registry data, despite limitations provide comprehensive information on cancer occurrence and valuable, leads to cancer control in this population. These first results from cancer registry program in Yazd provide a useful guide to direct and evaluate a cancer control program in this population.

Acknowledgments

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Conflict of interest statement

The authors declare that have no conflict of interests.

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