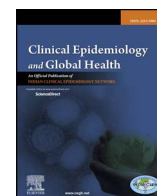




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Original article

Cancer epidemiology and trends in North Khorasan Province of Iran

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ABSTRACT

Problem considered: Knowing the prevalence, incidence and cancer mortality is essential in every country for planning of control, determining priorities for prevention and treatment programs and evaluation the results to reduce the burden of cancer. Therefore, this study was performed to determine the common cancers in the north Khorasan Province.

Material and methods: The present study is a reanalysis of available data that cancer registry data in the North Khorasan province of Iran were analyzed in a five-year period (2005–2009). The reported incidence rates are standardized based on the standard population of World Health Organization and direct method. And we have presented common Cancer Trends in North Khorasan Province. Time trend analysis of incidence performed by joinpoint regression analysis was carried out using Joinpoint Regression Program.

Results: Analysis of 5-year data showed an increasing rate for the total cancer cases in both sex. During these five years, 2165 cases of cancer were registered, of these, 924 cases (42.68%) occurred in males and 1241 (57.32%) occurred in females. The most common cancers in North Khorasan province in five-year period were: skin (19.3%), esophageal (14.08%), stomach (10.62%), breast (7.62%) and bladder (4.57%), respectively. For all cancers, Age standard incidence rate (ASIR) showed increasing trends in males (APC = 13.4) and females (APC = 16.6). Also, there were an increasing ASIR for all of the common cancers (Except stomach and esophagus in females).

Conclusion: The results of the present study have shown that in north Khorasan the most common cancers in males were skin, esophagus and stomach; in females these were breast, skin and esophagus.

1. Introduction

Cancer is a major health problem around the globe, particularly in developing countries^{1,2} and also is the leading cause of death in the world and the third cause of death in Iran.³ It had been estimated that 12.7 million new cancer cases, 7.6 million cancer deaths would occur in 2008 in all over the world,^{3–5} while more than half of all deaths from cancer would occur in developing countries.⁶ It is predicted that the proportion of diagnosed cases will arise from about 56% in 2008 to more than 60% in 2030 in less developed countries^{4,5}. Cancer burden in the world, especially in developing countries is increasing due to the aging and population growth.^{3,5,7} As well as increased acceptance of the

lifestyle associated with cancer risk, such as smoking, unhealthy diet and physical inactivity.^{3,5} So that even if current rates remain unchanged, 50% increase in 2020 is expected which is equal to 15 million new cancer cases and 10 million new cancer death.⁷ It is reported that the annual cancer incidence rate in Iran is 98 to 100 per 100,000.³

Few studies have showed the association between incidence and mortality with human development index (HDI)^{8,9}; and is changing incidence and morphology of cancers^{10,11}. So knowing the prevalence, incidence and cancer mortality is essential in every country for planning of control and completion of health policy and determining priorities for prevention and treatment programs and evaluate the results to reduce the burden of cancer.^{3,7,12} Nowadays many of the deaths are

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preventable, so that more than 30% of the cancer cases are preventable with immunization against cancer-related infections (HPV, HBV) and a healthy life cycle. Control of risk factors will prevent about 40% of deaths from cancer and also with treatment and early detection; one-third of burden will be reduced.^{13,14} Thus, the establishments of national programs for prevent and control cancer is a necessary step of the Health promotion in community and also is an effective factor in reducing the incidence and burden of cancer. So, the cancer registration system is an important tool for the management and control of cancer. While only one-sixth of the world's population are covered by population-based cancer registration systems.⁵

Given that knowledge of the epidemiology and trend of the disease are beneficial to health planning and identify the causes of the disease. In this paper we will study about cancer incidence and trend of common cancer in the North Khorasan Province in 2005 to 2009.

2. Methods

2.1. Data source

This is analytic study, carried out based on re-analysis national registry of cancer (NCR), and Disease Control and Prevention (CDC) report of ministry of Health and Medical Education in Iran. Deputy for health of each university is responsible for health issues of the population and all health activities are managed by these deputies. All deputies for health have been included in the NCR. Registrar would apply the national registration software which was developed by CDC. The data are transmitted, by electronic file and also hard copy of 'Cancer Registry Data Collection Form'; this form is comprised of three parts: part I, regarding patient's identity characteristics and demographic information. Part II includes the most important findings of patient's clinical history. Part III includes preclinical findings. Quality control has been coordinated in five main areas by Cancer Office of CDC: (i) regarding completeness of coverage; (ii) completeness of details; (iii) accuracy of data; (iv) accuracy of reports; (v) accuracy of interpretation and (vi) repeated cases are deleted from national data. IARC software provides a way to identify inaccuracies in data coding.¹⁵ In this study all registered cases, were studied from 2005 to 2009 in the North Khorasan province in Iran. The extracted data were studied based on the number of cases and standardized incidence rate for both sexes and sex ratio. After collecting the information, trend of diseases during the study in both sexes and the distribution of the most common cancers in North Khorasan Province were shown.

3. Statistical analysis

We computed the age-Standardized Incidence Rate (ASIR) using direct standardized method and world standard population. To describe incidence time trends, we used Joinpoint Regression Program, Version 4.1.1.1 October 2014.² The analysis contained logarithmic transformation of the rates, standard error, maximum number of one joinpoints, and minimum of six years between zero joinpoints. default values were used for other parameters. The aim of the approach is to identify possible joinpoints where a significant change in the trend occurs. In present study 0 joinpoint (Full model) was a significant model. The final model selected was the most parsimonious of these, with the estimated annual percent change (APC) based on the trend within each segment. In describing trends, the terms "significant increase" or "significant decrease" signify that the slope of the trend was statistically significant ($P < 0.05$). All statistical tests were two-sided.

4. Results

Analysis the 5-year data (2005–2009) of the Cancer Registry in North Khorasan Province showed during these five years, 2165 cases of cancer were registered, of these, 924 cases (42.68%) occurred in males

Table 1

The Frequency and Percentage of Cancer Cases by Sex and Year in North Khorasan Province during 2005–2009.

Year	Male	Female	Total (percent)
	Frequency (percent)	Frequency (percent)	
2005	177(42.11%)	243(57.86%)	420(100%)
2006	95(42.98%)	126(57.02)	221(100%)
2007	165(40.64%)	241(59.36%)	406(100%)
2008	249(45.44%)	299(54.56%)	548(100%)
2009	238(41.75%)	332(58.25%)	570(100%)
Total:	924(42.68%)	1241(57.32%)	2165(100%)
2005–2009			

and 1241 (57.35%) in females. During the years of study, the highest number of cases was recorded in 2009 with 570 cases and the lowest number was recorded in 2006 with 221 cases (Table 1).

The ASIR showed an increasing rate for the total cancer cases in both sexes. So that the age-standardized incidence rate for all cancers in males was 61.95 in 2005 and was increased to 73.25 in 2009 (APC = 13.4). The age-standardized incidence rate for all cancers in females showed an increasing rate from 73.20 in 2005 to 103.89 in 2009 (APC = 16.6). (Fig. 1 and Table 2).

In total, the most common cancers in north Khorasan province during the five-year period were as follows: skin (19.3%), esophageal (14.08%), stomach (10.62%), breast (7.62%), and bladder (4.57%), respectively. The average ASIR within the years 2005 to 2009 revealed that the five most common cancers in females were skin (11.73%), breast (10.33%), esophageal (10.18%), stomach (5.09%), and colorectal (3.08%). As these five cancers were accounts for 58% of cancers in females totally. And also based on the average ASIR during 2005 to 2009, the five most common cancers in males were skin (16.96%), esophageal (11.32%), stomach (11.18%), bladder (5.13%), and leukemia (3.08%). As these five cancers were accounts for 61% of cancers in males totally.

Skin and breast cancer, the most common cancers in women in the north Khorasan province, had an increasing trend until 2008, but after it was dropped. So, the Age-Standardized Incidence Rates (ASIR) in 2005, 2008 and 2009 were 8.17, 16.47, 12.63 for skin cancer and 9.21, 20.08, 11.39 for breast cancer, respectively. And also, there was not a certain trend for esophageal cancer and always has fluctuated during the five-year period. The Joinpoint annual percent change (APC), though not significant, showed an increasing trend of common cancers for females (Except stomach and esophagus in females) (Table 2).

Fig. 2 shows the most common cancers in males in north Khorasan province. Generally, trend of cancer in males is increasing. The age-standardized incidence rate of skin cancer has increased in males from 11.42 in 2005 to 22.44 in 2009. The age-standardized incidence rate of esophageal cancer in males has increased from 10.59 in 2005 to 14.19 in 2009. Also, this rate for bladder cancer and leukemia has increased from 3.77 to 4.87 and 6.49 to 8.13, respectively. The Joinpoint annual percent change (APC), though not significant, showed an increasing trend of all common cancers for females (Except stomach and esophagus in females) (Table 2).

The lowest reported cases of cancer in both males and females between 2005 and 2008 were Adrenal cancer (4 cases) and Parotid and salivary gland cancer (6 cases). The incidence rate for all cancers increased with increasing age in both sexes. So that in 2008, from the total of age-standardized incidence rate of cancers, 93% in males and 87% in females had occurred over the age of 50 years.

5. Discussion

It is estimated that about 50,800 new cases of cancer occur each year in Iran. Of which more than 53% are related to male with age-

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