Original Article

Prevalence and Demographic Characteristics of Cancers

Abstract

Context: Latest global cancer data confirmed that there are 18.1 million new cancer cases and 9.6 million cancer deaths in 2018. **Aims:** The aim of this study is to describe for the first time prevalence (PP), incidence rate (Ir), and reported mortality for patients with cancer in Isfahan Province/Iran. **Materials and Methods:** The study was conducted in Isfahan Kidney Transplantation Research Center. Information related to the surveillance and epidemiology were collected from the Isfahan Cancer Registry (2011-2015). The cancer sites studied were defined according to the international classification of diseases for oncology (Third Edition). PP and Irs were calculated and expressed per 100,000 persons. **Statistical Analysis Used:** The statistical analyses of dBase was performed using Microsoft Excel and SPSS version 20 (Chicago, IL, USA) for windows. **Results:** In all, there were 30,465 cancer cases that were comprised 22,282 alive and 8183 deceased reported individuals. For the total population, the PP was calculated as 611.5 and Irs significantly increased ($P < 0.05$) from 137.5–167.4. The mean (standard deviation, Min-Max) age of the patients was 59.3 (17.5, 1–110) years. The PP were ranked as breast (179.8), digestive system (145.6), and genital system (123.2), skin (77.1), urinary system (42.5), respiratory system (39.1), endocrine system (33.7), leukemia (32.2), brain and other nervous system (20.9), lymphoma (11.4) oral cavity and pharynx (8.2), heart (5.7), bones and joints (5.2), and eye-orbit (1.3). **Conclusions:** There was a 21.8% increase in the Irs over the study period. The PP associated with the digestive system was highest in both genders. In relation to age, cancers occurred in 67% associated with active years of life. Therefore, for the allocation of health-care resources, attention toward strategic-based-research associated with pharmacotherapy, and surgical care seem to be valuable.

Keywords: *Cancer, incidence, Iran, Isfahan, prevalence*

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Introduction

Recently, chronic diseases, including cancer raised as one of the most challenging public health issues in the United States and other parts of the world. Due to improvements in primary recognition and management, the number of cancer survivors continues to increase. Patients with a history of cancer have distinctive medical and psychosocial needs that necessitate active evaluation and supervision of key care workers.[1-4] Advanced urothelial carcinoma accounts for approximately 15,000 deaths in the United States annually.[5] According to the national death registry in Iran, cancer is the third cause of death after coronary heart disease, accidents, and other phenomena.[6,7]

Relevant study from the Islamic Republic (I. R,) of Iran published in 2017 also confirmed that there is an increasing burden of cancers in the I. R. of Iran. A significant increase in the incidence of gastrointestinal cancer in the I. R. of Iran has been reported recently.[8] Regarding prostate cancer (PCa), the incidence of PC are reported as high in countries with higher development. A positive association was observed between the standardized incidence rate of PCa and the human development index (HDI) and its constituents, such as life prospects at birth, mean years of schooling, and the gross national income per capita. In addition, there was a negative correlation between the standardized mortality rate and HDI.[9]

In order to achieve suitable strategies that could be compatible with an Iranian health system toward further pharmacotherapy or surgical managements', the study of cancer prevalence seem to be important. Therefore, in this article, we provide period prevalence (PP) and incidence rates (Irs) data of different types of cancers in Isfahan Province, Iran.

Materials and Methods

The study was conducted at the Isfahan Kidney Transplantation Research Centre

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and was approved by the Institutional Review Board (extracted from the project with Code No; 295115). Cancers data from March 2011 to March 2015 were obtained from the Isfahan Cancer Registry, located at the Isfahan Deputy of Health. The Isfahan Cancer Program is intended to record all cancer cases in the Isfahan. All pathology centers and other information sources such as hospital medical records, mortality data provinces, hematology-oncology centers, and radiotherapy centers are obliged to report their data to the Isfahan Cancer Office of Disease Control and Prevention. The management arm of the program is the deputy of research at the Isfahan University of Medical Sciences.

Statistical analysis

The cancer sites studied were defined according to the international classification of diseases for oncology (Third Edition). All cancers were defined by topography code. For example, breast cancer was defined by topography code C50, skin cancer by topography code C44, stomach cancer by topography code C16, and so on. Data, with linkage to using of the de-identified patient name and surname, demographic such as age and gender, final code for cancer diagnosis, and the date of reported cancer were recorded in Excel.

Microsoft Excel was used to arrange raw data before being inputted into the Statistical Package for the Social Science (SPSS® version 20; IBM Corp., Armonk NY, USA) for analysis. Age, as a continuous variable, was expressed as mean ± standard deviation (SD). The total population of Isfahan City was obtained from the Isfahan/Program and Budget Management Organization. The PP was calculated as the proportion of the total cases over the period of the years 2011–2015/to populations at risk during the same period ×100,000. The Ir was calculated by dividing new cases of cancer during a given period/to the population at risk during the same time period ×100,000.[10-17]

Results

Demographic and epidemiology characteristic of patients with cancers are shown in Table 1. In all, 14,638 females and 15,827 males were identified. For the total population, the PP was calculated as 611.5. Figure 1 shows that Irs was calculated for each year, as; 137.5 (2011–2012), 156.7 (2012–2013), 149.7 (2013–2014), and 167.4 (2014–2015), respectively. Figure 2 shows the distribution of age in the total population studied. The mean age ± SD was 59.3 ± 17.5 years old. In the 2% of population age ranged from 1 to 20 years old of life. In the 67% age ranged from 20 to 70 years old of life and in the 30% age ranged from 70 to 90 years old of life. In the 1% of the population age was between 90 and 110 years old of life. Figure 3 shows the PP associated with both genders for the top 12 ranked cancers, among others in Isfahan Province, Iran. The PP was ranked as breast (179.8), digestive system (145.6) and genital system (123.2), skin (77.1), urinary system (42.5), respiratory system (39.1), endocrine system (33.7), leukemia (32.2), brain and other nervous system (20.9), lymphoma (11.4) oral cavity and pharynx (8.2), heart (5.7), bones and joints (5.2) and eye-orbit (1.3). In all, there were deaths reported data in 27%. Mortality of different cancers was ranked as Karposi sarcoma (100%), multiple myeloma (100%), respiratory system (66%), bones and joints (64%), brain and other central nervous system (56%), digestive system (42%), leukemia (40%), genital system (27%), oral cavity (23%), lymphoma (19%), urinary system (11%), breast (10%), endocrine system (4%), soft-tissue (including the heart) (3%), skin (2%), and eye-orbit (0%).

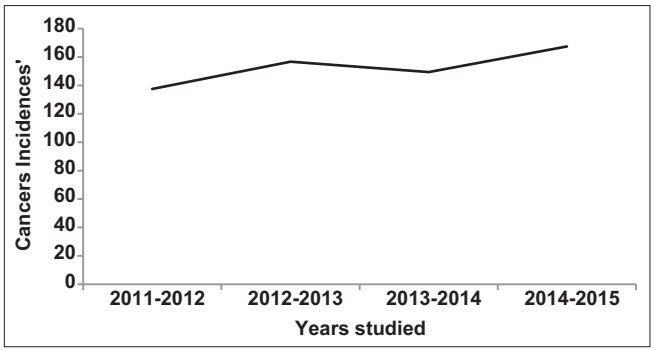

Figure 1: Cancers Incidence in Isfahan Province, Iran

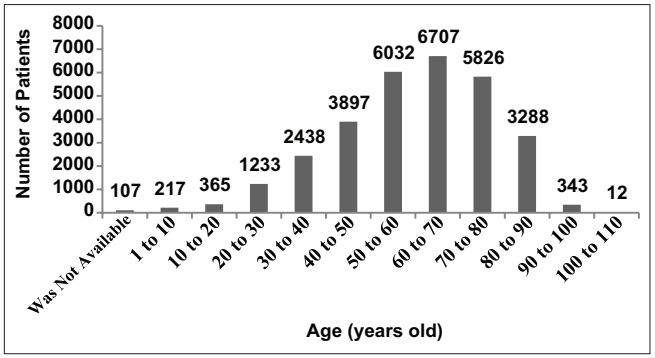

Figure 2: Age distribution in total population studied

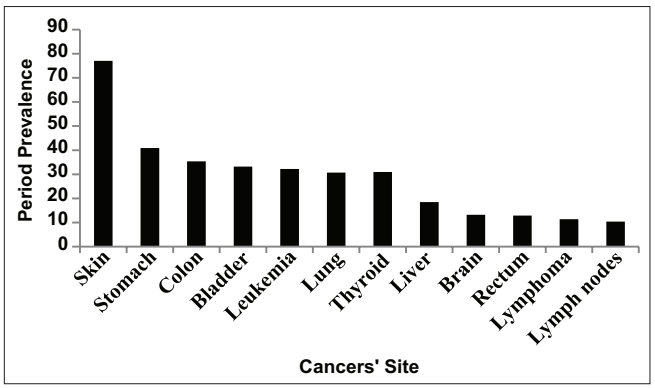

Figure 3: Period prevalence for the top 12 ranked cancers among others

Table 1: Period prevalence, estimated deaths and living cancer cases by sex, Isfahan/Iran

Sites of cancers	Total cases	Period prevalence	Estimated living cases			Estimated deaths		
			Both sexes	Females	Males	Both sexes	Females	Males
All sites	30,465	611.5	22,282	11,359	10,923	8183	3271	4912
Oral cavity and pharynx	407	8.2	312	149	163	95	51	44
Tongue	167	3.4	130	75	55	37	19	18
Floor of mouth	9	0.2	6	4	2	3	2	1
Pharynx	75	1.5	68	26	42	7	1	6
Tonsil	11	0.22	10	4	6	1	1	0
Lip	16	0.32	10	3	7	6	2	4
Major salivary gland	38	0.8	37	16	21	1	0	1
Gum	7	0.14	3	2	1	4	0	4
Palate	25	0.5	12	6	6	13	12	1
Unspecified parts in mouth	59	1.2	60	28	32	23	14	9
Digestive system	7256	145.6	4204	1674	2530	3052	1202	1850
Esophagus	444	8.9	299	133	166	145	57	88
Stomach	2039	40.1	1111	326	785	928	333	595
Small intestine	287	5.7	110	37	73	177	73	104
Colon	1767	35.5	1326	606	740	441	178	263
Rectum	644	12.9	586	230	356	58	23	35
Anus, anal canal, anorectum	49	0.98	44	16	28	5	2	3
Liver and intrahepatic bile duct	920	18.5	105	42	63	815	351	464
Gallbladder and other biliary	250	5.1	199	107	92	51	19	32
Pancreas	486	9.8	486	184	302	336	129	207
Other ill-defined digestive organs; intestinal tract	130	2.6	44	21	23	86	33	53
Rectosigmoid junction	163	3.3	156	68	93	7	2	5
Retroperitoneum and peritoneum	77	1.5	74	33	41	3	2	1
Respiratory system	1956	39.1	670	143	527	1284	409	875
Bones and joints	259	5.2	60	199	158	109	41	68
Soft tissues (including heart)	286	5.7	278	103	175	8	5	3
Skin	3837	77.1	3752	1370	2382	85	33	52
Melanoma of the skin	8	0.2	0	0	0	8	5	3
Other nonepithelial skin	3829	76.9	1370	2382	2382	77	28	49
Breast	4413	179.8	3971	3971	0	442	442	0
Genital system	3024	123.2	2215	1005	1210	809	211	598
Female genital	1216	49.5	1005	1003	0	211	211	0
Uterine cervix	237	9.6	163	163	0	74	74	0
Uterine corpus	401	16.4	389	389	0	12	12	0
Ovary	437	17.8	352	352	0	85	85	0
Vulva	15	0.61	14	14	0	1	1	0
Uterus	100	4.1	67	67	0	33	33	0
Placenta	1	0.04	0	0	0	1	1	0
Vagina	11	0.45	11	0	0	0	0	0
Unspecified females genital organs	14	0.6	9	9	0	5	5	0
Male genital	1808	71.5	1212	0	1212	598	0	598
Prostate	1648	65.2	1066	0	1066	583	0	583
Testis	147	5.8	137	0	137	10	0	10
Penis	5	0.19	5	0	0	0	0	0
Penis and other genital male	8	0.16	3	0	3	5	0	5
Urinary system	2117	42.5	1881	368	1513	236	72	164
Bladder	1655	33.2	1499	239	1260	156	41	115
Kidney	404	8.1	348	72	276	56	21	35
Renal pelvis	21	0.42	9	2	7	12	6	6
Ureter	18	0.36	2	16	0	0	0	0
Other and unspecified urinary organs	19	0.38	7	1	6	12	4	8

Contd...

Table 1: Contd...

Sites of cancers	Total cases	Period prevalence	Estimated living cases			Estimated deaths		
			Both sexes	Females	Males	Both sexes	Females	Males
Eye and orbit	63	1.3	63	19	44	0	0	0
Brain and other nervous system	1043	20.9	457	179	278	586	244	342
Brain	660	13.2	367	168	199	233	101	132
Spinal cord, cranial nerves and other parts of central nervous system	311	6.2	21	7	14	290	123	167
Meninges	58	1.2	3	2	1	55	14	41
Periferal nerves and autonomic nervous system	14	0.3	6	2	4	8	3	5
Endocrine system	1675	33.7	1604	1231	373	71	38	33
Thyroid	1545	31.0	1504	1181	323	41	28	13
Parotid gland	75	1.5	72	33	39	3	1	2
Adrenal gland	29	0.6	25	15	10	4	0	4
Other endocrine	26	0.5	3	2	1	23	9	14
Lymphoma	570	11.4	463	174	289	107	40	67
Hodgkin lymphoma	25	0.5	0	0	0	25	12	13
Diffuse non-Hodgkin's lymphoma	6	0.12	0	0	0	6	3	3
Secondary and unspecified malignant neoplasm of lymph nodes	519	10.4	463	174	289	56	16	38
Other and unspecified types of non-Hodgkin's lymphoma	16	0.3	0	0	0	16	5	11
Kaposi sarcoma	4	0.08	0	0	0	4	2	2
Multiple myeloma	19	0.4	0	0	0	19	4	15
Leukemia	1604	32.2	961	369	592	643	254	389

Discussion

Cancer registration in the third biggest city of Iran/Isfahan is under development, particularly in recent years. In this study by a period prevalence of 611.5/100,000 persons, there was a 21.8% increase in the incidence of cancers from 2011 to 2015. The increased value observed for this study is in agreement with the publication of Maracy *et al*., that predicted an increase in prevalence and mortality. Besides, it was stated that approximately 37,535 of the cases would be diagnosed with cancer within 5 years up to 2015.[18] Data obtained from adult Emiratis conformed overall age-standardized cancer rates were 70.1 and 74.2/100,000 in males and females, respectively. Lung, gastric, and PCa ranked as the top three types in Emirati males, while breast, cervical, and thyroid cancer were the top three types in Emirati females.[19]

The previous publication confirmed that aging might be a negative prognostic factor of survival outcome in solid cancer patients.[20] In this study, with a mean ± SD of 59.3 ± 17.5, in 31% of patients, the age was 70–110 years old.

In addition, the result obtained from this study showed that the most prevalent cancer was associated with breast (179.8) and skin (77.1). With a PP of 40.9/100,000 persons, cancer of the stomach was placed as the most common cancer of the digestive system. This is in agreement with the previous publication,[6,13,15,16] that mentioned the breast and stomach cancer as the most common cancer among women and men. Another study confirmed that the most common cancers in men were; lung, bronchus, prostate, colorectum, and in women, cancers of the lung, bronchus, breast, and colorectum.[2]

Furthermore, there were 27% reported deaths among the total population studied, in which cancers of the respiratory system had the highest mortality (66%) after Kaposi sarcoma and multiple myeloma. This is in agreement with the mortality reported due to lung cancer as the most common cause of cancer death in the American population.[2]

Breast with a PP of 179.8/100,000 females was the most prevalent of cancers among females in Isfahan Province/Iran. Within 4413 cases with breast cancer, there were recorded data related to death in 442 females that were ranked as the 12th out of 16th different causes of mortality among other cancers in this study. According to a recent publication, the most common type of cancer and the fifth-most common cause of cancer-related deaths among Japanese women was mentioned as mammary cancer.[11]

In agreement with previous publication from Ferlay *et al*., in this study among 1808 males with different types of genital tract cancers, PCa with a PP of 65.2/100,000 was placed as first cancer among others.[21] Regarding female genital tract cancers, multiple studies reported that women with polycystic ovary syndrome were at a higher risk for endometrial and ovarian cancer. In this study, among 1216 females with genital tract cancers, ovarian cancer with a PP of 17.8/100,000 persons was placed in the first position, among others.[22]

Regarding 2117 patients with cancers of urinary tract system, bladder, and kidney with PP of 33.2 and 8.1/100,000 persons were placed at the first and second locations of cancers, among others. Increased risks of lung, prostate, colorectal and urinary tract cancers, and leukemia were identified in miners of specific areas in Western Australian.[23] Smoking suggested to increase cancers of oesophageal, upper aerodigestive tract, liver, cervical, kidney, and urinary bladder.[24]

As rapid increases in the incidence of thyroid carcinoma with stable mortality rates from thyroid carcinoma have been reported from many countries,[25] in this study of 1675 cases with endocrine cancers, the most prevalent cancer was thyroid cancer with a PP of 31/100,000 persons for 2011–2015.

Regarding to the tumors of the central nervous system, in 1043 patients, the PP for brain and spinal cord cancer was 13.2 and 6.2/100,000 persons, respectively. This is in agreement with a previous publication that reported an overall Ir of all brain tumors as 10.82 (95% confidence interval: 8.63–13.53) per 100,000 person-years. The incidence proportion estimates were heterogeneous, even among the same tumor subtypes, and ranged from 0.051/100,000 (germ cell tumors) to 25.48/100,000 (all brain tumors).[26]

Conclusions

The PP associated with cancers with a value of 611.5/100,000 persons, confirmed a 21.8 increase in Ir from 2011 to 2015. These outcomes highlighted that a greater effort should be made for prevention, early diagnosis, and better management. Therefore, planning for prohibitory action besides the prevalence of risk factors and focusing on health dietary production in terms of organic products could display a significant part in dropping the augmented number of related cancers such as breast, respiratory, digestive, and bladder cancers.

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Nil.

Conflicts of interest

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