RESEARCH ARTICLE

Epidemiology of Female Reproductive Cancers in Iran: Results of the Gholestan Population-Based Cancer Registry

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Abstract

Background: Malignancies of the female reproductive tract are estimated to be the third most common group of cancers in women. **Objectives**: We here aimed to present their epidemiological features in Golestan province located in Northeast of Iran. **Materials and Methods**: Data on primary female reproductive cancers diagnosed between 2004-2010 were obtained from Golestan Population-based Cancer Registry (GPCR). CanReg-4 and SPSS software were used for data entry and analysis. Age standardized incidence rates (ASR) (per 100,000 person-years) were calculated using the world standard population. Poisson regression analysis was used to compare incidence rates. P-values of less than 0.05 were considered as significant. **Results**: A total of 6,064 cancer cases were registered in Golestan females in the GPCR during 2004-2010, of which 652 cases (11%) were female reproductive cancers. Cancers of the ovary (ASR=6.03) and cervix (ASR=4.97) were the most common. We found significant higher rates in females living in cities than in villages. Our results showed a rapid increase in age specific incidence rates of female reproductive cancers at the age of 30 years. **Conclusions**: We found significant higher rates of female reproductive cancers among residents of cities than villages. Differences in the prevalence of risk factors including reproductive behavior between the two populations may partly explain such diversity. Our results also showed a rapid increase in incidence rates of these cancers in young age females. Further studies are warranted to determine risk factors of female reproductive cancers in our population.

Keywords: Female reproductive cancers - epidemiology - Golestan - Iran

Introduction

Cancer is a major public health problem in Iran and many other parts of the world. About 14 million new cases of cancer and 8.2 million cancer deaths were occurred all over the world (Ferlay et al., 2013). According to Globocan 2012, the age-standardized incidence rates (ASR) of all cancers were 205 and 165 per 100,000 person-year among male and female, respectively. 57% of new cancer cases and 65% of the cancer deaths occurred in the less developed regions. Cancer is the third most common known cause of death in Iran (Goya, 2007; Naghavi et al., 2009). Malignancies of the female reproductive tract (uterine corpus, uterine cervix, ovary, vulva, vagina, fallopian tube, and placental cancers) are estimated to be the third most common group of malignancies in women (Ferlay et al., 2013).

Cancer of the uterus is primarily a cancer of the developed world with higher incidence rates than those of the less developed countries (Sasco, 2001; Ferlay et al.,

2013; Binesh et al. 2014). However, developing countries have much higher rates of cervical cancer and, worldwide, and there are three times as many cases of cervical cancer as uterine cancer diagnosed each year (National Cancer Intelligence Network, 2008). Cervical cancer is the most common malignant disease afflicting women in many developing countries (Jemal et al., 2011; Parkin et al., 2001). It is the most common cause of cancer deaths in the South-East Asia Region as well as the African Region. Other cancers of the female reproductive tract are the eighth (ovary) and thirteenth (uterus) leading causes of cancer deaths globally (Mathers et al., 2008).

The first step in controlling the cancer burden in each population is to know their status in the population and collect information about the incidence, type, and location of cancers. In this article, we therefore provide an overview of epidemiology of female reproductive cancers based on the data available from a population-based cancer registry in Golestan province located in the Northeast of Iran.

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Materials and Methods

Data on primary female reproductive cancers diagnosed between 2004-2010 were obtained from Golestan Population-based Cancer Registry (GPCR). Secondary tumors resulting from the invasion or metastasis of other primary cancers were excluded from this report. GPCR is an ongoing population-based cancer in Golestan province of Iran. It is a voting member of the international association of cancer registries (IACR). The process of data collection in GPCR was described previously (Roshandel et al., 2012). In brief, data on primary cancers were registered based on standards of the IACR. Data were collected from all public and private diagnostic and therapeutic centers (hospitals, pathology laboratories, diagnostic radiology clinics and some of the specialist physician's private offices) throughout the Province. Information from medical centers and regional registries in neighboring provinces were obtained to minimize loss of the data and consequent underestimation. Two types of questionnaires, the first for out-patient and the second for inpatients cases were used. These questionnaires have been prepared based on IACR standards. Well-trained registry staff regularly visited all centers and collected information on cancer cases both actively and passively. Information about cancer related deaths was obtained from the death registry at the health department of Golestan University of medical sciences (GOUMS) and was matched with the file of registered cancer patients to identify additional unreported cases, which were classified as death certificate only cases (DCO). Items collected in GPCR consisted on the patient's demographic characteristics (first name, last name, father's name, sex, age, address and phone number), anatomical site of tumor, histology of tumor, method of diagnosis and incidence date. To assess the quality of data, about 10% of questionnaires were re-checked and compared with original documents in patients' files in sources. Cancer cases were classified according to the third edition of International Classification of Diseases for Oncology (ICD-O-III) (Fritz et al., 2000).

Data was entered into CanReg-4 software, created, and published by IACR. Finally, numbers of cases by sex, age and primary site as well as crude incidence rates and age standardized incidence rates (ASR) (per 1000000 person-years) were calculated using world standard population. Data on Golestan population was obtained from statistics office of Deputy of health of Golestan University of Medical Sciences. Poisson regression analysis was used to compare incidence rates. P-value of less than 0.05 was considered as significant.

Results

A total number of 6064 cancer cases were registered in Golestan females in the GPCR during 2004-2010, of which, 652 cases (11%) were female reproductive cancers. The mean (sd) age of these patients was 48.23 (14.88) years. 386 (59.2%) of female reproductive cancer cases lived in cites and the remaining 266 patients (40.8%) were from villages. Cancers of the ovary (284; 43.6%) and cervix (212; 32.5%) were the most common female

reproductive cancers. Table 1 shows the distribution of cancers of the female reproductive organs according to patients' place of residence. The crude incidence rates and ASRs of cancers of the female reproductive organs are shown in Table 2. We found significant higher rates of female reproductive cancers in females lived in cities than those of villages (Table 2). Figure 1 showed the age specific incidence rates of female reproductive cancers in residents of cities and villages of Golestan province. We found a rapid increase in age specific incidence rate of female reproductive cancers at the age of 30 years followed by a slight decrease and then the second increase was started at the age of 65 years.

Table 1. Distribution of Cancers of Female Reproductive Organs According Patients' Place of Residence in Golestan Province of Iran, 2004-2010

Organ	City		Village		Total
	Number	Percent	Number	Percent	Number
Cervix	131	61.8	81	38.2	212
Uterine	66	56.9	50	43.1	116
Ovary	173	60.9	111	39.1	284
Placenta	6	27.3	16	72.7	22
Others	10	55.6	8	44.4	18
Total	386	59.2	266	40.8	652

Table 2. Crude Rates and age Standardized Incidence Rates (ASR) (Per 100000 Persons-Year) of Cancers of Female Reproductive Organs According Patients' Place of Residence in Golestan Province of Iran, 2004-2010

Organ		Crude Rate	ASR	
Cervix	City	4.6	6.22	
	Village	2.76	3.77	<0.001
	Total	3.66	4.97	
Uterus	City	2.32	2.98	
	Village	1.7	2.24	0.049
	Total	2	2.6	
Ovary	City	6.07	7.51	
	Village	3.78	4.56	<0.001
	Total	4.91	6.03	
Placenta	City	0.21	0.15	
	Village	0.54	0.47	0.021
	Total	0.38	0.31	
Others	City	0.35	0.52	
	Village	0.27	0.43	0.079
	Total	0.31	0.48	
Total	City	13.54	17.39	
	Village	9.05	11.48	<0.001
	Total	11.26	14.39	
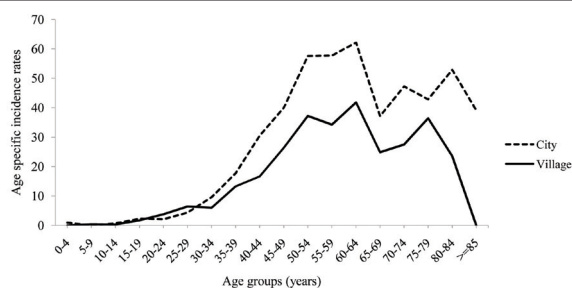
Figure 1. Age Specific Incidence Rates (Per 100000 Persons-Year) of Female Reproductive Cancers in Residents of Cities and Villages of Golestan Province of Iran During 2004-2010

Discussion

We aimed to describe the epidemiologic characteristics of female reproductive cancers in Golestan province located in Northern Iran.

Our results showed significant higher rates of female reproductive cancers including cancers of the cervix, uterus and ovary in females living in cities than those from villages. This may mostly be explained by disparities in socioeconomic status (Rohani-Rasaf et al., 2012; Rohani-Rasaf et al., 2013) as well as differences in life style especially reproductive behaviors between residents of cities and villages. This issue may be clarified in future studies focusing on differences in the prevalence of risk factors of female reproductive cancers between the two areas.

We found two peaks for age specific incidence rates of female reproductive cancers. The first one started at the age of 30 years and the second peak one started at the age of 65 years. Similar pattern was previously reported for breast cancer in this region (Taheri et al., 2012) and other parts of Iran (Arab et al., 2014). Increasing the rate of these cancers at young ages is an important issue suggesting possible changes in the prevalence of risk factors in new generations. Further studies are needed to clarify different aspects of this point and it should be considered for implementation of controlling programs for these cancers within the community.

The ASR of cervical cancer in Golestan female was 4.97 per 100000 persons-year. According to cancer data published by IARC, the ASR of cervical cancer in our population was relatively similar to the rates reported for other parts of Iran (Talaiezadeh et al., 2013) and some developed countries including the USA (5.4), UK (6.8) and Sweden (6.9) as well as some developing countries including Kuwait (4.6) and Turkey (5.4) (Forman et al., 2013). High incidence rates of cervical cancer were reported from some developing countries including South Africa (23.8), Brazil (15.2) and Korea (12.5) (Ferlay et al., 2013).

Low incidence rate of cervical cancer in some countries may be explained by healthy and protected sexual behaviors or implementation of effective controlling programs such as screening programs (especially in developed countries). Further studies are warranted to determine the reasons for these discrepancies between different regions of the world.

According to our results, the incidence rate of the cancer of the uterus was 2.6 per 100000 persons-year. It is considerably low when compared to the rates reported for other countries including the USA, UK and Turkey (Forman et al., 2013) as well as the overall worldwide incidence rate of cancer of the uterus (8.3) (Ferlay et al., 2013). This low rate of cancer of the uterus in our region may be explained by reproductive characteristics including parity of our population.

Our results showed that the ASR of cancer of the ovary was 6.03 per 100000 persons-year. It was similar to the rates reported for other parts of Iran (Talaiezadeh et al., 2013) and other developing countries including Kuwait (5.1), Turkey (6.0) and Korea (5.4). The rate of ovarian cancer in our population was low when compared to the rates reported from developed countries including the USA (9.2) and the UK (12.7) (Forman et al., 2013). These geographical differences may be contributed to genetic factors of cultural habits and lifestyle practices including reproductive behaviors in various regions of the world (Lowe et al., 2013).

In conclusion, we found significant higher rates of female reproductive cancers among residents of cities than villages. Differences in the prevalence of risk factors including reproductive behaviors between the two populations may partly explain such diversity. Our results also showed a rapid increase in incidence rates of these cancers in young age females. Further studies are warranted to determine risk factors of these cancers in our population.

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