Short Communication

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Frequency of Referrals of Cancer Patients Referred to Hospitals Affiliated to the Babol University of Medical Sciences according to the International Classification of Diseases

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ABSTRACT

BACKGROUND AND OBJECTIVE: Cancers are a wide range of diseases, and their numbers are increasing but the severity of the disease is varied in different cancers. This study was conducted to evaluate the frequency of referrals of cancer patients referred to hospitals affiliated to the Babol University of Medical Sciences based on ICD10.

METHODS: This retrospective study was conducted on all cancer patients referring to hospitals affiliated to Babol University of Medical Sciences from 1992 to 2016. The information related to the patients who referred to these centers for the first time were collected and reviewed using a checklist including hospital name, case number, age, sex, occupation, marriage, place of residence, type of cancer and ICD code.

FINDINGS: The highest frequency of cancer patients was related to male gender (50.7%, 3575 patients), married patients (87.2%, 6147 patients), and were related to Babol (16.8%, 1889 patients), Amol (14.4%, 1018 patients) and Sari (11.8%, 833 patients). Most of the patients were in the age group of 70 and above and the problem was mostly associated with the gastrointestinal organs, breast and respiratory organs. There was no significant difference between the type of cancer and the place of residence, but there was a significant relationship with age, sex, type of residence, type of occupation and marital status (p=0.05).

CONCLUSION: The results of the study showed that the pattern of cancer in different cities is similar and increases with age.

KEY WORDS: *Hospitals, International Classification of Diseases, Cancer, Patients.*

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Introduction

Cancers are a wide range of diseases that are currently considered to be one of the main causes of death in many high-income countries and are becoming the main cause of death in the decades to come in all regions of the world, regardless of the level of economic income (1, 2). Each year, more than 14 million people in the world develop cancer, and it is anticipated that by 2030, this figure will reach over 21 million people (3). In 2014, 16,000 new cases of cancer were reported in the United States (4) and about 357,000 new cases of cancer were reported in England (5). In Iran, 70,000 new cases of cancer are occurring every year (6) and based on the modeling conducted in this regard, and considering the demographic trends (life expectancy increase), the incidence of cancer will increase from 84,800 cases per year in 2012 to 129,700 cases per year in 2025 (7). Cancer is a chronic disease with a high financial cost, which is difficult or impossible to treat. Cancer is a major health concern and every year, a significant part of a country's health budget is dedicated to this disease (8).

On the other hand, cancer affects the occupational, economic, social and family status of a person and disrupts a person's mental, psychological and sexual aspects (9, 10). Understanding the frequency of cancers in different social groups considering different climatic conditions is one of the primary components of preventive plans at different levels (11). Having the right information about different types of cancers in specific geographical areas can help us design health programs for prevention, treatment, screening of at-risk groups, and decision making for hospital beds, as well as the need for different medical facilities, including chemotherapy drugs, radiotherapy, surgical equipment, and specialized physicians (12).

The International Classification of Diseases and Health Issues is the basis for identifying global trends in health and health statistics, and an international standard for reporting diseases, health conditions of a society and a diagnostic classification standard for all clinical purposes and researches (13).

In Iran, Keyghobadi et al. conducted a study to investigate the epidemiology and the process of cancer in Kerman province, while Rahimi et al. investigated the epidemiological trends and distribution of common cancers in Khorasan Razavi province from 2005 to 2010 (14, 15). Chen et al. (2000) estimated the number of new cases and deaths from cancer in China (16), and the study of the National Cancer Institute in the United States, in collaboration with Howlader et al., estimated the incidence of cancer in 2017 in the United States. Since no study has been carried out to investigate the frequency of referrals of cancer patients in Mazandaran province based on ICD10, the present study was conducted to assess the frequency of referrals of cancer patients in this region and its ranking based on ICD10 from 1991 to 2016 in order to make appropriate health planning based on it.

Methods

This retrospective study was approved by the ethics committee of Islamic Azad University, Sari Branch (IR.IAU.SARI.REC.1396.39). The study was conducted among all cancer patients who were referred to teaching hospitals affiliated to Babol University of Medical Sciences (Ayatollah Rouhani Hospital with 481 active beds, Shahid Rajaee Hospital in Babolsar with 22 active beds and Amirkola Pediatrics Hospital with 143 active beds) from 1991 to 2016. Considering the large research community, all patients who referred to the research environment in the years 1991, 1996, 2001, 2006, 2011, and 2016 were selected; 5849 cases in Shahid Rajaee Hospital, 1123 cases in Ayatollah Rouhani Hospital (considering the time of establishment of this hospital, cancer patients who were referred from 2011 to 2016 were included in the study) and 78 cases in Amirkola Pediatrics Hospital.

Patients' demographic information, hospital name, case number, age, sex, occupation, marital status, place of residence (province of residence, city of residence), type of residence (urban or rural), type of cancer, ICD10 code and ICD10 category were collected in a checklist based on the patient records in the hospital information system and after coding, the data were entered into SPSS ver.22. The data were analyzed using χ^2, ANOVA, and independent T-test, while $p<0.05$ was considered significant.

Results

The results showed that the highest frequency of cancer patients referring to hospitals of Babol

University of medical sciences was related to male gender (50.7%, 3575 patients), married (87.2%, 6147 patients), urban (57.1%, 4028 patients), and housewives (41.7%, 2941 patients). There was a significant relationship between the type of disease and type of residence (p<0.001), marital status (p<0.001), occupation (p<0.001) and gender (p<0.001) (Table 1). The highest frequency of cancer patients in the treatment centers of Babol University of medical sciences in both genders was in the age group of 75 years and above (19.6%, 1378 patients).

The highest frequency of cancer patients in Babol University of medical sciences in male patients was in the age group of 70 years and above (26.7%, 953 patients). However, the highest frequency among women was observed in the age group of 46-50 (12.7%, 441 patients). The incidence of cancer in men increases with age, but its model is different in women (Fig 1). Of all studied patients, 6648 (94.3%) patients were from Mazandaran province. The highest frequency of cancer patients was in the cities of Babol (26.8%, 1889 patients), Amol (14.4%, 1018 patients), Sari (11.8%, 833 patients) and Ghaemshahr (9.8%, 693 patients). There was no significant difference between the type of cancer according to ICD10 categories in different cities (p=0.009) (Table 2).

Table 1. Demographic status of cancer patients referred to hospitals affiliated to Babol University of Medical Sciences from 1991 to 2016

Demographic variables		N(%)	P-value
Gender	female	3475(49.3)	<0.001
	male	3575(50.7)	
Occupation type	government job	967(13.7)	<0.001
	non-government job	1821(25.8)	
	housewife	2941(41.7)	
	farmer	936(13.3)	
	child, student	384(5.4)	
Type of residence	urban	4028(57.1)	<0.001
	rural	2962(42)	
Marital status	married	6147(87.2)	<0.001
	single	556(7.9)	
	divorced and widow	345(4.9)	

The results showed that the incidence of 5 common cancers increased from 1991 to 2016. The upward trend in breast and gastrointestinal cancers was faster than other cancers, and there were fluctuations in some cancers, such as respiratory cancers. The upward trend in female and male genital cancers was slower (Fig 2). There was a significant difference between the mean age of women and men in some of the cancer categories (digestive organs, respiratory organs, etc.) (p<0.001) (Table 3).

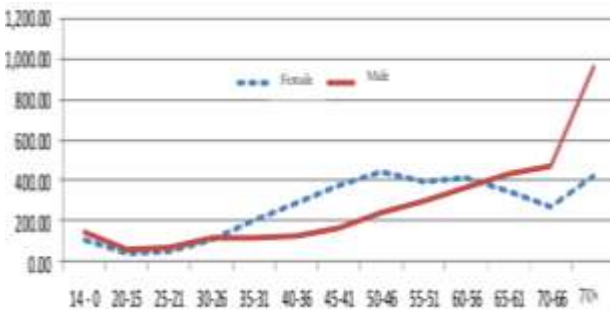

Figure 1. Frequency of cancer patients referred to medical centers affiliated to Babol University of Medical Sciences from 1991 to 2016

Table 2. Number of cancer patients referred to medical centers affiliated to Babol University of Medical Sciences from 1991 to 2016

Province	City	N(%)
Mazandaran	Babol	1889(16.8)
	Amol	1018(14.4)
	Sari	833(11.8)
	Ghaemshahr	693(9.8)
	Babolsar	481(6.8)
	Noor	274(3.9)
	Behshahr	233(3.3)
	Mahmudabad	206(2.9)
	Fereydunkenar	170(2.4)
	Chalous	165(2.3)
	Neka	152(2.2)
	Noshahr	132(1.9)
	Juybar	108(1.5)
	Savadkooh	103(1.5)
	Tonekabon	87(1.2)
	Kiakola	46(0.7)
	Ramsar	21(0.3)
	Galugah	16(0.2)
	Abbas Abad	5(0.1)
Other provinces	Golestan, Gilan, Tehran, Kashan, Semnan and others	444(6.30)
Unspecified		42(0.6)

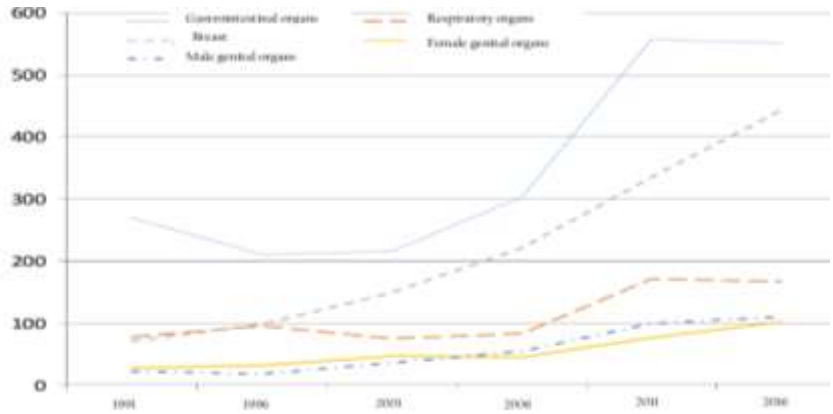

Figure 2. Frequency of the most common cancers (five first priorities) from 1991 to 2016 according to ICD10 classification

Table 3. Number of cancer patients referred to medical centers affiliated to Babol University of Medical Sciences from 1991 to 2016 based on gender and international classification of diseases

Category ICD10	Category title	Gender	Number	Mean±SD	p-value
C00-C14	Lip, oral cavity and throat	female	115	56.32±19.04	0.931
		male	130	56.53±18.71	
C15-C26	Gastrointestinal organs	female	815	59.40±14.37	0.001
		male	1292	62.17±14.29	
C30-C39	Respiratory and intracranial organs	female	135	57.48±13.64	0.001
		male	530	62.03±13.75	
C40-C41	Bone and articular cartilage	female	47	44.19±20.28	0.207
		male	52	49.65±22.31	
C43-C44	Skin	female	84	57.64±18.49	0.570
		male	142	59.12±19.04	
C45-C49	Soft tissue and mesothelium	female	40	49.45±16.32	0.972
		male	28	49.61±20.43	
C50	Breast	female	1288	49.49±11.83	0.001
		male	28	61.71±13.69	
C51-C58	Female genital organs	female	324	51.93±15.15	-
		male	0		
C60-C63	Male genital organs	female	0	59.62±19.77	-
		male	338		
C64-C68	Urinary tract	female	45	50.02±22.09	0.001
		male	139	64.30±16.87	
C69-C72	The eyes, the brain and other parts of the central nervous system	female	173	38.67±19.08	0.004
		male	256	44.43±21.74	
C73-C75	Thyroid and other endocrine glands	female	33	50±15.03	0.630
		male	13	53.39±19.58	
C76-C80	secondary and uncertain malignant neoplasm in unspecified site	female	120	50.20±19.47	0.030
		male	208	54.79±17.66	
C81-C96	Primary malignant neoplasms of the lymph, hematopoietic tissues and other relevant tissues	female	254	39.67±22.85	0.106
		male	417	42.72±25.08	
C97	Malignant neoplasm independent of multiple sites	female	2	45.00±19.79	-
		male	0	-	

Discussion

The results showed that the highest frequency of cancers was among men, in the elderly and the urban population. In addition, type of residence, marital status and type of occupation affect the frequency of cancers. The incidence of cancer in the cities of the Mazandaran is similar and is the most frequent in the cities of Babol, Amol and Sari, and the incidence of cancer has been increasing in the studied years. Furthermore, the frequency of cancer in men is more than women.

The study of Asthana et al. showed that in India, the frequency of cancer in women (51.6%) was higher than men (43.7%) (13), whereas Vafajo et al. in a study in Qom province in Iran showed that the percentage of men with cancer was 58% (18). Environmental and occupational factors, and outdoor economic and social stress (19), as well as hormonal differences (4), increase the chance of developing cancer in men, which necessitates more accurate planning for this group.

The results of this study showed that the frequency pattern of cancers in all cities of Mazandaran was similar and only 16.8% of all patients were from Babol. This result is consistent with the results of the study by Moghadamnia et al. who showed that many of the patients referred to the teaching centers of Babol are from other cities of Mazandaran (20), which may be due to the patients' trust in these centers and, on the other hand, Shahid Rajaee Hospital in Babolsar has been the only referral center that provides specialized radiotherapy and chemotherapy services for cancer patients in northern Iran since 1985.

The results of this study showed that the most common cancers based on ICD10 classification included gastrointestinal, breast and respiratory cancers, and the frequency rate of the most common cancers in the study years showed that the trend of gastrointestinal and breast cancers had a very steep ascending slope, but the upward trend of the incidence of respiratory cancers was slow and had fluctuations. Roshandel et al. in a study showed that the incidence of gastrointestinal and pulmonary cancers in the northern part of the Western Asia, such as Turkey and northern Iran, was higher than that of the southern countries (21).

Nikbakhsh et al. in their study mentioned breast cancer as the most common type of cancer (22). In 2006, Iran National Cancer Registry reported that the most common cancers in the northern region were gastrointestinal and breast cancer (23). It seems that nutritional habits and lifestyle in the northern region are a factor in the incidence of gastrointestinal cancers. Breast cancer may also be due to changes in women's reproductive patterns, genetic factors, environmental factors such as diet, obesity, physical activity and alcohol consumption (24), as well as increased diagnosed cases through screening techniques and advanced equipment, such as mammography (4), which requires more specific studies in this regard. In addition, since cigarette has been replaced with hookah in the community in recent years, which is much more harmful than cigarette, the frequency of respiratory cancers increased. Various studies still consider smoking and tobacco a major contributor to lung cancer (25, 26).

The results of the study showed that the frequency of cancer patients referred to medical centers of Babol University of Medical Sciences in urban areas was more than rural areas.

Zahnd et al. in a study in the United States showed that despite the differences in the incidence of cancer in the urban and rural areas, the frequency rate in urban areas is higher than rural areas (26). However, in the study of Chen et al. in China, the incidence of cancer in rural residents was higher than that of urban residents (16). In their study, Batouli et al. showed that there is a significant relationship between the incidence of cancer and the size of rural population worldwide (27).

This might be because the lifestyle of rural people living in the north is close to urban population, and because of the appropriate level of access to health facilities in rural areas and the health insurance coverage of all villagers, which is effective in increasing the quality of life (28).

In this study, the pattern of cancer in different cities of the province was similar and was most frequent in

the cities of Babol, Amol and Sari. The prevalence of cancer has increased over the years, and this trend has been accelerating in some cancers. The highest incidence of cancers was related to gastrointestinal, breast and respiratory cancers, and screening and behavioral interventions based on age, sex, and type of cancer seems necessary.

Limitations of this research include the destruction of some medical records of patients, the unavailability of old records (stagnant archives, and for this purpose, the researcher referred to the stagnant archives in person) and the inadequacy of the hospital information system in some hospitals, and for this purpose, the researcher used the manual registration offices.

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