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RESEARCH ARTICLE

Incidence of Breast Cancer in Markazi, Iran, Population-based Cancer Registry Results

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Abstract:

Background:

Breast Cancer (BC) is the most prevalent malignancy and a significant cause of cancer deaths in females all around the world. BC includes 16 percent of all cancers.

Objective:

This study aimed at examining the epidemiology of BC in Markazi.

Materials and Methods:

This was an epidemiological study in which data resulted from the population-based cancer registry program in Markazi, Iran was used during the years 2010-2014. Data was recorded in Excel software and coded based on ICD-O and all duplicate reports were removed according to their unique codes. All cases out of Markazi were excluded from study and cases with code C-50 (all BC) were included in this study. SPSS ver.18 was used to analyze the data.

Results:

In this study, 1,254 new cases of BC in Markazi were included in the analysis. The highest cancer rate was reported in 2012 (319 cases). The highest crude rate of BC was reported in 2012 (45/100,000 people) and the lowest crude rate was reported in 2010 (26.2 /100,000 people). The Age-Specific Rates (ASR) of BC were 27, 37.3, 45.7, 39.8 and 31.5 per 100,000 people in 2010 to 2014, respectively. The highest ASR of BC was reported in 2012 (45.7/100,000 people) and the lowest ASR was reported in 2010 (27/100,000 people).

Conclusion:

The results showed similar incidence rate of BC in Markazi as compared to other provinces in Iran. Efficient approaches should be considered for cancer registry systems especially BC.

Keywords: Age-specific rate, Breast cancer, Epidemiology, Markazi, Malignancy, ICD-O.

Article History

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1. INTRODUCTION

BC is the most prevalent malignancy and the most important death cause due to cancer all around the world [1].

BC includes 32% of female's cancers and is the first death cause in 40-44 years old females [2]. This cancer includes one-third of all females' cancers [3]. The BC incidence in developed countries is higher than in developing countries [4].

The Islamic Republic of Iran is a developing country and it is in transition from communicable to non-communicable diseases [5]. Cancer is the third leading cause of death in Iran and this rate is increased over time [6]. The results of studies

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showed that Iran was a middle BC prevalence country [7]. This cancer includes 16% of all cancers reported in Iran [8].

The increasing rate of the incidence of various cancers is expected by increasing the life expectancy and aging index in Iran. Age pattern and incidence of BC have been considered less in the various studies in Iran. The distribution and incidence of BC are affected by regional and environmental conditions. Therefore, the BC incidence trend measurement is required in all regions. This study was conducted due to the lack of information about the incidence of BC in Markazi, Iran.

2. MATERIALS AND METHODS

2.1. Study Design

This is an epidemiological study in which data reported by the population-based cancer registry program in Markazi of Iran was used during the years 2010-2014. Markazi is located in district 4, western Iran. Arak is the capital of this province. The population of Markazi is estimated at 1.14 million. The neighboring provinces of Markazi are Qom, Isfahan, Lorestan, Hamadan, Qazvin and Tehran.

2.2. Data Collection

The data reported from this study were extracted from population-based cancer registry national program. This program was conducted in 2014 in 11 provinces of Iran. This registry information was collected from various sources such as pathology reports, medical records center, death registry, and other sources (radiotherapy, chemotherapy, insurance, etc.). The data collection forms included questions such as demographic information, duration of cancer, location, cancer type, method of diagnosis, the exact location of tumor, the ICD-O code, location of metastasis and cancer stage. This data was obtained from the registration center. Data was recorded in Excel software and coded based on ICD-O and all duplicate reports were eliminated according to their unique codes. All cases out of Markazi provinces were excluded from study and cases with code C-50 were included in this study.

2.3. Population Estimate

The population of Markazi was 1,413,959 people (717,026 males and 696,933 females) in the census of 2016. The population of other years has also been estimated. The exponential (Geometric) growth formula was used as follows to estimate population over the years studied:

$$P_n = P(1+r)^n$$

Where, P_n is the population in the year to be estimated, P₀ is population in the census year (i.e. 2011), r is the growth rate (0.22), and n is the number of years after the census. The gender and age group ratios were considered the same as that of the census year, the year when their population was estimated.

2.4. Crude and Age Standardized Rate (ASR)

The findings were shown as the number of cases by age groups and years, with crude rate, age-specific and ASR per 100,000 persons. Also, the direct standardization method was used with the World standard population to calculate the ASR.

3. RESULTS

In this study, 1,254 new cases of BC from Markazi were included in the analysis. The highest rate of cancers was reported in 2012 (319 cases), and the lowest rate was reported in 2010 (183 cases). Also, the mean and standard deviation in terms of age in all year groups are shown in Table 1.

The crude rate (per 100,000) and ASR of BC in Markazi is shown in Table 2. The results showed that increasing age causes to increase the incidence of BC and the highest incidence rate was observed in the groups older than 50 years old. The highest crude rate of BC was reported in 2012 (45 cases per 100,000 people) and the lowest crude rate was reported in 2010 (26.2 per 100,000 people). The ASR of BC were 27, 37.3, 45.7, 39.8 and 31.5 per 100,000 people in 2010 to 2014, respectively. The highest ASR of BC was reported in 2012 (45.7 cases per 100,000 people) and the lowest ASR was reported in 2010 (27 cases per 100,000 people).

Table 1. The mean and standard deviation of age based on years.

Year	Number	Mean	S.D.
2010	183	52.22	14.71
2011	257	50.35	14.74
2012	319	49.30	13.59
2013	280	53.01	14.96
2014	215	52.10	12.31
Total	1254	51.25	14.16

Table 2. The Crude Rate (per 100,000) and Age-Standardized Rate of BC in Markazi.

Age Groups		2010	2011	2012	2013	2014
<40	Number of Cases	33	43	63	40	36
	Denominator	469275	470213	471153	483702	484766
	Crude rate	7.03	9.14	13.37	8.26	7.42
	95% CI	4.63, 9.43	6.41, 11.88	10.07, 16.67	5.70, 10.83	5.0, 9.85

(Table 2) *contd....*

Age Groups		2010	2011	2012	2013	2014
40-50	Number of Cases	61	71	108	85	60
	Denominator	87478	87653	87828	90167	90365
	Crude rate	69.7	81	123	94.3	66.4
	95% CI	53.66, 89.17	63.6, 101.2	101.4, 147.7	75.49, 116	51.09, 85.08
50-60	Number of Cases	32	80	77	74	57
	Denominator	62286	62411	62535	64201	64342
	Crude rate	51.4	128.2	123.1	115.3	88.6
	95% CI	35.72, 71.58	102.4, 159	97.64, 153.2	91.4, 143.8	67.48, 114.1
60-70	Number of Cases	34	33	35	32	44
	Denominator	36823	36897	36970	37955	38038
	Crude rate	92.3	89.4	94.7	84.3	115.7
	95% CI	65.28, 127.8	62.54, 124.1	66.94, 130.1	58.95, 117.5	85.4, 154.2
>70	Number of Cases	22	24	31	48	18
	Denominator	39681	39760	39840	40901	40991
	Crude rate	55.4	60.4	77.8	117.4	43.9
	95% CI	35.95, 82.51	39.14, 88.19	53.8, 109.4	87.56, 154.3	27.1, 67.93
Total Crude rate	Number of Cases	182	251	314	279	215
	Denominator	695542	696933	698327	716926	718503
	Crude rate	26.2	36	45	38.9	29.9
	95% CI	22.37, 29.97	31.56, 40.47	39.99, 49.94	34.35, 43.48	25.92, 33.92
ASR		27	37.3	45.7	39.8	31.5
95% CI		18.99, 36.32	29.4, 46.21	36.44, 54.28	31.26, 48.25	23.92, 39.98

4. DISCUSSION

The results obtained from our study showed that the ASR of BC in Markazi was increased from 27/100000 to 45.7/100000 in 2012. This rate was decreased again to 31.5 in 2014. An increasing trend was observed in ASR in this study from 2010 to 2014.

The various studies conducted in Iran have shown similar results. ASR was examined for BC during the 11-year period in Mirzaie's study in Kashan in 2016. ASR was increased from 20.2/100000 in 2001 to 32.8/100000 in 2011 [9]. In a study conducted by Nouruzinezhad in Mazandaran, BC was ranked first with ASR 23.76 [10]. Also, Babae *et al.* in their study showed that BC with ASR 21.3 was first cancer in the age group of 40-44 years old [11]. While the ASR was 67.8 in developed countries, it was 23.8 in the developing countries and is 37.5 all around the world [12]. In a study conducted in 2012 on the epidemiological pattern of BC in Iranian females, it was shown that ASR for BC was 28 per 100,000 person-years. This study identified an unusually rapid increase in BC rate at the age of 25. The ASR of BC was significantly lower in females from Turkmen ethnicity and those from rural areas. This study showed that ASR of BC increases annually at age 25, and then after a decrease, the second peak occurs at age 65 [10]. ASR was reported to be 18.4% for BC by GLOBOCAN in Iran in 2008 [12]. A study conducted in Kermanshah from 2001 to 2006 showed that the annual change in BC incidence was increased and the ASR of BC has been increased by 1.5/100,000 [13]. Another study conducted by Mehrbani *et al.* in Fars showed that the BC incidence was increased [14]. In general, the various studies showed that the incidence trend of BC was similar and additive in all provinces that this issue can be also observed in Markazi. However, the incidence of BC has been decreasing in Italy [15], French [16], and the USA [17], which is opposite to that reported in Iran.

This study showed that most BC cases occurred at the age of 50-60 in all years. Mostly reported, ASR were for these ages. BC had the highest frequency in 5 and 6 decades of life. The ASR of BC was increased in the age of 50 and then

decreased after menopause [18]. A review study showed that most cases of BC occurred in the age of 40-49 and this result was not consistent with our study [19]. The other studies also suggested that the most incidence rate was for the age under 50 [10]. In a study conducted in Mazandaran, the highest rate of ASR of BC was reported at age of 50-55 that was consistent with our results [20].

CONCLUSION

BC incidence rate and ASR were reported to increase in Markazi in 2010-2014. According to this result, the evaluation of measuring parameters of this increase is required. Therefore, it is recommended to conduct further studies related to various factors that can increase the incidence of BC.

LIST OF ABBREVIATIONS

ASR	=	Age Specific Rate
BC	=	Breast Cancer

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The protocol of the study was approved by the ethics committee of Arak University of Medical Sciences under grant number IR.ARAKMU.REC.1397.184.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Written informed consent was obtained from all the participants prior to publication.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

FUNDING

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest, financial or otherwise.

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