Changing Trend of Breast Cancer in Ardabil Province, Iran by Age Group, Grading, and Gender during 2003-2016

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Abstract

Background: Breast cancer (BC) is the most prevalent cancer in women and the second most common cancer in the world. Two million new cases were reported in 2018. The aim of this study was to investigate the changing trend of BC in the people of Ardabil during 2003-2016.

Method: In this cross-sectional descriptive study, we analyzed BC incidence rates using population-based cancer registries stratified by city, age group, gender, and disease grading. We analyzed the collected data by statistical methods in SPSS version 21.

Results: The mean age of patients was 48.4±13.1. Of all patients, 98.5% were female, and most were aged 40-60 (56%). The most of BC cases was registered in year 2011 with the most incidence rate about 10.41 per 100000 and the most of cases with 71.5% was registered in Ardabil city. The incidence rate of BC reached from 4.13 per 100000 in 2003 to 6.93 in 2016. The annual percentage change during the study years was 4.1%.

Conclusion: Results showed that the incidence rate of BC during study years had an increasing trend in Ardabil's people and reached from 4.13 per 100000 in year 2003 to 6.93 per 100000 in year 6.93 with Annual percentage change about 4.1%. The trend of BC incidence increased during 2003-2011 and then, decreased during 2011-2016.

Keywords: Breast cancer, Incidence rate, Grade, Trend

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Introduction

Breast cancer (BC) is an epidemiologically important issue with a global spread; its incidence rate has increased in the past two decades; thus, it is addressed as a growing

social problem in all communities. BC is a multi-factorial disease associated with many factors such as genetic and hormonal factors and environmental exposures.[1]

Breast cancer is the second common cause of death among women aged 20-59 years in developed and developing countries worldwide. The total incidence of breast cancer around the world is about 12.5% (one in eight women). According to the World Health Organization (WHO), more than 1.2 million patients are annually diagnosed with BC; among these patients, more than 500,000 have died.[2-3]

In Iran, breast cancer is one of the most frequent malignancies in women. Its peak incidence age in Iranian women falls in the fourth and fifth decades of life, which is a decade earlier than the global peak age of incidence. Because of Iran's socioeconomic status and the important role of women as mothers, breast cancer significantly damages the patients' families. Therefore, it is important that the public health sector plan and make policies for the early diagnosis of the disease and reducing its complications and mortality in Iran.[5] Breast cancer is the 5th leading cause of cancer death in Iranian women.[4-5]

Breast cancer is one of the most prevalent types of malignancy and the leading cause of cancer-related deaths in women worldwide. It could be regarded as a global challenge regarding women's health schemes.[6]

Northeastern Iran is known as a high-risk area for upper gastrointestinal cancers. Recent reports have suggested a declining trend for these cancers as well as an increase in the incidence of other malignancies, including breast cancer.[7]

Based on statistics, BC incidence is increasing in low and middle-income countries such as Iran.[8] In Iranian women, this incidence is 24 per 100000, which is lower than that of high-income countries.[5]

Our findings showed that the incidence rate of BC increased with age, reaching its peak between the ages of 40 and 59 years. The second peak was observed between the ages of 80 and 84 years.

The incidence of breast cancer was lower in Iran compared with other parts of the world. However, cancer registries, which cover a wide range of patients are needed to map out the exact incidence rate and trend of breast cancer in Iran.[9] The aim of this study was to investigate the changing trend of BC in Ardabil's population during 2003-2016.
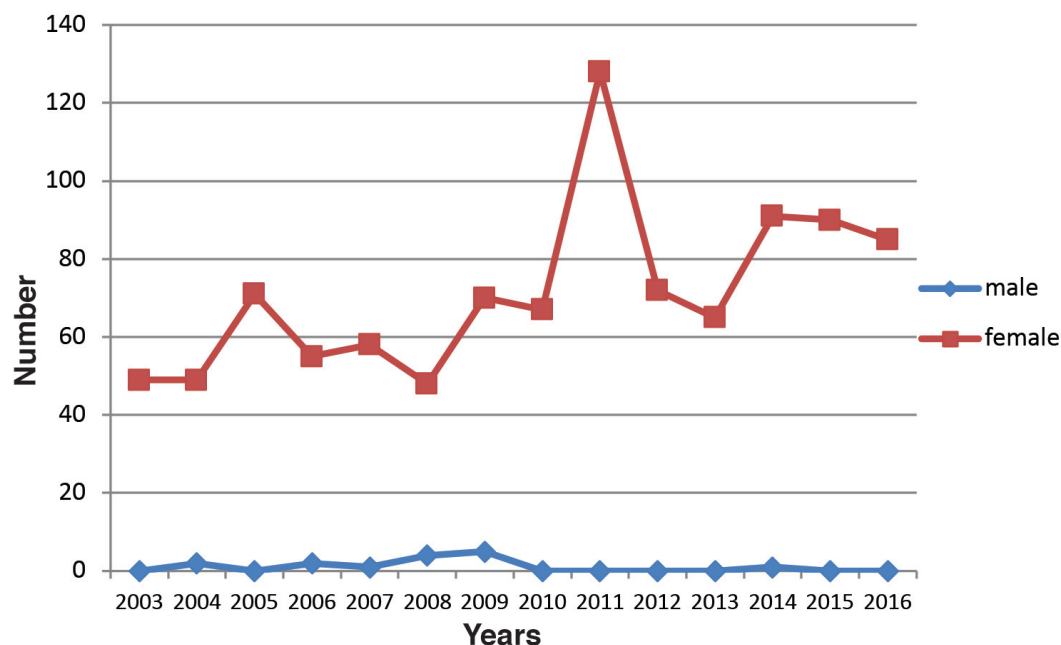

Figure 1. This figure shows the number of breast cancer cases during the study years 2003-2016 based on sex.

Table 1. The incidence rate of BC based on Ardabil's estimated population during 2003-2016

Years	No.	Population	Incidence per 100000
2003	50	1210654	4.13
2004	53	1217324	4.35
2005	68	1223469	5.56
2006	56	122815	4.56
2007	58	1231724	4.71
2008	47	1235954	3.8
2009	68	1239714	5.49
2010	64	1244567	5.46
2011	130	1248488	10.41
2012	70	1251954	5.59
2013	66	1258824	5.24
2014	93	1262325	7.37
2015	89	1267456	7.02
2016	88	1270420	6.93
Total	1000	-	5.31

BC: Breast cancer, No.: Number.

Methods

Study location

Ardabil Province is a province in northwest of Iran with an area of about 17953 km². This province consists of nine urban districts: Meshkinshar, Parsabad, Germi, and Bilesavar in the northern part; Ardabil, Nir, and Namin in the central part; and Kousar and Khalkhal in the southern region of the province. There is a common border of 285.5 km with the Republic of Azerbaijan. The capital of Ardabil is situated in the center of the province, where the majority of diagnostic and treatment facilities are located. Sabalan Mountain, a silent volcano located in Meshkinshahr district, is the third tallest mountain in Iran with an altitude of 4821 m. According to the 2016 census, the population of Ardabil is 1,228,155 (1.9% of the total population of Iran). The population of Ardabil is relatively young, with 76% below the age of 40 years.[16]
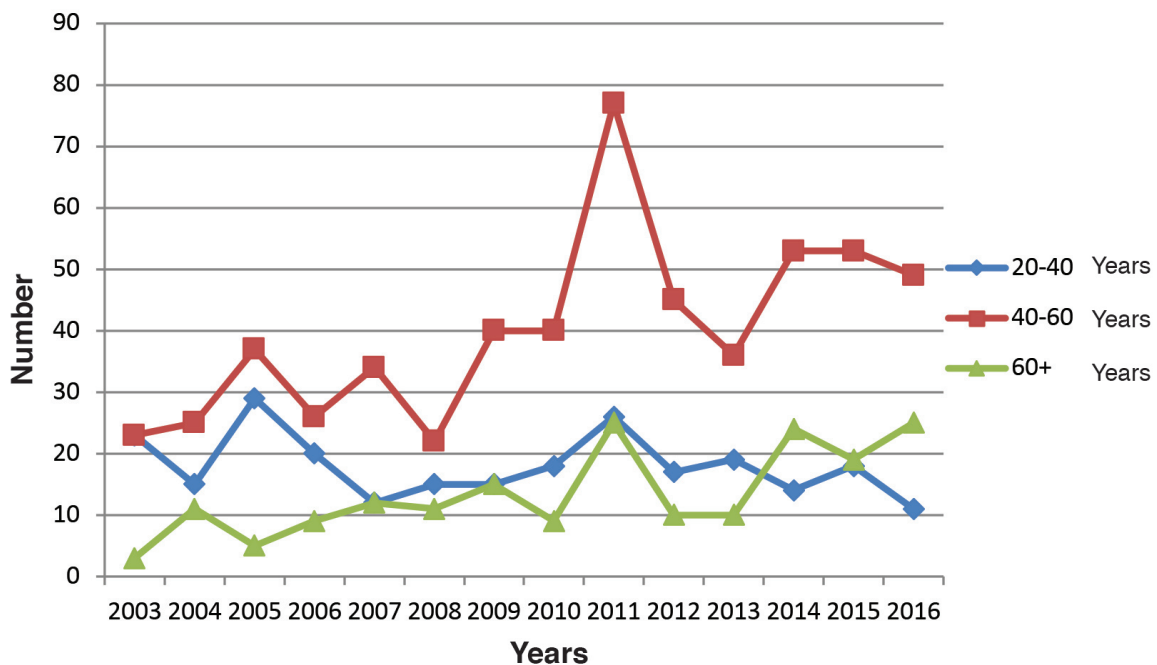

Figure 2. This figure shows the number of breast cancer cases during study years 2003-2016 based on age group.

Study design and participants

In this cross-sectional descriptive study, we analyzed 1000 cases of BC based on population-based cancer registries stratified by place of residence, age group, sex, and disease grading. Also, based on Ardabil's population, estimated from national population census in the province during the study years, we estimated the incidence rate of BC for each year and also analyzed the changing trend of BC incidence rates during the study years. We also extracted the Ardabil's population from the census statistics and used the data in estimating the incidence rate of BC for each year.

Statistical analysis

Population data of Ardabil were obtained from the country and province national census statistics for years 2001, 2006, 2011, 2016 and estimated for other years.

We used the annual percentage change (APC) to determine the yearly change.

Also, the incidence rate of each year was estimated based on yearly population and we showed the change of incidence rate by graph and also, used GIS for geographical distribution of grading of BC cases in various cities of Ardabil.

All of the analysis was done in excel and SPSS

version 21.

Ethical approval

We used the Ardabil province cancer registry data in this study which was financially approved by the Ardabil University of Medical Sciences. Due to the retrospective nature of the study, we only used the registered data, and hence, there was no need for written informed consent forms.

Results

During the study period, 2003-2016, 1000 cases of breast cancer were documented in the cancer registry unit.

Of the cases, 98.5% (n = 985) were women and 1.5% (n = 15) were men. The female to male ratio was 65.7: 1 (Figure 1).

The overall mean age of the patients was 48.4±13.1 years (range 20-89), most of whom were in age group 40-60 (56%) (Figure 2).

Men were significantly older than women at diagnosis (men 61.9 vs. women 48.2 years, *P*=0.001). Of all BC registered cases, most of them were registered in Ardabil city with 715 cases (71.5%) (Figure 3).

Of all the patients, 46.9% were without grade and 53.1% were with grade. Among the cases with grade, most were observed in grade two
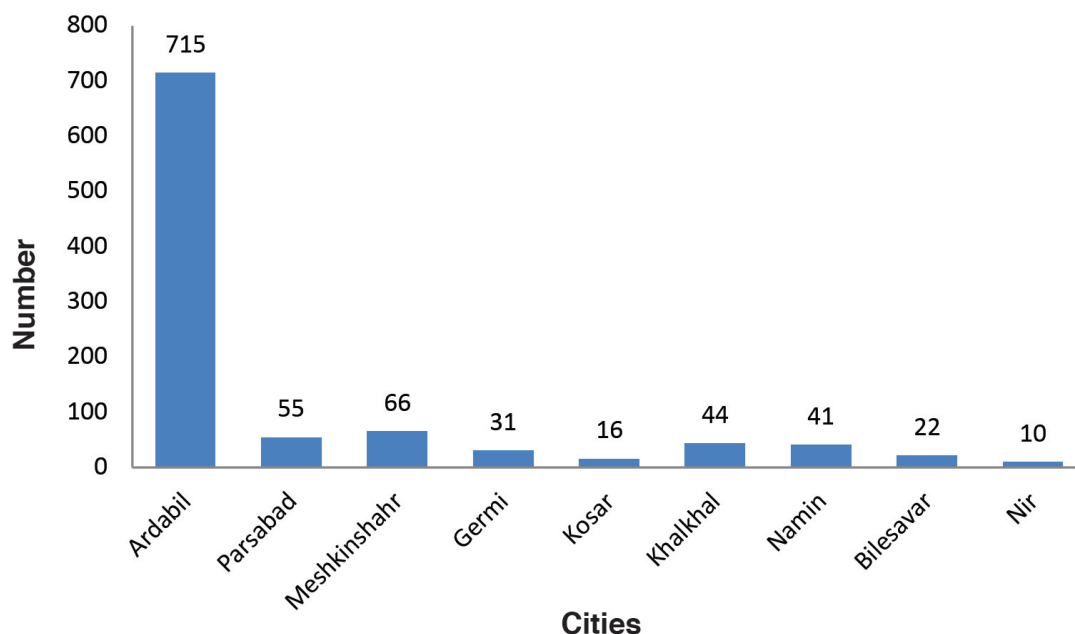

Figure 3. This figure shows the number of registered breast cancer cases during study years 2003-2016 by cities.

(n=190, 35.8%). Also, results showed that by geographically distribution, most of cases with grading IV were seen in cities Nir and Kosar (Figure 4).

The total incidence rate during study years was 5.31 per 100000 which slightly increased from 4.13 in 2003 to 6.93 in 2016. The APC during 2003-2016 was 4.1% for each year (Table 1).

Discussion

In this study, BC had an increasing trend during 2003-2010; a peak occurred in 2011, after which the trend decreased and became smooth again. The peak in 2011 could be due to the overdiagnosis of BC cases and the established registry system in Ardabil province. The decreasing trend of BC after 2011 in Ardabil province is generally unknown; however, it could be attributed to the lack of a screening program in Ardabil province, non-awareness of women for self-evaluation and early referred to doctors, lack of a precise BC registry system at province levels and referred many of BC cases to other provinces near Ardabil for treatment.

Similar to our study, Babaei et al., in a study in Ardabil, showed that BC had a smooth and steady trend during 2004-2006 years. Also, Sadjaddi et al. showed that cancer incidence had an increasing trend in Ardabil province during 1996-1999; this is in line with Ardabil cancer registry data and our statistics in these studies.[7,10]

In this study, 98.5% of the BC cases were women which were more than a study conducted in Iran by Taheri et al., which reported this rate about 76%. The total number of BC cases in Iran is about 70000, to which more than 10000 new cases are annually added.[8,11]

In this study, most of the BC cases were seen in age groups 40-60 years (56%), which was different from the other studies within Iran, because many of the BC cases in these studies were seen in age group 40-49 years.[12-13]

The mean age of patients in this study was 48.4 year, which is similar to other studies conducted in Iran such as Nourouzinejad in Mazandaran (48 year), Almasi in Kermanshah (46 year), and Holakouei (48.7 year).[12,14-15]

In recent years, BC cases have increased among Iranian women. According to statistics, the incidence of BC has significantly increased in Iran, especially in the central and northern provinces.[16-17]

In agreement with a previous study, the mean age of all BC patients in this study was 48.4 years. In accordance with our study, Mousavi et al. (2007) reported that most of the women with breast cancer were aged 40-60 years.[5] Anders et al. (2009) revealed that approximately 7% of
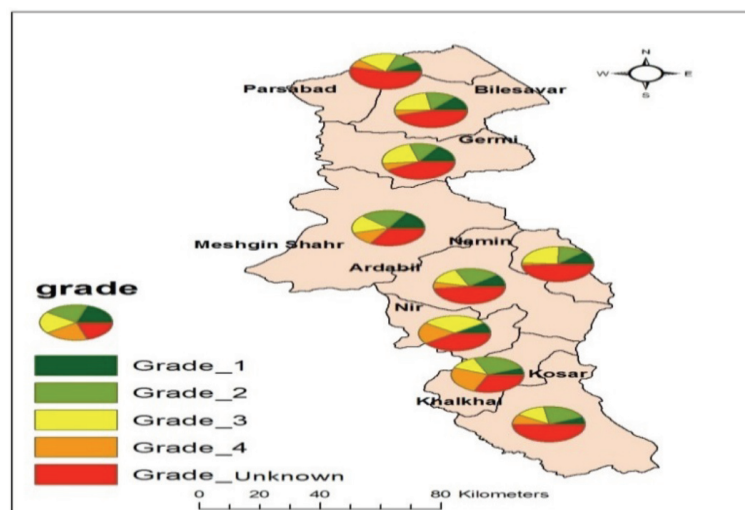

Figure 4. This figure shows the geographical distribution of the grading of breast cancer cases during study years 2003-2016 based on city.

women with BC were diagnosed before the age of 40. This is not in line with our study because 19% of the women were diagnosed before 40, which is significantly higher than Anders et al.[18] This result is in agreement with the findings of another study which reported that Iranian breast cancer patients were relatively younger than their Western counterparts.[19]

Due to some limitations, we were not able to estimate the ASR in this study and only used the incidence formula to calculate the incidence rate based on population statistics for years 2003-2016.

Conclusion

The results showed that the incidence rate of BC in Ardabil during the study years was similar to other provinces in Iran, in which it had an increasing trend and reached to higher incidence rate in the year 2011. It can be said that the incidence of BC increased from 2003 to 2011 and decreased from 2011-2016 and a change point was occurred in the pattern of BC incidence rate in the year 2011. So, enhancing the skills of specialists and staff, by providing training programs could play a key role in detecting and newly-diagnosed of BC cases in future.

In addition, educational interventions to promote awareness, attitude, and empowerment of health professionals and different groups of women in the community to use early BC screening programs play an important role in disease prevention, control, early treatment, reduced mortality, and prolonged patient life.

Conflicts of Interest

None declared.

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