Original Article

Estimation of the burden of breast cancer in West Azerbaijan province in 2013

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Abstract

Background & Aims: Breast cancer is the second most common cancer in women and second cancer in both sexes. The aim of this cross sectional study is to estimate the burden of breast cancer in women in Western Azerbaijan Province in 2013.

Materials & Methods: In this cross-sectional study, the information needed to calculate YLD and YLL creating the total DALY including the female population, the mortality, incidence and mean time stage of breast cancer that were obtained from province death registration system and cancer registry. The standard World Health Organization (discount rate 0.03 0.04 Weight age, and fixed adjusted 0.165) was used to calculate YLL and YLD and all the information collected and entered into EXCEL TEMPLATE software and the calculations were carried out.

Results: The entire burden of lost years of life due to breast cancer in 2013 was 1645 years. YLL in 2013, was equaled to1385 years while the share of YLD was calculated as 260 years. DALY rate per hundred thousand female populations was 1.1 years. Breast cancer incidence and death rate per hundred thousand women in 2013 were 14.2 and 4.7, respectively, that the peak age of breast cancer has been accessed in the age group of 45-59.

***Conclusion*:** The incidence, mortality and the burden of breast cancer in women have been raised compared to the study last year. The findings may help managers through the awareness of factors affecting the burden of disease, preventative measures and the idea of screening and early detection of breast cancer.

Keywords: Breast cancer, Burden, DALY

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Introduction

For strengthening the policy-making foundations, true allocation of health resource, prioritization of health-related interventions, and quantifying measures related to public health, some measures are required that keep the losses due to premature death from any cause and the burden of disabilities that arise during disease and its consequences together and provide them based on a common unit to express them and on the other hand, to show the level of its distribution in society in the form of one or two indicators (1). By selection of time as the unit of measure, this is possible to sum the burden of the consequences of non-fatal diseases and injuries consequences of such duration or time lost as a result of

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premature deaths and an index is accessed which measures the inability of patients even with non-lethal diseases and death resulting from health problems in the community (2).

DALY is a health gap index calculating lost years of life, whether due to premature mortality (YLL)or due to disability YLD. The figure in the study of the global burden of diseases and injuries (GBD) is used to estimate the burden of disease definition. GBD study is a joint work between the World Bank, Harvard School of Public Health and the World Health Organization, aiming at determining the quantification of the burden of disease and damages in human society and determining the health challenges facing the world since 1988 (1). In Iran, a study entitled estimating the burden of disease, injuries and risk factors started in 2003, the results of which were published in 2007 (3).

Currently, non-communicable diseases are the largest cause of death worldwide. According to the global organization of Health in 2008, more than 36 million deaths are due to non-communicable diseases that mainly 48% is due to cardiovascular diseases, 21% due to cancers, 12% due to chronic respiratory diseases and 3% due to diabetics (4). Breast cancer is one of the most common cancers and a major threat to women's health and is the most common cancer in women after non-melanoma cancer. This cancer is the second leading cause of cancer death in women after lung cancer and involves 32% of cancer cases in women. According to Golobcan, 2008, its standardized incidence rate in developed countries is 86.4, 27.3 in less developed countries and 38.9 in the world, one in a hundred thousand cases (5). After cardiovascular diseases and events, breast cancer is the third cause of death in Iran. 16% of all cancers relate to the breast cancer and is the number one cancer among Iranian women (6).

Breast cancer is seen mainly in those aged over 50 years in Western countries, while according to the studies conducted in our country in 2007, the number of people aged 40-44 is more than other age groups.

The number of younger patients is more than Western countries considering the peak age incidence of this cancer in women who were reported to be in their 40s and 50s and a decade lower than global statistics (7). In 2007, breast cancer with an incidence of 23% was the most common cancer among women and in the same year, the percentage of cases in West Azerbaijan province is 17.3 and breast cancer is among the five most common cancers in the province (8). Since the studies related to the calculating the load of breast cancer in country is limited to the researches of references, hence, performing this study and having access to the results and determining the burden of this disease enable health planners in the country to distribute resources into appropriate manner and assess the development of breast cancer prevention programs effectively and scientifically.

Materials and Methods

This cross-sectional study was carried out on data available using census sampling in order to calculate the burden of breast cancer in West Azerbaijan province in 2013. For this purpose, the death rate from all causes in the province. Inability weight and breast cancer are obtained from the sources listed below, respectively.

This cross-sectional study has been carried out on data available in 2013 in West Azerbaijan province using census sampling in order to calculate the burden of breast cancer. The following information is required in order to calculate the Global Burden of Disease for cancer based on templates: The population in terms of age and gender, the incidence and death from breast cancer, the death rate from all causes in province and disability weight of breast cancer which are obtained from the sources listed below.

1) the population of the province according to age and gender sub-groups using 2013 census

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2) the incidence of breast cancer in women of any age subgroups using data from cancer registries.

3) the rate of death from all causes and deaths from breast cancer in women, according to subgroups of age extracted from death registration system.

4) the disability weights used in the DUTCH study are in accordance with patient staging and are used in a national survey in 2003 (9,10). The incidence of breast cancer, including pathology reports and reports based on population, were extracted from the Office of Cancer of the Ministry of Health and Medical Education. 222 cases of cancer were studied according to the number of breast cancer cases classified according to ICD10 (C50.0-C50.9).

Index for lost years of life YLL due to premature death is often presented in two ways in Western communities: Total years of life lost for the population under study and all other forms of life lost per thousand for a year. In both cases, the YLL indicator shows the number of years. YLL values can be optional, from zero to the highest life expectancy in a standard society. The standard society is Japan due to its highest life expectancy (11).

Mortality data have been accessed from death registration system. The system which is completed by provincial health centers, mortality and its causes in the city collected from all possible sources, such as hospitals, cemetery, forensic medicine, rural health centers and other sources using special forms that have been modified in accordance with international standards. The data includes the number of deaths in the studied year in the province in total and also based on age groups. The age at death time has been extracted for all the deceased as it is necessary in measuring the index of lost years of life. Data required have been provided to researchers by provincial health centers.

Calculations have been performed according to the following formula in Excel software to calculate the amount of YLL using standard life expectancy table as well as the number of deaths caused by breast cancer disaggregated by age groups. It should be noted that the calculations are according to World Health Organization Standards by applying a discount rate of 0.03 for future and the use of age weight for different life years.

Equation 1:

$$YLL_{(3.1)} = NCe^{(ra)} / (\beta + r)^2 [e^{-(\beta+r)(\mathrm{L}+a)} [-(\beta + r)(\mathrm{L}+a) - 1] - \mathrm{e}^{-(\beta+r)a} [-(\beta + r)a - 1]]$$

In this equation:

N = the number of deaths in a given age and gender.

L = standard life expectancy at the same age and sex.

R = discount rate equal to 0.03.

β = contract rate in calculating age value which is equal to 0.04.

C= a fixed amount equal to 0.1658

Regarding the proportion of patients who received the treatment and the healing cases, the proportion of patients entering each level was calculated. Determination of cancer incidence shows the number of patients who pass to the next stage. YLD of each stage can be calculated according to the formula 2 and the number of patients gives us the mean score of each period as well as disability weight at each stage (12).

Equation 2:

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$$YLD_{(3.1)} = I \times DW \times Ce^{(ra)} / (\beta + r)^2 [e^{-(\beta+r)(L+a)} [-(\beta + r)(L+a) - 1] - e^{-(\beta+r)a} [-(\beta + r)a - 1]]$$

In this equation:

I: the number of new cases of an illness or injury during a given time.

L: duration of illness or injury.

DW: inability weight of the illness or injury.

r: discount rate that is equal to 0.03.

β: the default rate in calculating the age value which is equal to 0.04.

C: 0.1658

The estimated burden of breast cancer in 2013 was compared with an estimated value in 2003 in Iran, the Eastern Mediterranean region and the world.

Results

222 cases of breast cancer were prospectively studied. The incidence of breast cancer per 100,000 women in 2013 was estimated as 14.2 and breast cancer death rate was 4.7. The highest incidence and death from breast cancer was between the age range of 45-59. (Table 1)

Table 1: Total population, the incidence, the death from breast cancer and from all causes per 100,000 women according to age groups in Western Azerbaijan in 2013.

Age group	Population	Incidence of breast cancer	Age-specific death rates-due to breast cancer	Dead rate due to all causes
0-4	140000	0	0	308.5
5-9	127000	0	0	23.6
10-14	121000	0	0	34.7
15-19	136000	0.7	0	50.7
20-24	165000	3.6	0	43.4
25-29	168000	1.1	1.7	68.4
30-34	147000	8.1	1.3	61.9
35-39	116000	15.5	3.4	65.5
40-44	101000	35.6	11.8	130.6
45-49	87000	54	11.4	152.8
50-54	73000	46.5	16.4	249.3
55-59	58000	51.7	6.8	427.5
60-64	42000	35.7	19	726.1
65-69	30000	40	23.3	1370
70-74	22000	13.6	9	2336
75-79	17000	29.4	23.5	4835
80≥	19000	15.7	31.5	10231
All	1569000	14.2	4.7	358.1

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Total lost years due to premature death and disability from (DALY) in total female population of Western Azerbaijan in 2013 due to breast cancer is 1645 years of which 1385 years are due to premature mortality (YLL) 260 years are due to disability (YLD) (table 2). The lost years of life due to premature death or disability per thousand women (DALYs / 1000) is 1.1 (Table 3).

Table 2: Incidence, mortality and the incidence of breast cancer deaths in women in Western Azerbaijan province in 2013 and comparison with Iran, the Eastern Mediterranean region and the world in 2003

	New cases (cases)	Number of deaths (per hundred thousand)	Incidence	Mortality level (per hundred thousand)	The proportion of incidence to deaths
Wets Azerbaijan	222	74	2.14	4.7	3.02
Iran	3068	1075	61.4	1.62	2.85
Eastern Mediterranean	9256	4376	53.6	3.07	2.12
World	10331	477196	88.16	7.67	2.17

Table 3: years lost due to premature death (YLLs/1000), disability (YLDs/1000) and the sum of the two (DALYs/1000) per thousand women of West Azerbaijan province in 2013 due to breast cancer and comparison with Iran, the Eastern Mediterranean region and the world in 2003

	YLLs/1000	YLDs/1000	s/1000 DALY
Wets Azerbaijan	0.9	0.2	1.1
Iran	0.13	0.49	0.62
Eastern Mediterranean	1	0.1	1.1
World	1.76	0.23	1.99

Discussion

222 cases of breast cancer were entered the study and the age-standardized incidence for all ages in one per hundred thousand women was 14.2 which was higher than Eastern Mediterranean region (6.53 per hundred thousand women) and lower than the global level (16.8 in hundred thousand). The death rate from breast cancer in West Azerbaijan province (4.7 per hundred thousand women) somewhat higher than Eastern Mediterranean region (3.7 per hundred thousand women), and lower than global level (7.67 per hundred thousand women).

The DALY in West Azerbaijan province due to breast cancer (1.1 per hundred thousand women) was nearly doubled compared to the country in 2003 (0.62 per hundred thousand women), while was less than of the world (1.99 per hundred thousand women) and the same as Eastern Mediterranean region (1.1 per hundred thousand women) (13).

It should be noted in connection with the share of YLD in the study as 15.8 percent of total DALY that the higher proportion is of cancers with lower survival rate than cancers with higher survival rates such as breast cancer. (14)

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Possible reasons to justify the difference YLD in studies is that the cancer registries and mortality from the cancer is different in different provinces of the country. The incidence of this cancer in our country is lower than global level. The young population of Iran led to a lower incidence of breast cancer. If these assumptions are considered as true, and given the trend of population control in the coming years, we will see an increase in the country. The difference in incidence and as a result, differences in burden of breast cancer in different areas that is more related to environmental and lifestyle risk factors such as high maternal age at first live birth, fewer live births, no history of childbirth, history of X-ray radiation to the chest from teens to 30s, taking OCP , Menopause and the marital status than genetic predisposition (15).

Based on the results obtained in this study, the average age of diagnosis in Western Azerbaijan province is almost the same as other studies in other parts of the Iran and other developed and developing countries. The incidence, mortality and the burden of breast cancer in the province showed a significant increase compared to previous years and also is higher than the Eastern Mediterranean Region. Also, the age distribution is younger than global level that the results show the first level obligation of prevention to reduce the incidence of breast cancer as well as the need to prevent the second level screening and create risk factors care system to identify high-risk individuals is important.

The major limitations of this study include illegible and incomplete and bad recorded patient data in some cases. As well as incomplete coverage of the disease in the province. With respect to these cases, it is recommended that further studies on the burden of breast cancer to be done in the province and other provinces, therefore the burden caused by the disease to be further identified. Since many variables in this study had a lot of missing values, the cancer registry centers are suggested to provide standard list of variables required for the assessment to the pathology and oncology centers to have uniform access to data in the future.

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