RESEARCH COMMUNICATION

# Burden of Breast Cancer in Iran: A Study of the Tehran Population Based Cancer Registry

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## Abstract

**Background: Breast cancer is the second most common cancer among Iranian women. This study was designed to estimate the burden of breast cancer in Tehran, the capital of Iran. Methods: In this retrospective study, the existing data of Tehran Population Based Cancer Registry (TCR) from 1998 to 2001 were used; all Tehranian women with breast cancer were followed for computing the survival and remission rates. The World Health Organization's Practical Guide of National Burden of Disease Studies was employed for performing the study. The data for breast cancer were analyzed with DISMOD II software and Disability Adjusted Life Years (DALY) were computed using Excel based software. Results: The mean age of the patients was 51.3±12.5, 31.4% being under 40 years old. The incidence rate of breast cancer was estimated to be 17.09 (95 %CI: 15.67-18.50) per 100,000 women. The five year survival rate was 75 %. The DALY for breast cancer was 4,252 years (95 %CI: 3896-4604). Conclusion: Breast cancer is a high burden in the community. More than 36% of the tumors occur in women under 40 years old. Comprehensive national cancer control programs including promotion of awareness, early detection, treatment and palliative cares are vitally important for decreasing the burden of breast cancer in Iran. This strategy should be strongly recommended to policy makers and special programs should be considered for women under 40 years old.**

**Key Words**: Burden - breast cancer - Iran - DALY

*Asian Pacific J Cancer Prev,* **7**, 571-574

## Introduction

Breast cancer is the most second cancer among Iranian women. According to death survey in 18 and 23 provinces of Iran, its mortality rate was registered 2.5 and 2.7 per 100.000 women population in 2001 (Mohsen, 2003) and 2003 (Mohsen, 2005), respectively. National Cancer Registry Program was registered 3946 cases of breast cancer which incidence rate was 16 per 100,000 in 2003 (Ministry of Health and Medical Services, 2003) and 4557 cases, which incidence rate was 18.2 per 100,000 in 2004 (Ministry of Health and Medical Services, 2004). There are many reports about the epidemiology (Talei et al., 1997; Harirchi et al., 2000), early detection (Hadi et al., 2002, Naderi and Bahrampoor, 2003) , delayed presentation (Montazeri et al., 2003; Harirchi et al., 2005), risk factors (Ebrahimi et al., 2002; Yavari et al., 2005), treatment (Salsali et al., 2003; Najafi et al., 2005), and other basic surveys (Mehdipour et al., 2003; Moslehi et al., 2003) on breast cancer in Iran. According to these studies, breast cancer is a health priority, the most age group was seen in 40-50 years, and there were delay presentation for diagnosis and treatment. Tehran Population Cancer Registry (TCR) had been conducted by Cancer Research Center of Cancer Institute of I.R. Iran from 1998. This registry was completed until the end of 2001. This study was conducted to define the burden of breast cancer among Tehranian women.

## Subjects and Methods

This study was conducted in two phases; the outcome of breast cancer in Tehran was evaluated at the first step. Eleven thousand, four hundred and eleven breast cancer records were registered by TCR from 1998 to 2001. TCR is population based cancer registry, repeated records being deleted. Since there are no national ID numbers in Iran, the following protocol was used to define the repeated records by using Access software: the data were sorted by their name, family name, and father's name. All repeated records were sorted near each other. Each repeated record was proposed as a block. The record with earliest diagnostic time defined the index record of block and its uncompleted variables were

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merged with other records automatically. After this process, the other records of each block were deleted. This process could not define the cases which their name or family name were not correctly entered in TCR. Many name and family names have a prefix or suffix, which might not be entered in TCR. For completing the deletion of repeated records, all data were sorted by name, family name and phone number, and then the data were assessed manually by a trained technician to define the repeated cases and to delete them.

After this phase, all records which had a phone number, were selected and telephoned by five trained technicians, so the data collection forms for each patient were completed where possible by telephone interview with the patients or their family. The demographic, diagnostic time and survival situation were assessed by this data collection form. Each phone number was contacted in three times in three sequence days with one day interval, if there was no response, the communication was considered unsuccessful. From all records without phone number or unsuccessful communication, 360 records were selected with simple random sampling method, and their hospital files were reviewed to complete the demographic and location situations data by four trained technicians. All data was entered in access file and then export to SPSS, version 11.5, for descriptive and analytic analysis, p value was significant under 0.05. The Kaplan- Meier regression model was used for computing the survival analysis.

The second phase, the following steps were conducted for computing the burden of breast cancer by using WHO's Practical Guide of National Burden of Disease Studies (Mathers et al., 2001).

*Data analysis with DISMOD II*

Since numbers of age of onset and duration of the disease were not available directly from disease registers and only incidence data were available, a software program called DISMOD II had been used to model average age of onset and expected duration from estimates of prevalence, incidence, remission, and mortality (WHO, 2001). The estimated population and mortality rate of Tehran by age and sex groups had been copied in structure of DISMOD II. Mean women population was estimated 3753267 and mortality rate was 4.03 per 1000 in Tehran from 1998-2001 (Iranian Statistical Center, 2005).

*Computing the DALY*

DALYs had been calculated as the sum of the years of life lost due to premature mortality (YLL) in the population and the "years lived with disability" (YLD) for incident cases of the health condition (Murray and Lopez, 1996). We also used the estimated Life Table of Iranian population (http://undp.org/hdr2003/indicator/indic_1_1_1.html, Home > Iran > People > Life expectancy at birth, June 2005)

*Statistical Methods*

All data analyzed with DISMOD II (a software which introduced by WHO and World Bank for this purpose), the out put of DISMOD II data had been sent to Excel software for computing the DALY. DALY's assumptions were as follows: B (Standard age weights) =0.04, r (Standard discount rate) =0.03, C (Standard age weights) =0.1658, and K (full age weights) =1.

**Table 1. Mean Incidence Rates for Breast Cancer per 100,000 Women Population in Tehran from 1998-2001**

| Age Group | 1998 | 1999 | 2000 | 2001 | Mean |
|---|---|---|---|---|---|
| 15-19 | 0.00 | 0.00 | 0.18 | 0.00 | 0.09 |
| 20-24 | 0.84 | 1.04 | 1.45 | 0.82 | 0.99 |
| 25-29 | 5.40 | 5.08 | 5.88 | 5.00 | 5.27 |
| 30-34 | 14.45 | 13.66 | 17.95 | 12.09 | 14.53 |
| 35-39 | 33.96 | 26.62 | 35.41 | 24.19 | 30.11 |
| 40-44 | 51.81 | 50.54 | 56.90 | 42.99 | 50.43 |
| 45-49 | 68.36 | 60.22 | 72.76 | 55.99 | 64.44 |
| 50-54 | 72.63 | 66.24 | 81.03 | 56.46 | 68.87 |
| 55-59 | 76.35 | 63.52 | 87.39 | 65.49 | 73.18 |
| 60-64 | 90.50 | 75.33 | 74.72 | 68.89 | 77.30 |
| 65-69 | 74.06 | 51.48 | 65.65 | 46.29 | 59.30 |
| 70-74 | 47.54 | 49.13 | 64.83 | 46.45 | 53.32 |
| 75-79 | 60.91 | 45.36 | 59.99 | 71.38 | 59.46 |
| 80-84 | 27.56 | 36.50 | 54.30 | 53.84 | 40.87 |
| 85+ | 39.94 | 23.80 | 23.60 | 23.40 | 25.67 |
| Total | 18.19 | 15.90 | 19.51 | 14.76 | 17.09 |

**Table 2. Mean Mortality Rates for Breast Cancer per 100,000 Women in Tehran from 1998-2001**

| Age group | No | Mortality | Age group | No | Mortality |
|---|---|---|---|---|---|
| 0-4 | 0 | 0.00 | 5-9 | 0 | 0.00 |
| 10-14 | 0 | 0.00 | 15-19 | 0 | 0.00 |
| 20-24 | 1 | 0.17 | 25-29 | 1 | 0.23 |
| 30-34 | 8 | 3.04 | 35-39 | 21 | 8.99 |
| 40-44 | 17 | 8.11 | 45-49 | 30 | 17.73 |
| 50-54 | 35 | 27.42 | 55-59 | 31 | 34.02 |
| 60-64 | 26 | 36.39 | 65-69 | 20 | 30.97 |
| 70-74 | 17 | 32.35 | 75-79 | 13 | 41.63 |
| 80-84 | 9 | 88.66 | 85+ | 3 | 25.69 |

## Results

Of 7098 patients, 4416 were interviewed by phone. This phone interviews were succeeded among 2358 cases; Tehranian and other cities were defined in 986 and 1372 records respectively. The Tehranian cases were estimated 36.9% (CI95%: 31.9%-41.8%). The mean age of breast cancer cases was 51.34 ±12 .46, the min and max ages were 16 and 98 years, 31.4% of them was under 40 years old, the incidence rate of breast cancer in 100.000 women was estimated 17.09 (CI95 %: 15.67-18.50). Five-year survival was 75% for all women. The median survival was 5.0 years CI95 %( 4.9 years -5.1 years). After seven follow up from the first year of registry (1998) to the end of the project (2004); survival rate of patients which were diagnosed on 1998, 1999, 2000, and 2001 was 55.9%, 61.4%, 60.3%, and 66% respectively. The breast cancer incidence and mortality rates are shown in Tables 1 and 2. The burden of breast cancer was estimated as YLD 782 years 95%CI: 717-846, YLL 3470

**Table 3. Estimation of Burden of Breast Cancer in Tehran from 1998-2001**

| Age (years) | Over Estimation | | | Mean Estimation | | | Under Estimation | | |
|---|---|---|---|---|---|---|---|---|---|
| | YLD | YLL | DALY | YLD | YLL | DALY | YLD | YLL | DALY |
| 10 | 0.0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| 15 | 0.7 | 0.0 | 0.7 | 1 | 0.0 | 0.7 | 1 | 0.0 | 0.7 |
| 20 | 6.4 | 27.7 | 34.0 | 6 | 25.5 | 31.6 | 6 | 23.4 | 29.0 |
| 25 | 31.9 | 25.4 | 57.3 | 29 | 23.5 | 52.9 | 28 | 18.8 | 46.4 |
| 30 | 70.1 | 254.6 | 324.7 | 65 | 235.1 | 299.9 | 60 | 215.6 | 275.1 |
| 35 | 120.3 | 579.8 | 700.1 | 111 | 535.4 | 646.7 | 102 | 490.9 | 592.7 |
| 40 | 171.5 | 401.3 | 572.8 | 158 | 370.5 | 529.0 | 145 | 339.7 | 485.0 |
| 45 | 163.8 | 633.9 | 797.7 | 151 | 585.3 | 736.7 | 139 | 536.7 | 675.2 |
| 50 | 109.9 | 623.0 | 732.8 | 101 | 575.2 | 676.6 | 93 | 527.4 | 620.3 |
| 55 | 70.1 | 465.9 | 536.0 | 65 | 430.2 | 494.9 | 59 | 394.5 | 453.8 |
| 60 | 48.6 | 317.0 | 365.6 | 45 | 292.7 | 337.6 | 41 | 268.4 | 309.5 |
| 65 | 28.2 | 193.3 | 221.5 | 26 | 178.5 | 204.6 | 24 | 163.7 | 187.5 |
| 70 | 16.0 | 125.2 | 141.2 | 15 | 115.6 | 130.4 | 14 | 106.0 | 119.6 |
| 75 | 7.4 | 70.5 | 77.9 | 7 | 65.1 | 71.9 | 6 | 59.7 | 66.0 |
| 80 | 0.8 | 34.3 | 35.1 | 1 | 31.7 | 32.4 | 1 | 29.1 | 29.7 |
| 85 | 0.2 | 6.3 | 6.5 | 0 | 5.8 | 6.0 | 0 | 5.3 | 5.5 |
| Total | 845.8 | 3758.2 | 4604.1 | 782 | 3470.1 | 4252.0 | 717 | 3179.1 | 3896.2 |

years 95%CI: 3179-3758, and DALY 4,252 years 95%CI: 3896-4604. The detail of this by age group is shown in Table 3.

## Discussion

This study defined the mean age of patients were 51.3 CI95%(50.5-52.1), and 20.6% of cases were under 40 years old, the most age group was 40-49 years old (33% of cases). The mean incidence rate of breast cancer from 1998 to 2001 was estimated 17.09 (CI95 %15.67-18.50) per 100,000 women population, but Harirchi et al (2000) earlier estimated a value of 22.51. According to National Cancer Registry, it was computed 18.2 in Iran and 20.3 in Tehran (Ministry of Health and Medical Services, 2004). This difference might due to the different methods for distinguishing the patients address; Patients may intentionally give an address in the area covered served by a special hospital in order or qualify for acceptance. In the other hand, many addresses were defined by patient's relatives' addresses. In this study, the patient's address was questioned, and was defined clearly whether she was Tehranian or not. Therefore, the incidence rate estimated had a high validity. The median follow up time for patients in this study was 60 months. Over all patient' 5 year survival rate was estimated 60.3%. According to a study which was conduced among 167 cases in 1997; they could follow 127 cases, over all patients'5 year survival rate was 62%. Although there are 8 years past this study and many treatments protocol of breast cancer was developed; unfortunately, there were no difference in patient's survival rate during these years. However, the base of this study was the data of TCR, and the phone interviews was conducted in 986 Tehranian cases; all Tehranian was estimated 2619 of 7089, indeed; the epidemiology and out come of breast cancer was defined in 37.6% of all Tehranian breast cancer patients which had been registered during 1998 to 2001 in TCR. Although, this problem was a bias and might effect on the result of this study, but the results of other studies confirmed this study's findings. In the other hand, this study is the largest study about breast cancer survival rate in Iran.

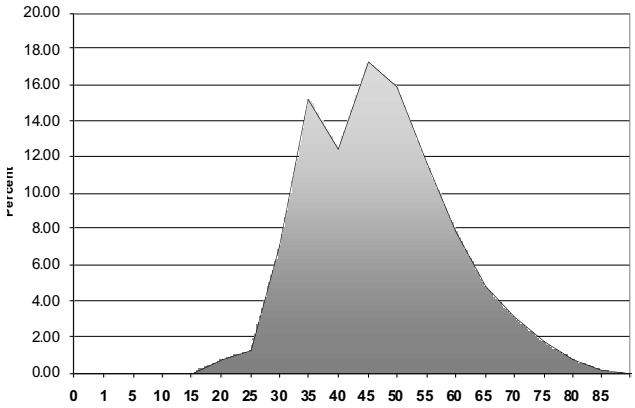


**Figure 1. Percentage of Burden of Breast Cancer by Age Group from 1998-2001**

The DALY of breast cancer was estimated 4,252 years; according to Naghavi's unpublished data; the DALY of breast cancer was estimated at 16,792 years in 2003 (Naghavi, 2005). YLL of breast cancer in 23 provinces with 73% of Iranian total population was computed 11,109 years. This data and our finding suggested which national burden of breast cancer was underestimated. Breast cancer was high burden in the community. More than 36% of this burden occurs in women under 40 years old (Figure 1). The most significant finding from this study is the point that Iranian breast cancer patients are younger than the west countries parts (Mousavi et al., 2006).

Developing comprehensive national cancer control program with four components: mass education and awareness, screening and early detection, national guideline treatment and palliative cares; are recommended to policy makers to decrease this burden. Special programs should be considered for women under 40 years old. The authors

suggest educating new effective treatment protocol for surgeon, oncologists, and radiotherapist developed in the Continuing Medical Education (CME) courses. There are only 126 centers for mammography of which many were not calibrated for screening, many default in medical insurance, few linear accelerators, and etc; Ministry of Health and Medical Education was advised to assess the need of such problems and provide the facilities for early detection and treatment of breast cancer in Iran.

## Acknowledgments

This study had been supported by Cancer Research Center of Cancer Institute of I.R.; Iranian and Deputy to Research of Tehran University of Health and Medical Education. We wish to thank the staff of Cancer Research Center; Miss Bita Sadeghi, Miss Fatemeh Sani, and Mr Mohamamd Golmahi.

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