

# Epidemiology of breast cancer in the Islamic Republic of Iran: first results from a population-based cancer registry

A. Sadjadi,<sup>1,2</sup> M. Nouraie,<sup>1</sup> A. Ghorbani,<sup>1</sup> M. Alimohammadian<sup>3</sup> and R. Malekzadeh<sup>1</sup>

وبائيات سرطان الثدي في جمهورية إيران الإسلامية: النتائج الأولى لسجل السرطان السكاني المرتكز

علي رضا سجادي، مهدي نوراني، أناهيتا قرباني، معصومة علي محمدیان، رضا ملك زاد

الخلاصة: تعرض هذه الدراسة أول تقرير سكاني المرتكز حول سرطان الثدي في جمهورية إيران الإسلامية، باستخدام المعطيات المستمدة من سجل السرطان. فقد أجريت دراسة استيعادية للعثور على جميع الحالات الجديدة من سرطان الثدي، في 5 ولايات يغطيها سجل السرطان، خلال فترة 5 سنوات 1996 – 2000. ووجد الباحثون أن هناك 2421 حالة مسجلة في السجلات الخمسة، وأن معدل الوقوع المعايير حسب الجنس 16.2 لكل مئة ألف شخص – سنة. وكان معدل الوقوع المعايير حسب الجنس لسرطان الثدي منخفضاً، وذلك يناقض ما هو عليه في البلدان الأكثر تطوراً، مع وجود أخفض المعدلات في ولاية أردابيل.

**ABSTRACT** This study presents the first population-based report on breast cancer in the Islamic Republic of Iran using data derived from a cancer registry. A retrospective study was conducted to find all new breast cancer cases in 5 provinces covered by the cancer registry during the 5-year period 1996–2000. There were 2421 cases recorded in the 5 registries. The age-standardized incidence rate (ASR) was 16.2 per 100 000 person-years. In contrast to more developed countries, the ASR of breast cancer was low, with the lowest rate seen in Ardabil province.

## Épidémiologie du cancer du sein en République islamique d'Iran : premiers résultats d'un registre du cancer dans une population

**RÉSUMÉ** Cette étude présente le premier rapport sur le cancer du sein dans une population en République islamique d'Iran, établi à partir de données provenant d'un registre du cancer. Une étude rétrospective a été menée pour recenser tous les nouveaux cas de cancer du sein dans cinq provinces prises en compte dans le registre du cancer au cours de la période de cinq ans comprise entre 1996 et 2000. Le nombre de cas répertoriés dans les cinq registres s'élevait à 2 421. Le taux d'incidence standardisé sur l'âge était de 16,2 pour 100 000 personnes-années. Comparé à celui de pays plus développés, ce taux était faible, la valeur la plus basse étant atteinte dans la province d'Ardabil.

<sup>1</sup>Digestive Disease Research Centre, Shariati Hospital; <sup>2</sup>Faculty of Health, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran (Correspondence to R. Malekzadeh: malek@ams.ac.ir).

<sup>3</sup>Department of Epidemiology, University of Groningen, Received: 14/03/07; accepted: 31/05/07

## Introduction

With the diminution in communicable diseases and improvement in life expectancy, cancer has become an increasing problem in low-resource countries. As the most common cause of cancer-related deaths among women worldwide—each year it is newly diagnosed in more than 1.1 million women [1–3] and represents > 10% of all new cancer cases in males and females combined [2,4]—breast cancer warrants attention within health care systems [5].

It is the most common cancer among women in both low- and high-income countries [4]. Incidence rates are high in most of the developed areas of the world, with the highest age-standardized incidence in North America (99.4 per 100 000) [2]. It is also becoming an important problem in low-resource regions, where incidence rates have been increasing by up to 5% per year [1,2,4]. In the Middle East, it is the most common malignancy among women [6].

There are a few small studies and reports available in the Islamic Republic of Iran: the findings suggest that breast cancer affects Iranian women at least one decade younger than women in developed countries, with the mean age ranging from 47.1 to 48.8 years) [7,8]. According to an estimate of the Ministry of Health and Medical Education in 2000, breast cancer ranked first among cancers in Iranian women, comprising 21.4% of all malignancies in females [7].

Population-based cancer registration systems can produce the most reliable incidence rates, one of the core statistics in assessing the burden of the disease. None of the available reports yield population-based data on breast cancer in our country. This study presents the first report on incidence and age distribution of breast cancer in the Islamic Republic of Iran using population-based data extracted from a cancer registry which covers 5 provinces.

## Methods

The Islamic Republic of Iran has 30 provinces. The data used in this study were derived from cancer registries located in 5 provinces (Gilan, Mazandaran, Golestan, Ardabil, and Kerman) during a period of 5 years (1996–2000). In each province, the registry is run by the local university of medical sciences and is supervised by the Digestive Disease Research Centre (DDRC), Tehran University of Medical Sciences. They cover a population of nearly 10 million, about 15.7% of the total population.

The survey team was trained to visit hospitals, pathology laboratories, diagnostic radiology services and public and private outpatient clinics; they checked the medical records related to cases of breast cancer and copied the related documents if possible.

The team also collected mortality data from death certificates issued by physicians in each province and information derived from the annual health census of the Ministry of Health and Medical Education in rural areas. As it was probable that a number of breast cancer patients may have sought medical care outside their province, to minimize loss of data, the team also checked the main medical centres in neighbouring provinces and the cancer registry database of the Cancer Institute in Tehran for records of cases residing in these 5 provinces.

The collected data were sent to the cancer registry office in each province and then to the registry unit in the DDRC where the research team (1 gastroenterologist, 2 epidemiologists and 2 pathologists) performed a thorough examination of the data for conformity to the inclusion criteria (residence and date of diagnosis). The final data were summarized in a data sheet and coded using *ICD-O*, 3rd edition [9].

The data were alphabetically arranged and duplicates with the same name, sex, age and place of residence were omitted by man-

ual and computerized linkage. Additionally, 2 individuals assessed each alphabetical group manually on 2 separate occasions.

The data were analysed using *SPSS*, version 10.0, and *MS Excel*. We calculated person-years of the population at risk using each year method [10]. Crude (all ages) and age-specific rates per 100 000 person-years for all provinces were calculated. For each province, the average annual age-standardized incidence rate (ASR) per 100 000 person-years was calculated by the direct method using the World Standard Population [10]. The standard error was calculated for each province and for the whole sample, providing summary comparison statistics. The direct ASR for each province was compared with that for the other provinces using standardized rate ratios [10]. Significance was determined at the 5% level.

## Results

During the study period, 1996–2000, 2421 cases of breast cancer were documented in the 5 registries. The ASR was 16.2 per 100 000 person-years (Table 1); the ASR for women aged  $\geq 50$  years in the 5 provinces was 83.8 per 100 000 person-years. Using data derived from these registries and con-

sidering the whole population of the Islamic Republic of Iran, we estimated the ASR for developing breast cancer among Iranian women at 17.1 per 100 000 person-years.

The peak incidence rate for breast cancer was in the age group 45–54 years (Figure 1). The mean age of patients at the time of diagnosis was 48.4 [standard deviation (SD) 14.4; median 47; mode 50] years.

ASRs for breast cancer were statistically significantly higher in Mazandaran and Kerman and were statistically significantly lower in Ardabil and Gilan compared with the other provinces ( $P < 0.05$ ) (Table 1).

## Discussion

Like cancers of other sites, when undertaking any breast cancer control programmes, one of the essential steps is to quantify its burden in the country in order to assess the current situation, allocate resources to different control strategies, and evaluate progress [11].

Our study demonstrates that the ASR of breast cancer is low (17.1/100 000 person-years), as it is in most Asian countries: 20.6, 21.8 and 33.3 for Eastern, South-Central and Western Asia respectively [3,11]. This is in contrast to North America and Europe

Table 1 Incidence rates of breast cancer among women in 5 provinces in the Islamic Republic of Iran, 1996–2000

Province	Cases		Crude rate	ASR	SE	Rank <sup>a</sup>
	No.	%				
Mazandaran	899	37.1	20.5	23.9 <sup>b</sup>	0.84	1
Kerman	554	22.8	11.2	16.9 <sup>b</sup>	0.68	1
Golestan	349	14.4	11.6	15.7	0.82	1
Gilan	513	21.1	10.1	12.6 <sup>c</sup>	0.57	1
Ardabil	106	4.3	4.7	7.6 <sup>c</sup>	0.68	3
All	2421	100.0	–	16.2	0.42	

<sup>a</sup>Breast cancer compared to rank of cancer at other sites.

<sup>b</sup>Significantly higher than for the rest of the provinces,  $P < 0.05$ .

<sup>c</sup>Significantly lower than for the rest of the provinces,  $P < 0.05$ .

ASR = age standardized rate per 100 000 (direct method, world standard population).

SE = standard error.

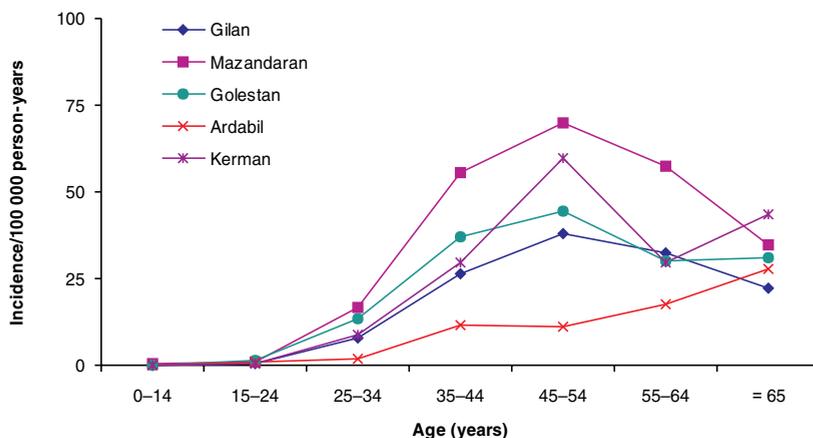


Figure 1 Age-specific incidence rates per 100 000 person-years for breast cancer among women in 5 provinces in the Islamic Republic of Iran

where the highest rates of breast cancer are observed (99.4 per 100 000 person-years for North America and 82.5, 62.4, 84.6 and 42.6 per 100 000 person-years for Northern, Southern, Western, and Central and Eastern Europe respectively) [3,12]. The difference has been attributed to variations in lifestyle and environmental exposure [2,4] and in part to the presence of screening programmes detecting early invasive cancers in the more affluent regions [2,13].

Age-adjusted incidence rates for breast cancer peaked in Iranian women aged 45–54 years. This agrees with the findings of other limited studies previously conducted in the country [7,8]. Similar findings have been reported in a number of Asian countries such as Pakistan [49.8 (SD 13.9) years] [14] and Lebanon [49.8 (SD 13.9) years] [15]. In contrast, in the United States of America, the highest incidence rate is among women aged 75–79 years and the median age at the time of diagnosis is 61 years [16]. Similarly, in the United Kingdom cancer of the breast becomes more common with age, approximately 80% of cases occur in women over

the age of 50 years, with the peak in the 50–64 years age group [17].

The mean age at the time of diagnosis of breast cancer in most developing countries is around 50 years, which is at least 1 decade younger than in developed countries [14–16]. Thus, as in other developing countries of Asia, the percentage of women with breast cancer in pre-menopausal and younger age groups in our study was higher in comparison with those reported from developed countries. This might be due to the lower age structure of the Iranian population [17]. In contrast, the ASR of breast cancer in post-menopausal women (over the age of 50) in the 5 provinces was 83.8 per 100 000 person-years, while the corresponding rates for the United States of America, the United Kingdom, China and India are 354.5, 298, 105.5 and 105 [18], which again shows the contrast.

The 2004 National Cancer Registry report showed that breast cancer was the most common cancer among Iranian women followed by cancers of the skin, colon and rectum and stomach [19]. Remarkably, the

ASR of breast cancer in Ardabil was among the lowest rates around the world [18]. This small, newly established province with a predominantly rural population and religious behaviour is a deprived region.

According to various studies, reproductive patterns in Ardabil, such as older age at menarche, earlier age at first pregnancy, greater number of pregnancies, and longer duration of breast-feeding (as a religious belief), have probably given rise to the low risk of breast cancer among women [20–22]. Lifetime exposure to endogenous sex hormones may play an important role in the pathogenesis of breast cancer [22]. Menarche at over 14 years results in lower exposure of breast epithelium to estrogens and progesterone [22]. In addition, first pregnancy under the age of 20 years and prolonged lactation can have a protective effect. The positive role of pregnancy in reducing the risk of breast cancer can be attributed to changes in the hormonal environment and breast epithelium reaction to various carcinogens during pregnancy [22]. Furthermore, according to many studies which suggest a clear positive gradient in risk for breast cancer by education level (illiteracy 32.3% in women in Ardabil) and socioeconomic status, low rates of breast cancer in Ardabil can be explained [22–24].

As in other retrospective studies, the number of cases registered can be affected

by the poor quality of recording in medical documents, especially in private centres. Despite our best efforts, it is likely that the incidence rates have been underestimated.

Establishing cancer registries covering a broader spectrum of the population and further studies are needed to map out the exact breast cancer incidence rate and trends over time and to determine possible environmental, lifestyle and/or genetic risk factors in the Islamic Republic of Iran.

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