Assessment of a breast cancer screening programme in Shiraz, Islamic Republic of Iran

N. Hadi,[1] A. Sadeghi-Hassanabadi,[1] A-R. Talei,[2] M.M. Arasteh[3] and T. Kazerooni[4]

تقييم برنامج تحرِّي سرطان الثدي في شيراز بجمهورية إيران الإسلامية

نكين هادي، علي صادقي حسن آبادي، عبد الرسول طالعي، محمد مهدي آرسته، طليعه كازروني

الخلاصة: تم تقييم برنامج لتحرِّي سرطان الثدي شمل عشرة آلاف امرأة ممن تبلغ أعمارهن 35 عاماً فأكثر. واكتُشفت 67 حالة سرطان ثدي بينهن. وقد كانت أعلى معدلات المراجعة بين النساء اللاتي هنّ أصغر عمراً (35–44 عاماً) وفي الشرائح المتوسطة اجتماعياً واقتصادياً؛ في حين كانت أخفض المعدلات بين من تزيد أعمارهن على 65 عاماً وفي الشرائح الدنيا اجتماعياً واقتصادياً. وقد كانت معدلات الاكتشاف بالفحص الذاتي مساوية لمعدلات الاكتشاف من قِبَل العاملين الصحيِّين. وفي كل مراحل التحرِّي كانت الموجودات الإيجابية أكثر شيوعاً لدى الشرائح العليا اجتماعياً واقتصادياً. وقد تناقص معدل مراجعة النساء تناقُصاً مطرداً من المراحل الأولى إلى المراحل الأخيرة من التحرِّي المتسلسل. ورغم أن تصوير الثدي يُعَدُّ الطريقة الأكثر حساسية للكشف، إلا أن تكلفته العالية تجعلنا نقترح إنشاء برنامج تثقيفي للفحص الذاتي للثدي وتشجيع النساء على القيام بالفحص الذاتي لأثدائهن.

ABSTRACT A breast cancer screening programme was evaluated for approximately 10 000 women aged 35 years and older. There were 67 cases of breast cancer. Highest rates of attendance were seen among younger women (35–44 years) and middle socioeconomic groups. Lowest rates were among those aged over 65 years and low socioeconomic groups. The rate of detection by self-examination was similar to that by health personnel examination. At all stages of screening, positive findings were most common among the high socioeconomic class. Attendance decreased steadily from first to last stages of serial screening. Although mammography is the most sensitive method of detection, because of its high cost we suggest establishing breast self-examination education programmes and encouraging women to self-examine.

Evaluation d'un programme de dépistage du cancer du sein à Chiraz (République islamique d'Iran)
RESUME Un programme de dépistage du cancer du sein a été évalué pour environ 10 000 femmes âgées de 35 ans et plus. Il y avait 67 cas de cancer du sein. Les taux de participation les plus élevés ont été observés chez les femmes plus jeunes (35-44 ans) et dans les groupes socioéconomiques moyens. Les taux les plus bas se trouvaient chez les femmes âgées de plus de 65 ans et dans les groupes socio-économiques faibles. Le taux de dépistage par auto-examen des seins était semblable à celui du dépistage par examen clinique effectué par un professionnel de santé. A tous les stades du dépistage, des résultats positifs étaient plus fréquents dans la classe socioéconomique supérieure. La participation diminuait régulièrement des premiers aux derniers stades du dépistage en série. Bien que la mammographie soit la méthode de dépistage la plus sensible, en raison de son coût élevé nous suggérons de mettre en place des programmes de formation à l'auto-examen des seins et d'encourager les femmes à procéder à cet examen.

[1]Department of Community Medicine; [2]Department of Surgery; [3]Department of Radiology; [4]Department of Gynaecology, Shiraz University of Medical Sciences, Shiraz, Islamic Republic of Iran.
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Introduction

Breast cancer is of special importance among various malignancies for many reasons. It has a high prevalence all over the world, affects women during their productive period of life and has a significant economic burden on health services. Furthermore, although it is curable at early stages, surgery is difficult for women to accept.

Breast cancer comprises one-third of all female cancers and ranks second among cancer related deaths worldwide. About 19% of cancer related deaths are due to breast cancer [*1–3*]. The highest rates of prevalence are found in the United States of America (USA) and Europe. The breast cancer rate in the USA is 8.5–9 per 1000 and affects 1 in 9 women during their lifetime [*4,5*]. In England, the prevalence rate is 7.8 per 1000 women and affects 1 in 12 women with a high mortality rate [*6*]. Prevalence rates reported for Sweden, Ireland and Italy are 4–7.5, 7.2 and 6.9–8.1 per 1000 individuals respectively [*7–12*].

It has been reported that rates are lower in the developing countries and in the Eastern hemisphere. For example, the prevalence in Korea has been reported to be 2.6 per 1000 [*2*]. In Japan, it was found to be 1.4 to 1.6 times less than the rate of the USA and Europe [*1,13*].

The incidence rate of breast cancer has been increasing since 1940 in most parts of the world and this increase has been more significant in originally low-incidence countries. For instance, there has been an increase in the rates of this cancer in Israel, Japan and Singapore. Some parts of this increase have been attributed to increases in life expectancy and some to changes in lifestyle and diet [*3,14,15*].

The screening methods introduced during the second half of the 20th century have used breast cancer as a very common example for their application. The primary concern of screening in general, and as it is applied to breast cancer in particular, is the early detection of the disease for more effective therapy and longer survival.

The first population-based breast cancer screening programme in the Islamic Republic of Iran was conducted in Shiraz during 1996–97. The study estimated the prevalence of breast cancer among women 35 years of age and older in an urban area [*16*]. In the present study, we evaluated the screening methods employed in the original study using two main indices, namely detection rate and attendance rate among the study sample.

Methods

The results of the original Shiraz breast cancer study (1996–97) were used to evaluate that serial screening programme on the basis of its detection rate at each stage and the response rate of the study sample. As reported in the original study [*16*], 10 000 women aged 35 years and older were invited to participate in a population-based serial screening programme. These women were selected in such a way that every 1000 eligible women came from a part of the city under the services of one health centre. Therefore, a total of 10 health centres distributed all over the city were enrolled in the study. The goal was to recruit 1000 women from each centre. The total study sample was a representative sample of all sociocultural levels within Shiraz, a city with a population of 1.2 million that is the centre of Fars Province in southern Islamic Republic of Iran.

All women were visited at their houses and were invited by health personnel familiar with the neighbourhood to come to the

neighbouring health centre according to a prepared schedule. They were then put into groups of 5–10 women to be taught about breast self-examination (BSE). For the first stage of the study they were asked to examine themselves and to report their findings in a data collection form designed according to the objectives of the study.

In the second stage, health personnel trained for this purpose examined the women and reported their findings in the previously mentioned form. In the third stage of the study, those who were found to have any mass or suspicious lesion in the breast were referred for examination by a surgeon. The final phase of screening was mammography for those whom the surgeon found to have any breast mass. All of the above-mentioned stages and the therapeutic measures employed for the cases were free of charge.

Results

Although a total of 12 948 women were invited, 9926 women were enrolled in the first phase of the study (an acceptance rate of approximately 76.7%). A total of 159 women found suspicious tumours in their breasts and the total number of women found by the health personnel to have breast masses were 225. All of those found to have breast lesions either by the women themselves or by the health personnel were referred to the surgeon. This comprised 248 women (Table 1).

Of those referred to the surgeon, 80 were designated as having breast masses and were referred for mammography. Only 68 women accepted to undergo mammography; 45 of them had abnormal findings and were sent for fine needle aspiration or biopsy to rule out malignancy. Malignancy was reported for 7 cases after biopsy.

Table 1 **Comparative results of BSE and personnel breast examinations**

Self examination	Examination by health personnel		Total
	Abnormal	Normal	
Abnormal	136	23	159
Normal	89	9678	9767
Total	225	9701	9926

As an additional effort, there was a mammographic screening programme for 1000 women designated as normal by BSE and personnel examination. They were selected randomly by a systematic sampling of 100 women from every one of the 10 neighbourhoods as reported previously [*16*]. A total of 4 confirmed cases were found among the 1000 women screened in this way. There were also 20 confirmed cases of breast cancer who had been diagnosed before the programme within the same 10 000 sample.

As mentioned earlier, if we had only dealt with the original research proposal that consisted of a survey and examination of 10 000 women and had gone through the serial screening programme, we would have had 20 known cases who were already diagnosed plus 7 cases who were detected in this programme, i.e. a prevalence rate of 27 per 10 000. By contrast, the mammography applied to 1/10 of those with normal findings in the original examination resulted in 4 confirmed cases (4 per 1000). If this rate is applied to the total sample of 10 000, we can say that there is an estimated true prevalence rate of breast cancer of about 6.7 per 1000 in the studied sample.

The attendance rate in the first stage was 76.7% but there was a significant dif-

ference among the different parts of the city ranging from 51.2% to 95.2%. Because it was thought that the main determinants in the attendance rate might be socioeconomic factors most profoundly expressed by the area of residence, the 10 health centres were divided into 3 main groups of low, middle and high socioeconomic levels. Attendance rates according to socioeconomic class were then evaluated (Table 2). The highest attendance rate was seen in the middle class and the lowest in the low socioeconomic group. This was statistically significan ($\chi^2 = 41.8$, $P < 0.01$). Furthermore, the participating sample had a younger age structure than the general population as younger women tended to participate more (Table 3). The difference between general population and study group by the chi-squared goodness of fit test was significant ($\chi^2 = 1023.76$, $P < 0.0001$). The detection rate was 1.6% (159 of 9926) by the women themselves and 2.3% (225 of 9926) by the health personnel. Only a minority of the lesions detected by both groups were reported with certainty; many more were uncertain (Table 4).

When the findings by the women and the health personnel were classified according to socioeconomic status, higher rates of abnormal and suspicious findings were found among the higher classes (Table 5). Kappa statistic was used to determine the degree of correlation between the findings by self-examination and physical examination by health personnel. This was 0.75 for the right and 0.63 for the left breast. It should be noted that overall concordance was 98.9%, which was statistically significant ($P < 0.001$) (Table 1). The overall detection rate in the third stage, i.e. examination by the surgeon, was 80 among the sample of 9926 (0.8%), ranging from 0.43% to 1.04% for the low to the high socioeconomic classes (Table 6).

Of the 80 women found to have breast masses in examination by the surgeon and referred to the mammography centre, 68 women (85%) underwent this stage of the screening programme and 45 (66.2%) were further confirmed as abnormal cases. Of these 7 were pathologically positive by biopsy (15.6%).

Discussion

As the overall prevalence rate estimated through the various stages of this study was 6.7/1000, and especially as the age distribution of the sample studied was younger than the general population, we can

Table 2 **Attendance rates of women in the first stage of the screening programme according to socioeconomic status**

Socioeconomic status	No. invited	No. attended	Attendance rate (%)
Low	4300	3004	69.86
Middle	5970	5002	83.79
High	2678	1920	71.69
Total	12948	9926	100

$\chi^2 = 41.8$, $P < 0.001$.

Table 3 **Age distribution of the studied sample as compared to the general population**

Age group (years)	Study sample		General population	
	No.	%	No.	%
35–44	5211	52.6	47 001	40.2
45–54	2393	24.2	27 321	23.4
55–64	1563	15.8	21 860	18.7
>65	731	7.4	20 768	17.7
Total	9898[a]	100	116 954	100

$\chi^2 = 1023.76$, $P < 0.0001$.
[a]Data were missing for 28 women.

Table 4 **Frequency of abnormal findings by the women themselves and the health personnel**

Physical finding	Self-examination		Health personnel	
	No.	%	No.	%
Normal	9767	98.40	9701	97.73
Abnormal	33	0.33	16	0.16
Uncertain	126	1.27	209	2.11
Total	9926		9926	

conclude that we have a rate of breast cancer to be seriously concerned about. Furthermore, it should be noted that the yield of mammography among a group of women considered normal in the two-stage breast examination screenings was unexpectedly high (4 per 1000). This means that screening is important in countries like the Islamic Republic of Iran. In addition, as in other societies, we found a higher prevalence rate among the higher socioeconomic classes indicating that these groups should receive priority in screening programmes.

It was found that the participation of middle class women was higher than that of the other classes. This could be due to the lack of knowledge in the lower socioeconomic groups and the lack of motivation among the higher classes of the society who do not feel the need to use free services. There was also a lower rate of participation among the older women, i.e. those more than 50 years of age. This should be taken into consideration when planning breast cancer screening and education programmes for similar populations.

The use of mammography is controversial between 40–45 years of age and even at older ages when women are at a higher risk of breast cancer. It has been found that

Table 5 **Frequency of abnormal findings in women examined by themselves and by health personnel according to socioeconomic status**

Socioeconomic status	No. examined	Abnormal by self-examination		Abnormal by health personnel examination	
		No.	%	No.	%
High	1920	55	2.9	69	3.6
Middle	5002	73	1.5	110	2.2
Low	3004	31	1.0	46	1.5
Total	9926	159	1.6	225	2.3

Table 6 **Frequency of cases detected in the third stage of the screening (physical examination by the surgeon) according to socioeconomic status**

Socioeconomic status	Total sample	No. positive	Rate (%)
High	1920	20	1.04
Middle	5002	47	0.94
Low	3004	13	0.43
Total	9926	80	0.80

BSE and/or screening mammography decreases breast cancer mortality rates by about one-fourth in women aged 50–65 years [*17*]. The training of health personnel is therefore of critical importance both to improve their skills of assessment and also to allow them to educate women about BSE.

The initial attendance rate of women to the neighbourhood health centres was 76.7% with more dropping out thereafter. Furthermore, when we take into account the cost of breast examination by health personnel, it is clear that for the purposes of mass screening we ought to concentrate on two activities, namely BSE health education for all women above 25 years of age in similar societies and a suitably spaced mammography programme for those above the age of 39 years.

Although the combination of BSE and mammography seems to be the best method of screening, because of the false positive rates of both methods [*18*], public health priorities and the real cost–benefit ratio have to be clarified, even in countries with high incidence rates of breast cancer [*17,19*]. Because of the high cost of mammography, especially in developing countries, BSE is particularly important. Moreover, some women are more willing to accept BSE than mammography [*17*]. In the Islamic Republic of Iran, in order to develop a policy of breast cancer screening, we also need to know mortality patterns of breast cancer and health priorities.

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