

RESEARCH ARTICLE

Breast Cancer Screening in Morocco: Performance Indicators During Two Years of an Organized Programme

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Abstract

Background: Breast cancer is commonly diagnosed at late stages in countries with limited resources. In Morocco, breast cancer is ranked the first female cancer (36.1%) and screening methods could reduce the proportion presenting with a late diagnosis. Morocco is currently adopting a breast cancer screening program based on clinical examination at primary health facilities, diagnosis at secondary level and treatment at tertiary level. So far, there is no systematic information on the performance of the screening program for breast cancer in Morocco. The aim of this study was to analyze early performance indicators. **Materials and Methods:** A retrospective evaluative study conducted in Tamara city. The target population was the entire female population aged between 45-70 years. The study was based on process and performance indicators collected at the individual level from the various health structures in Tamara between 2009 and 2011. **Results:** A total of 2,350 women participated in the screening program; the participation rate was 35.7%. Of these, 76.8% (1,806) were married and 5.2% (106) of this group had a family history of breast cancer. Of the women who attended screening, 9.3% (190) were found to have an abnormal physical examination findings. A total of 260 (12.7%) were referred for a specialist consultation. The positive predictive value of clinical breast examination versus mammography was 23.0%. Forty four (35.5%) of the lesions found on the mammograms were classified as BI-RADs 3; 4 or 5 category. Cancer was found in 4 (1.95%) of the total number of screened women and benign cases represented 0.58%. **Conclusions:** These first results of the programme are very encouraging, but there is a need to closely monitor performance and to improve programme procedures with the aim of increasing both the participation rate and the proportion of women eligible to attend screening.

Keywords: Breast screening - Morocco - cancer early detection - performance indicators

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Introduction

Cancer is an important public health problem and affects everyone, including females, males, the young, the elderly, the rich, and the poor. It is believed that cancer will be one of the most important cause of increased mortality and morbidity rates in the world in the next few decades. According to the World Health Organization (WHO), it is estimated that the number of new cancer cases will increase from 12.7 million in 2008 to 21.4 million by 2030, with nearly two thirds of all cancer diagnoses occurring in low- and middle-income countries (World Health Organization, 2011).

Breast cancer (BC) incidence is rising rapidly in low and middle income countries (LMC) due to population aging and changes in underlying risk factors, in particular reproductive patterns (Althuis et al., 2005; Maxwell Parkin

et al., 2006). According to Casablanca cancer registry for the years 2005, 2006 and 2007, breast cancer is ranked the first female cancer (34.3%), the age-standardized incidence of breast cancer was 30 per 100,000 person-years and more than 60% cases are diagnosed at stage III or IV (Cancer Registry of Greater Casablanca, 2012).

Screening methods could reduce proportion of cancer with a late diagnosis. Early detection of breast cancer entails both early diagnosis in symptomatic women and screening in asymptomatic women. The three commonly employed methods are mammography, breast self-examination (BSE), and clinical breast examination (CBE) using trained human resources (Jatoi, 1999). Organized national mammographic screening has been adopted as the gold standard for BC early detection in western countries; however it may not be the most cost-effective approach to BC early detection in LMC as it is very demanding in

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terms of human and financial resources (Corbex et al., 2012). Early detection and treatment of breast cancer is associated with better chance of long-term survival (Richards et al, 1999).

Morocco is currently adopting the method of breast cancer screening program based on clinical examination at primary health facilities, mammography at secondary level and treatment at tertiary level. It is one of the most important measure of Moroccan National plan against cancer.

Monitoring early indicators of effectiveness is therefore essential to optimize use of resources and to ensure the quality of the tests performed and interpreted (Madlensky et al., 2003).

So far, there is no systematic information on the performance of the screening program for breast cancer in Morocco.

The aim of this study was to analyze early performance indicators for the Morocco breast cancer screening programme.

Materials and Methods

Study design, participants

It was a retrospective evaluative study. In 2009, a breast cancer screening programme was launched in Temara city, targeting all women aged 45–70 years. The initiative was included as a pilot in National Cancer Prevention and Control Plan. Women are eligible for screening if they are aged between 45–70 years, did not have mammography examination in the previous 2 years and did not undergone surgical treatment (mastectomy) for breast cancer.

Data collection

Data collection was based on information system of the program. The information system reported outcome data at the Reproductive Health centers. The following data was collected from the information system data base numbers of women participating in the program, and those with abnormal clinical breast examination, number of positive clinical breast examination and those who consult at a higher level among the referred patients, the date of cancer screening, cancer diagnosis and treatment, and number of women referred back from the higher level to the lower level of the health system. The primary level is represented by the health centers, the secondary level by the Reproductive Health centers and the tertiary level by the National Institute of Oncology in Rabat.

The results of mammography were classified according to the ACR BI-RADSTM :Category 1(Negative);Category 2(Benign (non-cancerous) finding),Category 3(Probably benign finding), Category 4(Suspicious abnormality),Category 5(Highly suggestive of malignancy). If there were any suspicious lesions, patients were recalled for further mammography and magnification views or additional ultrasonography.

Statistical analysis

A descriptive analysis of variables collected was carried out. Categorical variables were summarized by frequencies and proportions and continuous variables were

summarized by means, medians and standard deviations (SD).

Indicators of program effectiveness was calculated, rates of participation and referrals, rates of founter-reference rate received from higher level, percentage of patients referred with cancer diagnosis, delay between screening and diagnosis, delay between diagnosis and therapeutic management and positive predictive values. Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 17.0.

Results

A total of 2 350 women participated in the screening program; the participation rate was 35.7 %. About 61.7% of these were performed in 2009, 47.3% in 2010, and 4.6% in 2011. The mean age was 53 years (SD 8 years). About 5.4 % of the CBEs were provided to women under the age of 45 years; 3.8 % were performed on women 70 years or older. 76.8 % (1806) of the participants were married, 87% were unemployed and 82.4% had no insurance healthcare.

More than half of the participants (60.6%) were not menopausal; 1.3% of women used hormone replacement therapy and 5.2% (106) had a family history of breast cancer.

Of the women who attended screening, 9.3% (190) were found to have an abnormal physical examination.

Table 1. Characteristics of Breast Cancer Patients, Morocco, 2009-2011

	Frequency	Percent (%)
Age (Mean ±SD, year)	53± 8	
Occupational activity		
Unemployed	2044	87.0
Employed	306	13.0
Marital Statut		
Single	96	4.1
Married	1806	76.9
Divorced /Widowed	447	19.0
Social healthinsurance		
Yes	413	17.6
Personal history of breast disease		
Yes	64	3.1
Family history of breast cancer		
Yes	107	5.2
Menopause		
Yes	927	39.4
Use of hormonal contraceptive		
Yes	690	33.7
Smoking status		
Yes	10	0.4
Alcohol Consumption		
Yes	14	0.6

Table 2. Prevalance of Breast Complaints among Patients Referred to Health Reproductive Centers

Mass	169	65.0
Asymmetry	35	13.5
Nipple discharge	27	10.4
Nipple retraction	24	09.2
Skin symptoms	24	09.2

Table 3. Performance Indicators of the Screening Program for Breast Cancer in Morocco

Indicators	%
Positive predictive value of clinical breast examination /mammography	23.1
Positive predictive value of clinical breast examination / cyto-puncture	2.1
Positive predictive value of mammography / cyto-puncture	9.1
Rate of positive mammograms (mammography positive BI-RADS ACR (0,3, 4 or 5))	35.5
Rate of diagnostic workups : Ultrasound alone	52.3
Ultrasound with mammography (BI-RADS ACR1 or 2) normal and clinical breast examination normal	44.9
Biopsy rate	0.8
Cancer rates	0.2

The mean age of the women with abnormal CBEs was statistically significantly less than that of the women with normal findings (49.4 versus 54.5 years, respectively; $P=0.04$). Abnormal results were more common among women with than among women without breast symptoms (80.7% versus 11.9%, respectively; $P<0.001$). Totally, 260 (12.7%) were referred for additional diagnostic assessment (breast ultrasound, mammography and cyto-puncture) in Reproductive Health centers. Breast masses were the most common causes of referral to these centers. Prevalence of different complaints in our patients is presented in Table 2.

Of women who attended screening, 124 (6.1%) of women having mammography fell within the framework of local organized programmes. Forty four (35.5%) of the lesions found on the mammograms were classified as BI-RADs 3; 4 or 5 category. The frequency of positive mammograms decreased with age (29.3% for the age group 45-50 years versus 8% for those 65 to 70 years).

The ultrasonography was performed for 26 women (44.8%) who had a mammography (BI-RADS ACR 1 or 2) normal and clinical breast examination normal.

The positive predictive value of clinical breast examination versus mammography was 23% and the positive predictive value of clinical breast examination versus cyto-puncture was 2.1 %.

During the two-year follow-up, 17(0.8%) were biopsied and cancer was found in 4 (1.9%) of the total number of screened women and benign cases represented 0.6%.

The median of delay between the date of screening and the date of cyto-puncture was 27 days (range 2-269 days), the delay between the date of positive screening mammograms and the date of cyto-puncture the median was 9 days (range 2-240 days) and the delay between the date of screening and the date of the first treatment, the average was 68 days (range 25-93 days).

Discussion

The present study analyzed the early performance indicators for the Moroccan breast cancer screening programme. With the consolidation of the information system of the program, it is now possible to assess various indicators against national standards or goals, and also to use indicators to compare relative performance across facilities, across service providers, and across states and populous municipalities. It will also be possible to compare quality indicators for mammography and cyto pathology against international benchmarks based on the

experience of countries with more established screening programme.

Our findings showed that the participation rate was 35.7% in the Moroccan breast screening programme, this rate is lower than reported in many other countries: 78.5% in the Netherlands (Fracheboud et al., 2001), 79.5% in Norway (Wang et al., 2001), 89% in the Swedish trials (Nystrom et al, 1993), 36.1% in France and 36% in Luxembourg (Wait et al, 1996; Autier et al., 2002)but it was higher to 31.3% value of Qatar programme (Donnelly et al., 2012). Our low rate may be explained by the absence of clear messages and awareness at the national level by policy makers and the media. In order to realise the expected benefits of the programme as a significant mortality reduction up to 30% (Tabar et al,1985).We have to improve the uptake of the programme and a greater effort is needed to increase the screening rates to the recommended levels.

About 9.3% of the CBE reported in our dataset were coded abnormal. An approximation of the frequency of abnormal findings in a research setting has been reported previously in the Canadian National Breast Screening Study. In a sample of 19 965 women aged 50–59 years who received a CBE from 1980 through 1985 from trained nurse examiners and physicians who followed a standardized protocol,11.8% of the CBEs were initially judged to be suspicious for cancer (Baines et al, 1989).

Age at time of CBE emerged as an important factor in many analyses. In this study, we found that age was negatively associated with the likelihood of having an abnormal CBE similar from the results of other studies (Bobo et al., 2000).

The cancer detection rate of 1.95 per 1000 screened women was a bit lower than the observed of the Hungarian Breast Screening Programme (Boncz et al., 2007) and our cancer-detection rate is lower to that reported by other screening programs that relied on both mammography and CBE (Bobo et al., 2000). For a high quality breast cancer screening program, a high cancer detection rate along with an earlier stage is required.

260 women (12.7%) were referred for additional diagnostic assessment in Health Reproductive centers. This rate is equivalent to the rate recommended by our program for early detection of breast cancer in Morocco (Fondation Lalla Salma Prevention and Treatment of Cancers, 2011). It is important to compare the reason for referral of patients in this study and the other ones. In a study performed by Newton et al, pain and breast mass were the most common reasons for referral of 508 patients

with the frequency of 0.38 and 0.42 respectively (Newton et al, 1999). In another study in Iran, pain and breast mass were 34 and 25 percents of causes of referrals, respectively (Kaviani et al., 2001). In the present study, breast mass with the frequency of 65 percent was the most common reasons of referrals.

The observed rate for the positive predictive value (PPV) of mammography test (9.1%) was lower than the European standards and the results observed in some countries (European Commission, 1996). Some of those programs use either the combination of mammography test and clinical breast examination or a double incidence (Anderson et al, 1986).

Waiting times for breast cancer patients in Morocco, from general practitioner referral to first appointment in Health Reproductive centers and to first definitive treatment observed in our study were longer to that reported by other studies (Spurgeon et al., 2000; Latarche et al., 2004; National Cancer Institute-France, 2013). The focus on reducing unnecessary delays in cancer treatment stems from the belief that the earlier disease is detected, the more quickly multidisciplinary care can be instigated and the better the outcome. Irrespective of the specific waiting times reported here, the key contribution of this study is in establishing baseline data which can be used to set targets for improvement and, crucially, to monitor such attempts.

In conclusion, these first results are very encourageant but there is a need to closely monitor performance and to review procedures with the aim of increasing both the participation rate and the proportion of women eligible to attend screening.

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