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Breast Cancer Screening Program in Jeddah, Saudi Arabia: Is There a Need for a National Program?

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Abstract

Background: In Saudi Arabia, breast cancer cases are detected at relatively advanced stages (IIb & III). The Saudi Cancer Registry showed that the age standardized rate for breast cancer was 22.1/100,000 which is lower than expected. This could be due to under-reporting of cases and poor data documentation in some centers.

Objective: To assess the willingness of the society to adopt breast cancer screening and to have an idea about the incidence of breast cancer in the western region of the kingdom.

Method: In October 2010, a pilot screening program in Jeddah, the second largest city in the Kingdom of Saudi Arabia was conducted. A mobile unit with a full-field digital mammography machine was used in 3 major districts in Jeddah city. Any asymptomatic Saudi woman, 40-69 years old, not pregnant nor lactating and not a breast cancer survivor was eligible. Pre-campaign educational announcements were distributed at primary health care facilities.

Results: Over 52 working days, 1167 women underwent mammographic screening. Out of these, 154 required further assessment with breast ultrasound (recall rate 13%), 32 underwent biopsy (biopsy rate 2.7%) and 7 (0.6%) breast cancer cases were detected in an early stage (T1N0M0).

Conclusion: A national screening program for breast cancer in Saudi Arabia is well accepted by the society. Healthcare providers of all specialties need to be oriented with the importance of public awareness and the impact of screening. A well-structured screening program tailored to the local parameters may help discover breast cancer cases at an early stage.

Keywords

Breast cancer in Saudi Arabia, Mammographic screening

Introduction

In Saudi Arabia, breast cancer is the commonest malignancy affecting women; it accounts for 25.8% of all female malignancies of all age groups as reported in the Saudi Cancer Registry [1]. The median age reported at diagnosis of breast cancer is 49 years which is younger than the reported age in the western societies (55-years-old). Localized disease that involves the breast only was seen in 31.7% of the cases, 42% present with regional disease that involves regional lymph nodes as well, 16.3% present with distant metastases and in 10% the stage of the disease was not documented [1].

Late presentation can be attributed to different factors; partly due to lack of proper knowledge about the disease and its mode of presentation. Most of the Saudi ladies are multi-parous and breast feed for long periods; so, they are under the impression that they are protected against breast cancer. In a recent study about the protective effect of breast feeding against developing breast disease in Saudi women, 94.2% of the women breast fed their babies for an average period of 15.2 months [2]. The fear of being diagnosed with cancer, the widespread knowledge that cancer is a killing disease regardless of the treatment provided and lack of the social support especially by the husband are other factors that may put the lady in an isolated depressed state and will not seek medical advice. In 2007, Dandash and Al-Mohaimeed studied knowledge and attitudes of 376 female teachers in Buriadah city (located in Qassim region in the center of Saudi-Arabia) about breast cancer. They reported that most of the participants (58.2%) held pessimistic views about the curability of breast cancer [3]. In the periphery (smaller cities), good medical service is lacking or might be inaccessible. El Bcheraoui, et al. showed a very low rate of breast screening in Saudi Arabia in spite of free its availability at no financial cost. They observed great geographic variation in breast cancer screening, ranging from 0.0-0.6% in the north part, to 9.7-17.0% in the south and east part. They reported that 75% of respondents are living less than 8 km from a health facility. Hence, access to a local health clinic for preventive care does not seem to be a factor [4].

Although public level of awareness is considered a significant reason for late presentation, lack of a screening program is another factor. There were many screening efforts in different parts of the kingdom sponsored by different unrelated societies and organizations. In Riyadh (the capital city) Abulkhair, et al. screened

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1215 women aged 19-91 (including symptomatic women) over a period of 8 months and discovered 16 (1.32%) cancer cases [5]. In Al-Qassim area, over a period of 18 months, data were available for 1628 screened women aged 35-60 years, 5 (0.3%) cases of cancer were detected [6]. In the Eastern province, Al-Mulhim, et al. screened 8061 women aged 40 years and above over a period of 4.5 years and discovered 47 (0.58%) cancer cases [7]. There were other sporadic non-published activities in Jeddah area; 3 different centers collectively screened 278 ladies over a period of 10 days and detected 4 (1.43%) cancer cases (Personal communication Dr. Samar Shigairi). The variability in cancer detection rates might be related to the different methodology and sample selection rather than a true reflection of different incidence between different cities.

Randomized controlled trials have demonstrated that mammography screening is sufficiently sensitive and specific and acceptable to most women [8]. In the screening study conducted in 2 Swedish counties, Tabar, et al. showed that regular mammographic screening resulted in a 63% reduction in breast carcinoma death among women who actually underwent screening [8]. Michaelson, et al. showed that there will be a significant reduction in breast cancer associated mortality in women > 40 years of age when screening mammography is regularly conducted with 90% adherence [9].

Although Saudi Arabia has low incidence of breast cancer, there is an observed progressive increase in the number of cases as documented by the Saudi Cancer Registry reports where the age standardized rate for breast cancer (ASR) increased from 14/100000 (in 1994-1996 report) to 22.1/100000 female population in 2012 registry report [1].

We conducted a pilot screening program for breast cancer in Jeddah (the main city in the western region and the second largest city in the kingdom) to test the feasibility of having a national screening program, to test the acceptance of the society and to have an idea about the incidence of breast cancer in Saudi Arabia.

Materials and Methods

In October, 2010, Jeddah health directorate under care of the ministry of health started the first pilot screening program for breast cancer in the western region of the kingdom of Saudi Arabia with team-work collaboration between the ministry of health tertiary centers (King Abdul-Aziz Hospital and Oncology Center and King Fahd General Hospital) and primary health care centers. The aim was to conduct an organized systematic approach that can be followed in a future nation-wide program. A specially designed mobile unit/trailer was temporarily freely provided by Siemens Company for this program. It has a small entrance that was used for welcoming and registering participants. This leads to another area for the interview and examination by the primary health care physician and the last area was for the digital mammogram (Mammomat Inspiration with PRIME Technology). To guaranty safety, privacy and competence of the process, it was decided to have the mobile unit in the vicinity of primary health care centers. Three different locations (Al-Hamra in the north, Al-Safa in the east and Al-Mahjar in the south) were chosen based on accessibility, space and staff availability keeping in mind the well-known variability in socio-cultural back ground of the living population in each district. During data collection, we did not document data on level of education or socio-cultural background among the screened population. Women visiting the primary health care staff for different health issues were introduce and educated about screening. No home visits nor phone communication were done to recruit women for screening. Multiple media campaigns were conducted few months earlier as well as distribution of educational materials about the program in the community to spread the idea of screening and inform the ladies about the schedule of the trailer.

Jeddah is the second largest city in the Kingdom of Saudi Arabia and it is the main city in the western region. The total Saudi population in Jeddah is 1729007 and the total Saudi females are 830992; 27% of these (224368) represent the target age group for screening (≥ 40-69 year old) [10]. It was decided during this phase of the program to screen only 1% of the population so the target number to be screened was 2244 ladies.

Table 1: Breast Imaging Reporting and Data System (BIRADS) classification.

Category	Description
0 (Incomplete)	Additional imaging evaluation needed before final assessment
I (Negative)	No lesion found (routine follow-up)
II (Benign finding)	No malignant feaswtures; e.g. cyst (routine follow-up for age, clinical management)
III (Probably benign finding)	Malignancy is highly unlikely, e.g. fibroadenoma (initial short interval follow-up)
IV (Suspicious abnormality)	Low to moderate probability of cancer, biopsy should be considered
V (Highly suggestive of malignancy)	Almost certainly cancer, appropriate action should be taken

The screening process was conducted daily, day time (7 hours), for a period of 3 consecutive months excluding weekends. It was interrupted by our pilgrimage (Holy Hajj) vacation for 10 days, so the total period of screening was 52 actual working days. Any asymptomatic Saudi woman, 40-69 years old, not pregnant nor lactating, not a breast cancer survivor and not with a significant morbidity was eligible. Only Saudi nationalities were included because they have free access to the health system and can be further investigated and managed at all government hospitals with no limitations or financial obligations.

Registration for mammographic screening begins in the mobile trailer by documenting names, phone numbers and national identification numbers, the latter is relied on as a unique identifier. Ladies will then be interviewed and examined by a female primary health care physician. Detailed demographic data as well as risk factors for breast cancer (age at menarche, 1st pregnancy and delivery, hormonal therapy, menopause, history of breast biopsy or surgery and family history of malignancies) were documented. Clinical assessment starts with weight and height measurements then breast and axillary examination performed. A Microsoft Office Access folder was specially created to document the required data of the screened population. Women with clinical evidence of definite breast or axillary masses were excluded and referred to the breast clinics at the tertiary centers.

Two-view (cranio-caudal and medio-lateral oblique) mammography was performed. Image reading was performed by a qualified group of radiologists in a centralized imaging unit at King Abdul-Aziz Hospital and Oncology Center. Each mammogram was reported by two radiologists who were blinded to each other's reading. A third opinion was requested in case of discordance between the two primary radiologists. Mammographic Computer-Aided Detection (CAD) system was not used. Breast Imaging Reporting and Data System (BI-RADS) was used to categorize mammographic reports (Table 1) [11].

Images reported as BIRADS III, IV and V were called for a breast ultrasound. Mammographically suspicious findings were biopsied using stereotactic vacuum assisted technique. Ultrasonographically suspicious lesions were biopsied using Tru-cut needle or vacuum assisted biopsies. Cases that were proven histologically to be malignant were referred to the breast clinic at King Abdul-Aziz Hospital & Oncology Center in Jeddah for complete standard cancer work-up and multidisciplinary team management. BIRADS I and II cases were reassured and advised for routine follow-up.

Results

From 2244 ladies (which is the target number to be screened in this phase of the program), 1167 ladies attended and underwent screening over a period of 52 days (uptake rate of 52%). The specified age for inclusion was 40-69 years old but we also included 25 ladies who were ≥ 70 years old since they were healthy and came to the mammography unit asking for screening. Table 2 shows the screened population age and some risk factors.

Most (570/1167, 49%) of the screened ladies were premenopausal, 235/1167 (20%) were peri-menopausal (Irregular menses for ≥ 6 months) and 362/1167 (31%) were postmenopausal. Multi-parity (Birth

of ≥ 3 kids) was documented in 964/1167 (82.6%) and 905/1167 (77.5%) breast fed ≥ 3 kids. The average minimum and the average maximum duration of lactation was 7.35 months (SD ± 7.8) and 17.88 months (SD ± 10.92) respectively. Use of OCP was documented in 815/1167 (69.8%) for variable periods (average 59.3 months) and only 30/1167 (2.6%) used HRT. Current or past history of smoking was documented in 160/1167 (13.7%) with an average duration of 13.27 months. House-hold activities were the only physical activities performed by 809/1167 (69.3%), only 56/1167 (4.8%) performed moderate to heavy exercise. The average body mass index (BMI) in the screened population was 37.45 kg/m^2; 335/1167 (28.7%) were overweight (BMI: 25-29.9 kg/m^2), 342/1167 (29.3%) had grade I obesity (BMI: 30-34.9 kg/m$_2$), 210/1167 (18%) had grade II obesity (BMI: 35-39.9 kg/m^2) and 124/1167 (10.6%) had grade III (extreme) obesity (BMI: ≥ 40 kg/m^2) [12]. History of breast disease/biopsy and family history seen in the screened population are summarized in table 3.

Out of 1167 mammograms, 154 required further assessment with breast ultrasound since 131 were BIRAD III, 20 were BIRAD IV and 3 were BIRAD V (Recall Rate 13%). After ultrasound, 32 cases required biopsy (Biopsy Rate 2.7%). In 25 cases, pathology results were of different benign breast conditions like fibro-adenomas, fibrocystic changes and benign epithelial hyperplasia. Seven cases were confirmed pathologically to be malignant; 4 cases of invasive ductal carcinoma, grade II (IDC, II), 2 cases of ductal carcinoma in situ (DCIS) and 1 case of invasive lobular carcinoma (ILC) (Table 4). The average age of cancer cases was 57.6 years (SD ± 7.63); 3 of them were peri-menopausal and 4 were postmenopausal. The average age at menarche was 12.6 years. All of them had their first pregnancy at an age ≤ 25 year, all were multi- parous (average number of kids was 6) and breast fed their kids for an average period of 13 months. Only one of them gave history of infertility that was treated medically for one year. All except one used oral contraceptive pills during their life for an average period of 97 months and none of them used hormone replacement therapy. History of smoking was documented in 3 out of 7 cancer cases (43%) and there was no history of alcohol consumption. House hold activities were practiced by all of them; 3 cases practice light exercise as well. None of the cancer cases had past history of breast disease or breast biopsy. Family history of breast cancer was positive in 3 cases, they were second degree relatives. Family history of other malignancies was positive in 3 cases, 2 of them were lymphoma in a first and a second degree relative and one case had a first degree relative with an unknown type of malignancy. The average body mass index (BMI) of the cancer cases was 40. They were referred to the tertiary centers to receive the required surgical/ oncology treatment.

Table 2: Age and risk factors of the screened population.

Risk Factors	Age Range (yrs)	Mean (SD)
• Menarche	8- 18	12.8 (1.7)
• Menopause*	35- 66	50.7 (4.7)
• 1st Pregnancy†	12- 41	20.9 (5.5)
• 1st Delivery	13- 43	21.9 (5.4)
• Starting HRT‡	36- 58	48.8 (5.9)
• Starting OCP§	15- 51	25.7 (6.8)
• Starting Smoking¶	13- 57	32.6 (11.5)

*Menopause is amenorrhea for ≥ 1 year.

†The outcome of the first pregnancy was not specifically asked for.

‡Hormone replacement therapy used by 2.6%.

§Oral contraceptive pills used by 69.8%.

¶History of smoking was documented in 13.7%.

Discussion

National screening programs are new to the Arab region and are opportunistic in nature, the few studies that documented breast cancer screening participation rates (CBE, mammography, and BSE) found them to be alarmingly low for women throughout the region. Knowledge of the benefits of breast cancer screening is an important determinant of breast cancer screening behavior [13]. Technicians and radiologists specialized in breast imaging are lacking in our country. At king Abdul-Aziz Hospital and Oncology Center, training courses for technicians were conducted on regular basis. However, to establish a national screening program all over the kingdom of Saudi Arabia, major efforts have to be done at the level of the ministry of health to train and prepare a specialized staff in well-equipped breast units.

Having the mobile unit located in the vicinity of the primary healthcare centers was admired by the screened ladies. It was considered an accessible and safe location. Calling ladies for a breast ultrasound or breast biopsy created a panic state. It is highly recommended to train the team members on how to convey the proper massage.

The uptake rate was 52% which is acceptable and comparable to what has been reported in similar pilot screening programs conducted in some European countries [14,15]. In the Luxembourg Mammography Programme, women 50-64 years participated in 3 screening rounds. Participation rate steadily rose from 34% in 1992 to 50% in 1997 (56% in 1998) [14]. In the Hungarian National Breast Cancer Screening Programme, 37 mammography centers got qualification for participation in the nationwide programme. The screening has been carried out in stationary screening mammography units and included women 45-65 years. The uptake (participation) rate was 45.1% [15].

The mean age at menarche (12.8 ± SD 1.7) and at menopause (50.7 ± SD 4.7) of the screened population is considered similar to what is reported in the literature (Table 3). Multi-parity, early pregnancy and delivery as well as breast feeding are common features in the Arabic countries. This combined with low rate of HRT use (2.6%), low rate of smoking (13.7%) and no alcohol consumption give our population a lower risk for breast cancer. However, obesity rate is increasing in our society in both sexes and at all age groups. The screened population had an average BMI of 37.45 kg/m^2, 335/1167 (28.7%) were overweight (BMI: 25-29.9 kg/m^2) and 676/1167 (57.9%) were considered obese (BMI ≥ 30 kg/m^2) according to the national institute of health classification [12]. Small number (56/1167,

Table 3: Breast cancer risk factors in the screened population.

Risk Factors	Number (%)
Breast disease (inflammatory conditions, fibro-adenomas, fibrocystic changes)	51/1167 (4.4)
Breast biopsy	15/1167 (1.3)
Breast cyst aspiration	15/1167 (1.3)
Breast operations	69/1167 (5.9)
Oophorectomy*	30/1167 (2.6)
Hysterectomy†	48/1167 (4.1)
Family history of breast cancer‡	29/1167(18.8)
Family history of other malignancies§	361/ 1167 (31)

*None was due to malignancies and 50% had bilateral oophorectomy.

†Only 3 had uterine malignancy.

‡40.2% was in 1st degree relatives and 21.5% had ≥ 2 family members with breast cancer.

§The commonest were uterine, hepatic and lung cancers.

Table 4: Outcome of screening mammogram after assessment.

	Age groups							
Number of	40-44 yr	45-49 yr	50-54 yr	55-59 yr	60-64 yr	65-69 yr	≥ 70 yr	Total
Cases	32	48	35	20	11	7	1	154
Biopsies	6	6	9	3	2	5	1	32
Cancer cases								
• **In-situ**	-	-	-	2	-	1	-	3
• **Invasive**	-	1	2	-	-	1	-	4

4.8%) of the screened ladies perform moderated to heavy exercise. This factor combined with other noticeable changes in the lifestyle like disturbed sleep pattern, moving towards fast food and canned products consumption, increasing smoking habits even in younger age and moving away from early childbearing and breast feeding may adversely affect the risk level in our population and result in a significant increase in the number of breast cancer cases in the coming future.

Our recall rate (13%) is relatively higher than what is reported in other programs. Yakasaka, et al. reported recall rates for initial screening mammography conducted in different countries, it ranged from 1.4% to 15.1%. For subsequent mammograms (18-29 months), the recall rates were lower ranging from 1.6% to 9% [16]. Our radiologists are low-volume readers and this is their first-time exposure to report screening mammograms within the context of a pilot program. As well, having 104/154 (67.5%) of the cases in the pre/peri menopausal age with denser breasts make mammographic interpretation difficult and require further assessment. A higher biopsy rate (2.7%) was also noted in the peri-menopausal age group (50-54 years).

The median age reported at diagnosis of breast cancer in Saudi Arabia is 49 years [1]. The epidemiological characteristics (Table 2) are different from the characteristics reported in Western women and that is why western mammographic screening guidelines are inappropriate for Saudi women. It was reported that initiating screening at age 40 is associated with a 3% median reduction in mortality with either annual or biennial intervals and one additional breast cancer death averted per 1000 women screened with annual as compared with biennial screening [17]. It is expected that screening a younger population with a higher breast density is associated with increased recall and biopsy rates. Gregory et al reported that the total number of mammograms and associated radiation exposure doubles and the risk of false-positive and additional biopsies increase proportionally [17].

Different studies in Asian countries concluded that biennial mammography screening for women aged at least 40 years is cost-effective [18,19]. Despite this debate, all of the major US medical organizations recommend that women over the age of 40 years should undergo mammography annually or biannually because screening could reduce the mortality of breast cancer by 7-23% [20]. In every country, mammography screening guidelines should be tailored according to the local parameters and these include breast cancer incidence, age groups affected, risk factors and healthcare resources.

Saudi women are encouraged to be self-aware in order to be able to seek medical opinion appropriately but we don't have local data on the effect of breast self-examination (BSE) on early cancer detection. Alsaif conducted a study on Saudi nursing students and BSE, a significant relation was found between higher levels of education and BSE practice [21]. Aboulfotouh, et al. studied the practice of BSE among adult Saudi female employees, working at King Abdulaziz Medical City, Riyadh, Saudi Arabia and their non-working adult female family members and found that only 41.6% reported ever practicing BSE and 21% only performed it regularly [22]. Another survey showed that only 25% of the female respondents aged 50-74 years old knows about BSE; among these 57% reported performing BSE [4]. So far, BSE is an optional practice that might bring the patient to receive medical care at an acceptable time.

Screening is a continuous process that should be associated with minimum obstacles to encourage ladies to come willingly for the next cycle. Our concern and aim is to have and maintain a smooth screening journey that provides Saudi ladies with the required optimum health service.

Conclusion

Saudi women accepted mammographic screening willingly. Breast-cancer screening has to be integrated into an optimally-functioning, properly staffed and well-equipped health care system. Health practitioners of all specialties need to be ready for the increasing work load and the need for higher skills. Detailed data registry of cancer cases including demographic data, risk factors, therapeutic modalities and follow up for recurrence and survival will help understanding the society needs.

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