The Need for Accessible Breast Cancer Screening Program for the Early Detection of the Cancer: an Assessment in Majmaah Region of Saudi Arabia

Medical Science

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ABSTRACT

Breast cancer is the most common malignancy in women worldwide. Despite its relatively low incidence in Saudi Arabia, breast cancer has been the most common cancer among Saudi women.[4] In fact, it is the single leading cause of cancer death for women of 20 to 59 years of age[5], thus posing a major public health concern. It is ranked highest amongst all the malignancies seen in Saudi women, comprising 21.8%[9]. It is generally of a high grade, and is locally advanced at the time of diagnosis[11]. The high incidence of breast cancer in young Saudi women should be addressed by evaluating the roles of early detection and prevention programs[6].

It is now well established that early detection provides survival advantages to the women with breast cancer. Mammography, which detects breast cancer at earlier stages, is a major step in reducing the risk of death from this disease. It was estimated to prevent approximately 20% to 40% of all deaths from breast cancer among women undergoing screening mammography[12-15].

The existing screening program for breast cancer in Saudi Arabia includes mammograms for the women 40 years of age or older[6]. In our study, we have evaluated the effectiveness of the prevalent screening/diagnostic program in early detection of breast cancer in the population of Majmaah. This has been a retrospective (5 years) and prospective (one year) study to enable us to assess the goals of early detection. Thereby, the reduction in the overall morbidity and mortality associated with breast cancer can be achieved. Our data also affirms the need of the easily accessible population based screening program to achieve the above goal.

Although, breast cancer is more common in women older than 50 years worldwide, it is frequently diagnosed in younger women in Saudi Arabia. In fact, breast cancer is the single leading cause of cancer death for women 20 to 59 years of age[5], thus posing a major public health concern. The high incidence of breast cancer in young Saudi women should be addressed by evaluating the roles of early detection and prevention programs.[6]

In western countries, breast cancer is the most common cancer in women and the leading cause of cancer mortality.[7] In Kingdom of Saudi Arabia, although its incidence is lower than in Western countries,[8] it is ranked highest amongst all the malignancies seen in Saudi women, comprising 21.8%.[9] Breast cancer in Saudi women displays features and characteristics that make it distinct from what is seen in Western nations.[10] Breast cancers in Saudi women are generally of a high grade, are locally advanced at the time of diagnosis, and affect predominantly women between 46-50 years of age, which is noticeably different from the median of 60-65 years seen in industrialized western countries,[11] where locally advanced disease is much less common.

It is now well established that early detection provides survival advantages to the women with breast cancer. Mammography, which detects breast cancer at earlier stages, is a major step in reducing the risk of death from this disease. It was estimated to prevent approximately 20% to 40% of all deaths from breast cancer among women undergoing screening mammography.[12-15]

The existing screening program for breast cancer in Saudi Arabia includes mammograms for women 40 years of age or older.[6] There has been the first published results of the New York randomized controlled trial of breast cancer screening[16] which indicated that a program combining physical examination and mammography at annual intervals was successful in reducing breast cancer mortality in women aged 50 years and older. These findings were confirmed by the same researchers in a 14-year follow-up of the original study group and control population.[17, 18]

There has been changing pattern in the proportion of breast cancer cases in the last 3 years (2007 to 2010). Before 2007, most of the breast specimens were benign, with an increasing annual incidence of malignant cases. However, after 2007, the trend shifted toward benign cases. In our opinion, this is a reflection of an effective campaign of breast diseases awareness programs.[19] Nevertheless, this trend should not be a reason for complacency, since some of these benign cases, though not cancerous, may indicate an increased risk toward the development of pre-malignant conditions such as fibroadenomas.[20] Another point of paramount importance, highlighted in this and other studies,[21, 22] is that among Saudi patients breast carcinoma occurs in relatively younger age groups than is the case in Western patients. This could be due to the demography of the Saudi population, which is characterized by a predominance of a younger population (more than 60% of the population is under 18 years)[23]. This pattern needs to be studied to know the possible other modifiable and non-modifiable causes.

The new guidelines from US Preventive Services Task Force (USPSTF) on screening for breast cancer recommends that breast cancer screening by mammography in women aged 40 to 49 years is not routinely required. They recommend biennial screening mammography from the age of 50 years or older.[24] The Canadian Task Force on Preventive Health Care also agrees with the above recommendation.[25] There have been many controversies and debates on these recommendation suggesting that the recommendation are more valid for the white population than

others (minorities, Hispanic, and Asian).[26]

In view of the above opposing evidence-based rationales, it is imperative that we also look into the screening policy adopted in Saudi Arabia with retrospective and prospective study of breast cancer. This may enable us to have an evidence based recommendation to achieve early detection of breast cancer so that the related morbidity and mortality can be reduced significantly.

Study Objectives:
1. To review the existing screening recommendations and practices of breast cancer in Majmaah region of Saudi Arabia in early detection and its effects on prognosis.
2. To propose the breast cancer screening policy that will significantly reduce the detection of the cancer in invasive stage of malignancy. We hope that the findings may help in reducing the overall morbidity and mortality in the local population resulting from breast cancer.

Material and Method:
We received ethical committee approval on December 3, 2013. We started data collection from the histopathology laboratory of the King Khalid General Hospital (KKGH) in Majmaah for 5 years (1430H to 1434H) retrospectively and one year (1434-1435H) prospectively.

We have collected the breast lesion data of 524 cases. We have analysed the data for various pathological lesions of the breast (table 1). We collected all relevant data from the case files of each malignant cases (diagnosed and suspected cases) that assisted our understanding of the pattern and severity of the cases. There have been 57 cases of histopathologically diagnosed breast cancers and 6 cases of suspicious breast cancer of the total 63 cases (table 2). Out of 63 cases, there are 3 cases of breast cancer and one case of suspicious breast cancer among the male patients. The remainder 59 cases were female patients of various age groups ranging from 29 to 80 years (table 3). These cases were diagnosed as breast cancer by FNAC (fine needle aspiration cytology), biopsies (incisional/excisional), or both. The 39 cases were diagnosed by FNAC only, 9 cases were by biopsies, and 9 cases were by both (FNAC & biopsies). The 6 cases of suspicious breast cancers were diagnosed by FNAC only that would need biopsies for the confirmation. The severity of the cases at the diagnosis is assessed (table 3, 4). There were 10 out of 57 cases with axillary lymph node metastasis and 2 cases with regional and other lymph node metastasis along with distant metastasis (table 4). The youngest cases that were diagnosed at the age of 29, 30, and 32 years (one case each) were breast cancer with axillary lymph node metastasis (table 4). The 7 out 10 cases were among the age ranging from 29 to 40 years (table 4). The two cases with distant metastasis were of 57 and 80 years of age (table 4).

Results:
The incidences of breast lesions are presented in the form of tables and graphs as follows for the period of 1430-1435H:

Table 1: Yearly Breast Lesions (1430-1435)

Diagnosis / Year	1430	1431	1432	1433	1434	1435	Total
Breast Cancer	12	9	6	16	9	5	**57**
Suspicious of Breast Cancer	0	1	0	1	4	0	**6**
Fibrocystic changes	10	4	3	8	1	1	**27**
Fibroadenoma	41	47	44	45	21	9	**207**
Mastitis	7	15	7	10	2	1	**42**
Duct cell hyperplasia	2	0	1	0	1	0	**4**
Lipoma	5	2	1	0	0	0	**8**
Galactocele	1	2	1	1	1	0	**6**
Gynecomastia	0	2	1	2	4	0	**9**
Fat necrosis	4	3	1	1	1	0	**10**
Retention cyst	2	0	0	0	0	0	**2**
Epidermal inclusion cyst	1	1	0	1	1	0	**4**
Normal	21	35	27	18	17	6	**124**
Non-representive sample	8	1	2	1	4	0	**16**
Squamous cell papilloma	1	0	0	0	0	0	**1**
Simple cyst	0	1	0	0	0	0	**1**
Yearly Total Breast Lesion	115	123	94	104	66	22	**524**

There had been a constant number of cases for first 4 years of study. The apparent decline in the number of cases is attributed to the absence of referral cases coming from 2-3 MOH hospitals when one nearby hospital had their own histopathologist. On top of this, there have been cases of 6 months only in year 1435H.

The incidences of breast cancers in various cities in Majmaah region are presented in the form of tables are as follows for the period of 1430-1435H:

Table 2: Breast Cancer in Majmaah & Surrounding Region (1430-1435H)

Breast CA/ Cities	Majmaah	H Sudair	Tumair	Zulfi	Shaqra	Rafiah	Duwadimi	Afif	Total
Breast Cancer (Confirmed)	33	5	1	8	8	1		1	**57**
Suspected Breast Cancer	1	2		1	1		1		**6**
Total Breast Cancer in cities	34	7	1	9	9	1	1	1	**63**

Table 3: Breast Cancer / Age / Severity (1430-1435H)

Age	Grading	LN/DM	Age	Grading	LN/DM	Age	Grading	LN/DM
29	C5	N1	42	C5		51	C5	
30	C5; B5	N1	43	C5		52	B5	
30	C5		45/M	C5		54	B5	N1
30	C5; B5		45	C5		54	C5	
31	B5		45	B5		55	C5	
32	B5		45	C5		56	B5	
32	C5	N1	45	C4		57	C4	
34	C5		45	C5		57	C5; B5	N2M1
34	C5		46	B5		58/M	C4	
35	?C ; B5		46	C5		60	C5	
36	C5; B5		46	C4		60	C5	
36	C5		46	C4		60	C4	
38	?C5	N1	47	C5	N1	60	C5	
38	C5	N1	47	B5	N1	63	C5	
38	C5; B5	N1	48/M	C5		63	C5	

40	C5		49	C5; B5	65	C5	
40	C5		50	B5	70	C5	
40	C5		50	C5	70	C5; ?B5	
40	?C5	N1	50	C5	77	C5; B5	
40	C5		50	C5	80	C5	
41	C5		51/M	C5	80	C5; B5	N2M1

C4	Suspicious Breast Cancer
C5	Breast Cancer (FNAC)
B5	Breast Cancer (Biopsy)
N1	Axillary LNs
N2	Axillary & other LNs
M1	Distant metastasis

**Table 4: Advanced Breast Cancer & their Age at the detection (1430-1435H)**

Age	LN	Age	LN	Age	LN
29	N1	38	N1	47	N1
30	N1	38	N1	54	N1
32	N1	40	N1	57	N2M1
38	N1	47	N1	80	N2M1

N1	Axillary LNs
N2	Axillary & other LNs
M1	Distant metastasis

The incidences of breast lesions and breast cancers in various cities in Majmaah region are presented in the form of G Graph and Bar Chart respectively, for the period of 1430-1435H:

G Graph 1: Breast lesions in cities
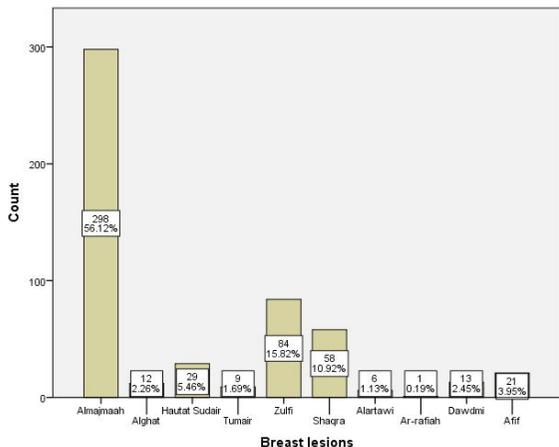
Bar Chart 1: Breast Cancer in cities
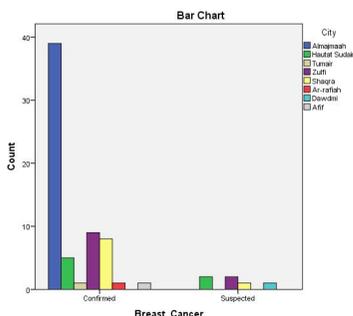
Discussion:

The available data affirms the trend that has been reported ear-lier in the literature about the incidence of advanced breasts cancers in relatively young population of Saudi Arabia. There-fore, screening the population starting at the younger age group is very important for early detection of the breast cancer.

The guidelines for "Breast Cancer Screening Program" from the MOH of Saudi Arabia[27] are as follows:
- ➢ **Breast self–examination**
  - o carried out once every month, between the 7th and 10th day of the menstrual cycle
  - o for postmenopausal women, it should be performed at the same date every month
- ➢ **Regular mammograms**
  - o once every one or two years, starting at the age of 40
- ➢ **Periodic breast examination by a health professional**
- ➢ **BI-RADS (Breast Imaging-Reporting and Data System):** It refers to the mammography assessment categories. These are standardized numerical codes typically assigned by a radiolo-gist after interpreting a mammogram. This allows for concise and unambiguous understanding of patient records between multiple doctors and medical facilities. It also provides quality control system in the reporting and categorization of the indi-viduals thereby a systemic approach to the various prophylac-tic and therapeutic modalities can be used for the best possible outcome.

- o Mammogram
- o Ultrasonography
- o MRI

The standard guidelines for the assessment are as follows:
BI-RADS – Mammogram[28]

Assessment	Management	Likelihood of Cancer
Category 0: Incomplete – Need Additional Imaging Evaluation and/or Prior Mammograms for Comparison	Recall for additional imaging and/or with prior examination(s) comparison	N/A
Category 1: Negative	Routine mammography screening	Essentially 0% likelihood of malignancy
Category 2: Benign	Routine mammography screening	Essentially 0% likelihood of malignancy
Category 3: Probably Benign	Short-interval (6-month) follow-up or continued surveillance mammography	> 0% but ≤ 2% likelihood of malignancy
Category 4: Suspicious	Tissue diagnosis	> 2% but < 95% likelihood of malignancy
Category 4A: Low suspicion for malignancy		> 2% to ≤ 10% likelihood of malignancy
Category 4B: Moderate suspicion for malignancy		> 10% to ≤ 50% likelihood of malignancy
Category 4C: High suspicion for malignancy		> 50% to < 95% likelihood of malignancy
Category 5: Highly Suggestive of Malignancy	Tissue diagnosis	≥ 95% likelihood of malignancy
Category 6: Known Biopsy-Proven Malignancy	Surgical excision when clinically appropriate	N/A

BI-RADS – Ultrasonography (USG)[29]

Assessment	Management	Likelihood of Cancer

Category 0: Incomplete – Need Additional Imaging Evaluation	Recall for additional imaging	N/A
Category 1: Negative	Routine screening	Essentially 0% likelihood of malignancy
Category 2: Benign	Routine screening	Essentially 0% likelihood of malignancy
Category 3: Probably Benign	Short-interval (6-month) follow-up or continued surveillance	> 0% but ≤ 2% likelihood of malignancy
Category 4: Suspicious	Tissue diagnosis	> 2% but < 95% likelihood of malignancy
Category 4A: Low suspicion for malignancy		> 2% to ≤ 10% likelihood of malignancy
Category 4B: Moderate suspicion for malignancy		> 10% to ≤ 50% likelihood of malignancy
Category 4C: High suspicion for malignancy		> 50% to < 95% likelihood of malignancy
Category 5: Highly Suggestive of Malignancy	Tissue diagnosis	≥ 95% likelihood of malignancy
Category 6: Known Biopsy-Proven Malignancy	Surgical excision when clinically appropriate	N/A

BI-RADS – MRI[30]

Assessment	Management	Likelihood of Cancer
Category 0: Incomplete – Need Additional Imaging Evaluation	Recommend additional imaging: mammogram or targeted USG	N/A
Category 1: Negative	Routine breast MRI screening if cumulative lifetime risk ≥ 20%	Essentially 0% likelihood of malignancy
Category 2: Benign	Routine breast MRI screening if cumulative lifetime risk ≥ 20%	Essentially 0% likelihood of malignancy
Category 3: Probably Benign	Short-interval (6-month) follow-up	> 0% but ≤ 2% likelihood of malignancy
Category 4: Suspicious	Tissue diagnosis	> 2% but < 95% likelihood of malignancy
Category 5: Highly Suggestive of Malignancy	Tissue diagnosis	≥ 95% likelihood of malignancy
Category 6: Known Biopsy-Proven Malignancy	Surgical excision when clinically appropriate	N/A

There is no comprehensive population screening program in place in the city of Majmaah. So, some of the above guidelines are used as diagnostic tools. Therefore the goals of early detection of breast cancers that could be curable are generally not achieved.

Our data, as discussed in the results, indicate that the burden of the breast cancer could be reduced by implementing population based screening program.

Conclusion and Suggestions:
The concerted effort for population screening for early detection of breast cancer is the fundamental tool for combating this cancer.

To achieve the goals of early detection of breast cancer, the following could be the practical suggestions:

1) Every woman should have easy and ready access to the screening program

a) A comprehensive Saudi national program would most likely be a step in right direction, if not existing
b) The population should be made aware of the essence of the screening so much so that the compliance would become almost 100%, like immunization program
c) A centralized or regionalized database program can be developed with following features:
i. Access to mammogram should be available at PHC/General Hospital, in addition to the self-breast examination recommendation
ii. The reporting of the mammogram by the team of experts can be done preferably at central or regional centres using access to the database that contain all pertaining information including digitalized images of the mammogram of the population
iii. The follow up and any other recommendation deemed necessary can be conveyed through the database to the local centres where mammogram was actually undertaken
iv. This would most likely provide a service that could be of high quality with cost effectiveness to the population
v. This would also provide easily accessible quality data that could/should be used to assess the program and amend the recommendation(s) as and when required
d) Interaction and collaboration of tertiary care oncology centers with centralized/regionalized screening program centers along with the active involvement of the local primary care centers could be very beneficial for the screening as well therapeutic modalities of the breast cancer with effective utilization of the resources to provide easy, quality, and accessible service to the population with cost-effectiveness
2) Regular research studies should be conducted to assess the effectiveness of the program
3) Further comprehensive population based study is very essential to assess the usefulness of the above suggestions

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