RESEARCH COMMUNICATION

Breast Cancer Knowledge, Risk Factors and Screening Among Adult Saudi Women in a Primary Health Care Setting

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Abstract

Objective: To assess level and determinants of knowledge about risk factors and utilization of screening methods used for breast cancer early detection among adult Saudi women in Al Hassa, KSA. Study Design: cross-sectional descriptive. Participants and Methods: A total of 1,315 Saudi adult females were included, selected through a multistage stratified sampling method from ten primary health care centers. No previous history of breast cancer, attendance for routine services or accompanying patients were prerequisites for eligibility. Participants were invited to personal interview with pre-tested validated questionnaire including inquiries regarding knowledge, screening practices including clinical breast examination (CBE), mammography, individual breast cancer risk factors and perceived barriers towards (CBE). Both descriptive and inferential statistics were applied; logistic regression was conducted to determine the possible correlates of knowledge. Results: Overall level of knowledge regarding risk factors and appropriate screening was low and dependent upon educational and occupational status. Early screening is underutilized among participants due to several perceived barriers. Clinical breast examinations were employed by less than 5% and mammography by only 3% of cases. A positive family history was found in 18% of cases among first and second degree relatives, and 2 % had a prior history of benign breast lesions. Conclusion: Included women, irrespective of their educational status, had knowledge deficits regarding breast cancer risk factors and underutilization of the recommended breast cancer screening. Several barriers are contributing to such knowledge deficits and screening behavior.

Key Words: Breast cancer knowledge - risk factors - clinical breast examination - mammography - Saudi Arabia

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Introduction

The total number of new cases of breast cancer diagnosed annually exceeds one million, and expected to reach 1.5 million by 2010 worldwide (WHO, 2007). In Saudi Arabia, according to Cancer Incidence Report, 1999, breast cancer accounted for 19.1% of cancers among females with a mean age of 48 years. Carcinoma in situ was nil while, infiltrating duct carcinoma represented 76% of cases (Cancer Incidence Report, 2001). The National Cancer Registry Report in 2001 revealed that breast cancer represented 12.9% of all cancers among Saudi population, with age specific incidence rate of 11.8/100,000 among adult females. Eastern Province ranked first, as breast cancer represented 26% of all cases with an age specific incidence rate of 22/100,000.

Cancer incidence is predicted to continue rising in response to the changes in lifestyle of Saudi population witnessed during the last three decades (Lee et al 2004). Peculiar social and demographic factors are contributing to the pattern of late presentation and unfavorable outcome of breast cancer in this country; females refrain from seeking medical care out of shyness imposed by conservative nature of the society (Tawfik et al.,1997; Alam 2006).

Screening behavior is governed by level of knowledge and perceived risk factor as some reports suggested that overall age-adjusted rates and mortality for breast cancer have progressively declined among U.S women and this trend has been attributed to several factors including emphasis on early detection and education of professionals and public (Vogel, 2000). Established risk factors for breast cancer including women with first degree relatives who have breast cancer (Lynch and Lynch, 2002), certain gynecologic and endocrine factors including age at menarche, late menopause (Seffrin 2000), while early pregnancy that produces a live born, was associated with reduced incidence (Vogel, 2000). Certain lifestyle factors are believed to be protective, including weight control, physical activity, and avoidance of smoking (Seffrin 2000).

Education and communication have been emphasized to encourage health seeking behavioral change with adequate utilization and compliance to screening guidelines (Madanat and Merril 2002; Dundar et al., 2006). However, several studies have shown inadequate levels of knowledge towards risk factors awareness and

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screening namely clinical breast examination and mammography, even among educated women (Madanat and Merill, 2002; Leslie et al 2003; Parsa et al., 2008).

In Saudi Arabia, few studies have been carried out to assess awareness towards risk factors of breast cancer with inherent methodological limitations (Millat, 2000; Alam, 2006), while none exist assessing distribution of various risk factors implicated in breast cancer as well as screening behavior. Consequently, the objective of this study was to assess level and determinants of knowledge about, risk factors for and utilization of screening methods used for breast cancer early detection among adult Saudi women in Al Hassa, KSA.

Materials and Methods

Setting and Design:

A cross-sectional descriptive study carried out in Al-Hassa Governorate, located in the Eastern Province of Saudi Arabia, populated with about one million. Included were three areas: urban, populated by about 60% of the population; rural, consisting of 23 villages and included 35% of the population; and Hegar "Bedouin scattered communities" comprising the remaining 5% of the population. Primary health centers in Al Hassa amounted to 54, serving 83 % of the population.

Participants and Methods:

Sample size and technique: Considering the total female population age ≥ 18 years of 190,000 "year 2008" registered in Al Hassa Primary Health Care level, with a prevalence of knowledge of 30 % (Alam 2006), taking the worst acceptable level of 26%, using a 95% confidence and 80% power. The total sample size would be 503 females ≥ 18 years of age; with a design error of two, the sample would be 1006, added 20% increment to compensate for the potential non-response, the total sample size was 1207. Applying the population distribution, proportionate sampling fraction was employed and accordingly 786 were proposed to be selected from urban and 422 form rural areas. Sampling technique: an updated list of Primary Health Care centers (PHC) was used in sample selection using multistage sampling technique; accordingly, 6 urban and 4 rural centers were randomly chosen. In each PHC center, all Saudi adult women aged ≥ 18 years were targeted for inclusion with the following criteria: a- Age ranged from 18 to 65 years. b- Saudi nationals. c- No previous history of breast cancer. d- Attending for routine primary care services or accompanying patients.

Method of Data Collection:

Participants were invited to personal interview using pre-tested validated questionnaire by well trained nurse recruited at each PHC after receiving several orientation and training sessions under the supervision of the investigators. The questionnaire included the followings:

a) Socio-demographic data: age, residence, educational, occupational status, marital status, age at marriage and number of living children.

b) Knowledge towards breast cancer: fifteen items adopted from previously validated breast cancer knowledge-based published surveys (McCane et al.,1990; Stager 1993), which reflect participant's knowledge of breast cancer and myths with the disease. Ten out of twelve questions were adapted from Stager's questionnaire as we found them applicable to our population with an internal consistency of 0.60. Four more relevant questions were added for identified breast cancer risk factors. Questions adopted from the previous tool were translated into Arabic followed by back translation into English to ensure reliability. Responses to the previous items on knowledge were scored as 1 for correct answer, while incorrect and do not know responses received nil.

c) Clinical breast examination (CBE): ever done, frequency if any, date of last examination, reasons for, who conducted it, and perceived barriers towards CBE. Barriers towards clinical breast examination were constructed in closed end format with multiple options as revealed during pilot testing.

d) Breast cancer risk factors: age at menarche, menopause, history of breast cancer among first degree relative "mother/sister" and second degree relatives "auntie/grandmother from maternal side" and others in the family, number of completed pregnancy, age at first live newborn, history of begin lesions including age at diagnosis, biopsy including aspiration and surgical intervention if any. History of mammography screening; age at initiation, frequency, reasons and who recommended such procedure.

Pilot testing was applied on female patients attending for routine care at a nearby primary health care center using 79 subjects beyond sample size to ensure proper administration and face validity of the instrument. The

Table 1. Socio-demographic Characteristics of the Participants

Parameter	Category	Number (%)
Total:		1,315 (100)
Residence:	Urban	789 (60.0)
	Rural	527 (40.0)
Age:	< 30 years	336 (25.6)
	30 - <40 years	503 (38.3)
	40 - < 50 years	367 (27.9)
	≥ 50 years	109 (8.2)
Age in years: Mean ± SD*		36.3±8.9
Marital status:	Single	160 (12.2)
	Married	1,094 (83.2)
	Divorced	38 (2.9)
	Widowed	23 (1.7)
Age at marriage: Mean ± SD* (median)		20.2±4.6 (20.0)
Educational status:		
	Illiterate/read and write	366 (27.8)
	Primary / preparatory	329 (25.0)
	Secondary/ technical	331 (25.2)
	College or higher	289 (22.0)
Occupational status:		
	Governmental employee	310 (23.6)
	Non-governmental employee	27 (2.1)
	Self employed**	12 (0.9)
	Retired / none / students	151 (11.5)
	Housewives	815 (61.9)

* Standard Deviation; ** Including trade, business, freelancer jobs, and technicians

Table 2. Breast Cancer Knowledge Among the Included Participants

Knowledge items [Correct response]	Number (%)
1- The most frequently occurring cancer in women is breast cancer. [True]	1,020 (77.5)
2- Breast cancer is more common in 65 years old women than 40 years old women. [True]	581 (44.2)
3- Hereditary may play a role in the development of breast cancer. [True]	435 (33.1)
4- Contraceptive hormones may increase the risk of breast cancer. [True]	656 (49.9)
5- Being overweight or obese increases the risk of developing breast cancer. [True]	463 (35.2)
6- Breastfeeding may decrease the risk of breast cancer development. [True]	835 (63.5)
7- Bearing the first child after the age of 30 increases the risk of breast cancer. [True]	526 (40.0)
8- Women over the age of 70 rarely get breast cancer. [False]	497 (37.8)
9- Late menopause may increases the risk of breast cancer. [True]	470 (35.7)
10- Breast cancer is caused by bacterial infections. [False]	840 (63.9)
11- Mammography is recommended yearly above the age of 50 years for early detection. [True]	411 (31.3)
12- The irritation of a tight bra can over time cause breast cancer. [False]	222 (16.9)
13- Breast cancer usually presents as a painful lump. [False]	285 (21.7)
14- Women with positive family history of male breast cancer are at higher risk. [True]	237 (18.0)
Total knowledge scores: Median (Mean ± SD)	7.0 (7.9±2.8)
Level of knowledge: High (≥ 7 score)	532 (40.5)
Low (< 7 score)	783 (59.5)

knowledge part demonstrated content reliability Cornbach's alpha of 0.68. Data were colleted between 15th of May and 10th of December, 2008.

Data Management and Analysis:

Data were analyzed using SPSS version 13 (SPSS Inc., Chicago, IL). Both descriptive and inferential data analyses were employed using appropriate statistical tests of significance. Categorical variables were expressed as proportions and percentage with trend analysis if applicable. Knowledge scores were expressed as mean, standard deviations and medians.

Non-parametric tests of significance namely ManWhitney and Kruskall Wallis were applied to knowledge scores for comparison along different independent variables. Binary logistic regression analysis model was used to define socio-demographic and other variables that may correlate with levels of knowledge by inclusion of significant variables at univariate analysis. Dependent variable was the level of knowledge, those attaining a score of ≥ 50% (≥ 7.0) scores were considered as knowledgeable. Confidence interval of 95% and significance level of <0.05 was applied.

Ethical Considerations:

Permissions were obtained from the local Health Directorate as well as our institution after approval of the proposal along with the data collection tool. Prior orientation of participants was carried out regarding objectives and possible impact of the study, emphasizing the right of the subject to non participation. Data confidentiality was maintained all through the study.

Results

A total of 1,315 women with age ranged from 18 to 65 years were included. Table 1 displays socio-demographics of participants. The age of marriage and the number of living children were influenced by the educational level of the woman (secondary or higher educational level, age of marriage was 20.2 ± 4.6 years with a median of 3 children versus, 18.3 ± 4.2 years and a median of 5 children for lower education levels) (P= 0.001). Only 26.5% were working; 88.8% were governmental employees, as teachers, managers, clerical jobs and technicians.

Knowledge towards breast cancer risk factors:

Table 2 displays knowledge of the included women about risk factors. The total knowledge score among our sample was low with a median of 7.0 (out of 14), and a mean of 7.9 ± 2.8.

Clinical breast examination and mammography:

Table 3 displays frequency, type of providers and reasons for CBE and mammography among participants. None of the included participants reported that they underwent mammography as a part of their age specific

Table 3. Clinical Breast Examination and Mammography by Age

Parameters	<30	30-40	>40-50	>50	Total
Clinical Breast Examination (CBE)					
Yes	32 (9.5)	69(13.7)	65(17.7)	16(12.2)	212(16.1)
1-3 times	15(46.9)	13(18.8)	33(50.8)	15(32.6)	76(35.8)
>3 times	17(53.1)	56(81.2)	32(19.2)	31(67.1)	136(61.2)
Providers conducting CBE					
Primary doctor	23(71.9)	38(55.1)	31(52.3)	19(11.3)	114(53.8)
Private specialist	6(18.8)	10(14.5)	25(38.5)	10(21.7)	51(24.1)
Surgeons	1 (3.1)	16(23.2)	3 (4.6)	15(32.7)	35(16.5)
Female nurses	2 (6.2)	5 (7.2)	3 (4.6)	2 (4.3)	12 (5.6)
Reasons for CBE					
Lump/Pain	16(50.0)	56(84.0)	37(57.0)	16(34.8)	127(59.9)
Follow up	2 (6.3)	5 (7.2)	17(26.2)	21(52.2)	48(22.6)
Assurance	1 (3.1)	1 (5.8)	11(16.9)	6(13.0)	22(10.1)
Acute problem*	13(40.6)	2 (3.0)	0 (0.0)	0 (0.0)	15 (7.1)
Mammography "ever":					
Yes	20(6.0)	63(12.5)	79(21.5)	31(31.2)	196(14.9)+
1-3 times	19(95.0)	59(93.6)	72(91.1)	23(67.6)	173(88.3)+
> 3 times	1 (5.0)	4 (6.1)	7 (8.9)	11(32.4)	23(11.7)
Reasons for mammography:					
Diagnosis	18(90.0)	49(77.7)	42(53.2)	5(14.7)	114(58.2)
Fears	2(10.0)	5 (8.0)	12(15.2)	0 (0.0)	19 (9.7)
Follow up	0 (0.0)	9(14.3)	25(31.6)	29(85.3)	63(32.1)

*Include breast abscesses, lactational problems and mastitis; +Statistically significant Chi-square for trend analysis (P = 0.001)

Table 4. Stated Barriers Towards Clinical Breast Examination in Relation to Age

Stated barriers*	<30	30-40	>40-50	>50	Total
Traditions**	174 (52)	308 (61)	173 (47)	78 (72)	733 (56)
No facilities	87 (26)	119 (24)	83 (23)	58 (52)	347 (26)
No female doctor	23 (7)	101 (20)	73 (20)	13 (12)	210 (16)
Lack knowledge	21 (6)	98 (20)	113 (31)	37 (34)	269 (21)
No pain/swelling	46 (14)	56 (11)	103 (28)	10 (9)	215 (16)
Fear of results	41 (12)	121 (24)	57 (16)	21 (19)	240 (18)
Only for the old	78 (23)	84 (17)	152 (41)	5 (5)	319 (21)
Having no idea	67 (20)	11 (2)	18 (5)	0 (0)	96 (7)
Reluctance	27 (8)	73 (15)	11 (3)	0 (0)	111 (8)
No need	30 (9)	41 (8)	29 (8)	13 (12)	113 (9)
Work overload	11 (3)	79 (16)	116 (32)	28 (26)	234 (18)

*Not mutually exclusive; ** Shyness/ not to be examined by male physicians

screening, and most of them referred the process in response to provider's recommendations. Both mammography and its frequency were significantly related to age of the respondents, in 50.5% of cases the reasons for mammography were diagnostic, 32.1% for follow up especially for those ≥ 50 years of age. Fears-driven mammography screening was stated among 9.7% of subjects to reassure participants in response to the affection of their relatives with the disease. Overall, those who adhered to screening by employing CBE and mammography according to age specified guidelines were 21/367 (5.7%) of women in the age group 40-< 50 years and 23/109 (21.1) in the age group of ≥ 50.

Perceived barriers towards CBE:

Perceived personal barriers towards breast clinical examination as stated by participants are demonstrated in Table 4. The most commonly encountered barriers were traditions in the form of shyness, being examined by male physicians followed by lack of specialized health facilities and shortage of female physicians at primary as well as other levels of care. Younger age group stated that CBE is indicated for older females.

Risk factors for breast cancer:

Table 5 demonstrates the distribution of breast cancer risk factors.

Correlates of knowledge:

Age groups in the range of 40 to < 50 years, with secondary or more educational level, working, having a positive history of breast cancer among relatives were all significant positive predictors for the state of knowledge among the included women as revealed in the generated binary logistic regression model (Table 6). Residence, parity, marital status, and previous history of benign lesions were insignificant correlates to the level of knowledge.

Discussion

This first population-based study in Saudi Arabia aimed to assess the pattern of known risk factors and screening behavior towards breast cancer showed the level of awareness is low, and that both CBE and mammography as tools for early screening were underutilized and mainly

Table 5. Breast Cancer Risk Factors

Risk factors	Number	%	95% CI
Family history	263	20.0	17.9-22.2
Mother / sister	97	7.4	6.1-8.9
Grandmother/ aunt	131	10.0	8.5-11.7
Others	35	2.6	1.9-3.7
Age at menarche			
≤ 12 years	341	25.9	23.6-28.4
12- 13 years	617	47.0	44.2-49.6
> 13 years	264	18.7	18.0-22.3
Not sure	111	8.4	7.1-10.1
History of benign breast lesions			
Yes (total)	96	7.3	6.0-8.8
Previous breast biopsies	80	83.3	-
Aspiration	47	49.0	-
Once with surgery	28	29.2	-
Twice with surgery	5	5.2	-
Age at 1st childbirth			
Nulliparous	119	10.3	7.7-12.2
≤ 30 years	959	83.0	80.8-85.1
> 30 years	77	6.7	5.4-8.3
Age at menopause			
Still menstruating	1,005	76.4	74.1-78.6
≥ 50 years	33	2.5	1.8-3.5
< 50 years	108	8.2	6.8-9.8
Not sure	169	12.9	11.2-14.8

CI, Confidence Intervals

used for the sake of diagnosis and /or follow up of an existing lesions.

Our results are consistent with those of a Turkish study (Dundar et al., 2006), in which 23.4% of the participants had no knowledge about breast cancer, 89.3% never had mammography and 75% never had CBE, and 27.9% of women stated no previous knowledge of mammography, only 5.1% having a mammogram over a two year period. The pattern of utilization of CBE mammography was low as compared to other studies in developing countries for example, in Malaysia (Parsa et al., 2008), 25% of women had a CBE, while in Turkey (Dundar et al., 2006), it was 18.4%. In Vietnam (Ho et al., 2005) it was reported that the annual CBE was reported in 45% among educated women, while in U.S, 59% of educated Asian immigrants performed CBE annually (Wu and Yu, 2003). The situation is different in developed countries where 61.6% of respondents had screening mammograms every two years, and this practice was positively associated with age and 29.1% of the respondents identified mammography as the best way for breast cancer screening with more knowledge among older women (Villanueva et al., 2008). In contrast to our results were mammography as a tool for screening was lower compared to figures obtained in both developing and developed countries (Blackman et al., 1999; Leslie et al., 2003; Parsa et al., 2008; Villanueva et al., 2008).

Logistic regression model revealed factors that might affect the level of knowledge; positive family history of breast cancer, educational level, working status and exposure to CBE as a proxy to receiving information about breast cancer, consistent with results obtained in another study carried out in Riyadh (Alam, 2006), in which there was a significant association between demographic

Table 6. Logistic Regression Analysis Model of the Socio-demographic Correlates of Breast Cancer Knowledge

Correlates		Knowledge level (univariate analysis)			Logistic regression model			
		Low (<7.0)	High (≥7.0)	Odds Ratio (95%CI)	Coefficient	Odds Ratio (95%CI)		P value
Age group	< 30 years	229	107	Reference		Reference		
	30-40 years	297	207	1.04 (0.83-1.32)	0.098	1.23	0.71-2.12	0.72
	40-50 years	173	194	2.02 (1.57-2.60)**	0.591	1.88	1.13-3.14	0.02*
	≥ 50 years	84	25	0.41 (0.25-0.60)**	-0.130	0.67	0.52-0.85	0.04*
Residence	Rural	319	208	Reference				
	Urban	465	324	1.07 (0.85-1.34)	-	-	-	-
Family history	No	675	377	Reference				
	Yes	108	155	2.57 (1.93-3.42)**	0.431	1.59	1.17-2.16	0.001**
Positive history of benign breast lesion								
	No	732	487	Reference				
	Yes	51	45	1.33 (0.86-2.05)	-	-	-	-
Education	< Secondary	450	245	Reference				
	≥ Secondary	333	287	1.48 (1.18-1.86)**	0.526	1.77	1.36-2.31	0.001**
Occupation	Non working	621	345	Reference				
	Working	162	187	2.08 (1.61-2.68)**	0.147	1.81	1.40-2.34	0.01*
Parity:	<4 children	396	258	Reference				
	4 or more	387	274	1.09 (0.87-1.36)	-	-	-	-
Marital status	Married	650	438	Reference				
	Others	133	88	0.97 (0.71-1.31)	-	-	-	-
Previous CBE	No	676	438	Reference				
	Yes	107	95	1.37 (1.01-1.88)*	-	-	-	-

*,** Statistically significant at 0.05, 0.001; CI= Confidence Intrvals; % predicted = 76.2, constant= -0.947, Chi-square = 387.2.

characteristic and knowledge towards breast cancer, the previous study possessed a methodological limitation in recruiting their sample from well educated and middle social class strata.

Milaat (2000) found that students with a history of breast problems who had a mammograms and a family history of breast mass showed significantly higher knowledge and women who attained <secondary educational level had less knowledge and practice. An Egyptian study reported that only 10.6% and 11.5% of their participants had satisfactory knowledge about breast cancer among academic women, from this and previous studies (Yanni, 2000; Alam, 2006), we can conclude that the level of knowledge about breast cancer and its reflection upon the screening behavior is universally poor in our region compared to most developed and many developing countries. An additional point is that the knowledge scores among study's participants seemed to be influenced by the way they had learnt about breast cancer, women were more knowledgeable if they underwent CBE by a health providers, a finding which is consistent with other study (Leslie et al., 2003). Lack of knowledge may increase the risk of under recognition of the disease in its early stage with subsequent late manifestation and devastating outcome (Horn et al., 2002). A Canadian survey yielded results which showed that physicians had great influence on mammography screening of patients. Having mammography at recommended intervals and CBE yearly was significantly associated with having a physician recommend the procedures. Rates of screening differed sharply by whether a family physician was physically practicing in the community or not (Tatemichi et al., 2002).

Studies found in literature have common barriers to the present findings, such as: fear of diagnosis, tests as unnecessary, lack of cooperation, and social and cultural beliefs, lack of knowledge (Lewis et al., 2002; Garbers et al 2003). Some other studies indicated logistics or costs and pain to the patients, geographic area, education level, and health status, infrequent clinical breast examinations as part of regular care, unavailability of mammography services, and lack of time for patients from their jobs are some of the barriers for recommending mammography and screening (George, 2000; Lewis et al., 2002). Costs and unavailability of mammography are the main barriers in other countries including the U.S, which is not present in case of Saudi Arabia since mammography is usually given free to Saudi citizens or is part of the patient's insurance coverage.

Leslie et al (2003) in their reporting of breast cancer risk factors, found that out of the 185 women included; 100 women reported that they had relatives with breast cancer and 32/100 had more than one relative with the disease . Age at menarche was greater than 12 years for 70% of the sample compared to 65.7% in our study and 67% had their first pregnancy by the age of 30 compared to 83% in ours and 59% of them had at least one mammogram in their life time.

Differences in prevalence of exposure to lifestyle and genetic risk factors among women from different countries in the Middle East are probably responsible for the variability in breast cancer incidence seen between countries in this area (Bernstein et al 2003; Chlebowski et al 2005). Time trends in the prevalence of these risk factors can be directly correlated with time trends in breast cancer incidence. Delay in time of first pregnancy, decrease in number of children and non breastfeeding, increase in use of external hormones, and a move toward high-calorie Western diets are all responsible for the current trends in breast cancer incidence in the developed as well as the developing countries in the Middle East. Comparison of the prevalence and distribution of breast

cancer risk factors is difficult as they may show great variation in relation to other differentials peculiar to different communities in the region (Parkin et al., 2002).

There is no National screening program for breast cancer in Saudi Arabia (Alam, 2006), coupled with the fact that health education programs are dedicated to those who attend secondary schools and higher education, diversity of medical workforce with language and trust barriers between women and providers, and traditions of conservative nature which halt women from consulting providers regarding this sensitive issues may all responsible for the knowledge deficits and poor screening behavior among our population.

Included women irrespective of their educational status have knowledge deficits regarding breast cancer risk factors and recommended breast cancer screening. Several barriers are operating for such knowledge and screening behavior including traditions and health care providers.

To conclude, we can make recommendations. Culturally sensitive health education messages should be tailored to fulfill knowledge gap among all population strata. Intensive educational campaigns to tackle the observed knowledge deficits should be planned in order to raise awareness towards breast cancer with emphasis on role of prevention and guidelines for screening through clinical breast examination and mammography. Practitioners must continue to remind and update women about breast disease, and women's cancer-screening practices must be reinforced.

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