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Impact of breast cancer awareness month on detection of breast cancer in a private hospital

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Abstract

Objective: Breast cancer awareness month increases public awareness in association with increased rates of screening and new diagnoses. This study aimed to evaluate the effect of breast cancer awareness month on primary diagnosis of breast cancer.

Methods: Asymptomatic women with the intention of breast cancer screening were included. The non-BCAM (Breast cancer awareness month) group were screened from February to September 2016 and the BCAM group during October 2016. Ultrasound and mammography were performed in all women and in those aged ≥ 40 years, respectively. A BIRADS (Breast Imaging Reporting And Data Systems) score of ≥ 4 and solid palpable masses without features suggestive of malignancy and/or the physician's preference were regarded as indications for histopathological analysis. Requirement for histopathological analysis and detection of breast cancer were identified as the main variables.

Results: There were 198 women with a mean age of 49.3 ± 9.5 years. Sixty-nine and 129 women were in the non-BCAM and BCAM groups, respectively. Percutaneous biopsy was performed in seven (10.1%) and three patients (2.3%) in the non-BCAM and BCAM groups, respectively ($P = 0.035$). Pathological examinations were benign.

Conclusion: Although public awareness campaigns lead to increased rates of screening, they may lose their impact on detecting breast cancer because of widespread use of routine screening programs.

Keywords

Breast cancer, cancer screening

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Introduction

Breast cancer awareness month (BCAM), which is in October, has been recognized to increase public awareness of breast cancer.[1,2] The primary goal of BCAM is to encourage regular breast self-examinations and screening for early diagnosis of breast cancer at an early stage.[3,4] There is also a close association of BCAM with an increased rate of breast cancer screening as shown by increased mammography (MG) rates. This is most probably due to recognition of the third Friday in each October as ''national mammography day''.[2,4,5] Additionally, there have been sharp peaks in web-based searching for the terms ''breast cancer'' and ''mammography'' or use of several social media platforms during October in most years in the last decades.[3,4,6]

In Turkey, a national BCAM has been recognized since 2004. Several public programs, including public educational lectures and scheduled numerous events (i.e., walks, sporting events, wear pink days, and screening campaigns) have been performed to promote breast cancer awareness.[4] There have also been several population-based screening programs throughout the year for asymptomatic women aged between 40 and 69 years for 10 years biannually.[7] Additionally, promotional campaigns of breast cancer screening have been performed by private practice medical institutions, especially in October, in the last several years. All of these efforts are thought to have resulted in better prevention, screening, detection of early cancer, knowledge, and understanding of treatment options.[3,8]

This study aimed to evaluate the effect of BCAM on primary diagnosis of breast cancer or the number of interventions necessary after the results of screening techniques in a private hospital that performed a promotional breast cancer screening program.

Patients and methods

This retrospective study was performed in a private hospital located at Fatih area of Istanbul, Turkey. Institutional review board approval was obtained (Medical Park Fatih Hospital, Istanbul, Turkey; approval number: 2016/8). Informed consent or could not be obtained from all participants for being included in this retrospective study. All of the procedures were in accordance with the World Medical Association Helsinki Declaration of 1964 and later versions.

The participants were identified retrospectively from hospital and radiology information systems that are used in the hospital. Asymptomatic women who visited the hospital with the intention of breast cancer screening were included between February 2016 and October 2016. Women with the complaint of a palpable mass, women aged younger than 35 years and older than 75 years, pregnant women, and women with a previous diagnosis of breast cancer were not included. During October 2016, the hospital performed a promotional campaign for breast cancer screening due to BCAM.

After the physical examination, which was performed by one surgeon, ultrasound (US) and/or MG was requested. Regardless of the results of the physical examination, US and MG were performed in all of the women and in those who were aged 40 or older, respectively.

Bilateral whole-breast US examinations were performed for breast cancer screening in all participants by one radiologist who has 15 years of experience in breast US. High-resolution units with 7–13 MHz or linear-array transducers (Logiq P6; GE Healthcare, USA) were used.

Full-field conventional MG was used (Senographe Essential DMR; GE Healthcare, USA). Bilateral mammograms were obtained, including mediolateral oblique and craniocaudal projections, in all

screening examinations. All mammograms were read by a radiologist with 10 years of experience. All examinations (US and MG) were assessed in accordance with the American College of Radiology Breast Imaging Reporting and Data System (BIRADS).[9,10] Histopathological confirmation was performed at the discretion of either the radiologists or the surgeon. A BIRADS score of ≥ 4 was regarded as an absolute indication for histopathological analysis. Additionally, non-cystic solid palpable masses without features suggestive of malignancy were also biopsied in accordance with the patient's and/or physician's preference.[11] For this purpose, US-guided core needle biopsy using a 16-gauge semi-automated core biopsy needle (Ultra Automatic Biopsy Instrument, ProMag™; Angiotech-PBN MEDICALS, Denmark) was performed. Pathological results were regarded as the final diagnosis.

The participants were categorized into two groups as follows. The non-BCAM group included participants who attended breast cancer screening from February 2016 to September 2016. The BCAM group included participants who attended breast cancer screening during BCAM (October 2016).

The age of the participants, a family history of breast cancer, detection of a palpable mass during a physical examination, BIRADS category of lesions detected at US and MG, requirement for a histopathological examination, and the final pathological diagnosis were retrospectively recorded.

Statistical analysis

Requirement for histopathological analysis and development of breast cancer were identified as the main variables. Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 22.0 (IBM Corp., Armonk, NY, USA). Normally distributed variables were assessed by the Kolmogorov–Smirnov test and histograms. Normally-distributed continuous variables are expressed as mean ± standard deviation, and median and interquartile range were used for non-normally-distributed continuous variables. Categorical variables are expressed as frequencies and percentages. Characteristics of the groups were compared using the t-test for normally distributed continuous variables and the Mann–Whitney U test for continuous variables without a normal distribution. Fisher's exact and Pearson chi-square tests were used to compare categorical variables. Statistical results are shown at the 95% confidence interval. Differences were considered statistically significant if the P value was less than 0.05.

Results

A total of 198 women with a mean age of 49.3 ± 9.5 years were enrolled in the study. There were 69 women in the non-BCAM group and 129 in the BCAM group. The age of the participants in the BCAM group was slightly higher than that of those in the non-BCAM group (50.3 ± 9.4 years vs 47.4 ± 9.5 years, $P = 0.04$). The groups were similar regarding the presence of a family history of breast cancer ($P = 0.650$).

During physical examinations, the detection rate of a palpable mass was significantly higher in the non-BCAM group than in the BCAM group ($P = 0.016$). In 7.2% of the participants in the non-BCAM group (5/69), a palpable mass was detected by the surgeon compared with 1.6% (2/129) of the participants in the BCAM group.

Imaging findings based on the BIRADS category are shown in Table 1. US and MG were performed in 198 and 162 participants, respectively. There was no BIRADS category 5 according to US and MG examinations.

US evaluation showed that BIRADS category 2 was the most common category for both groups (60.9% and 67.4% for

Table 1. Imaging results of the participants.

Technique	BIRADS category	Non-BCAM group (n = 69), n (%)	BCAM group (n = 129), n (%)	p
US (n = 198)	1	15 (21.7)	37 (28.7)	0.010
	2	42 (60.9)	87 (67.4)	
	3	11 (15.9)	4 (3.1)	
	4	1 (1.5)	1 (0.8)	
Mammography (n = 162)	0	2 (3.9)	8 (7.2)	0.022
	1	12 (23.5)	50 (45)	
	2	35 (68.6)	52 (46.8)	
	3	2 (4.0)	1 (0.9)	

non-BCAM and BCAM groups, respectively). With regard to MG evaluation, although BIRADS category 2 was the most common category (68.6%) in the non-BCAM group, BIRADS categories 1 and 2 had an almost equal distribution in the BCAM group (45% and 46.8% for category 1 and 2, respectively) (Table 1).

US-guided core needle biopsy was performed in seven (10.1%) and three patients (2.3%) in the non-BCAM and BCAM groups, respectively. There was a significant difference in the rate of performing a histopathological examination between the groups i.e. higher rate in non-BCAM group compared with BCAM group ($P = 0.035$). BIRADS category 4 on US, a palpable solid mass on US with BIRADS category 3, and the participants' preference were indications for a histopathological examination in one, four, and two patients in the non-BCAM group, respectively. In the BCAM group, BIRADS category 4 on US and a palpable solid mass on US with BIRADS category 3 were the indications for a histopathological examination in one and two patients, respectively. All of the pathological results were reported as benign.

Discussion

Our study showed that an increased performance of breast screening due to the effect of BCAM had no effect on detecting breast cancer or borderline lesions in breast tissue. Based on the results of a physical examination and screening with US and MG in the BCAM group, the beneficial effect of screening campaigns by public or private institutions is questionable.

During BCAM, there are many activities by voluntary organizations, governmental agencies, and private corporations with regard to the promotional effect of awareness of breast cancer.[1] With these activities, educational materials on the importance of breast cancer screening can be disseminated. In the USA, besides governmental agencies, private institutions also offered free or a reduced cost of mammograms to women scheduled in October of last year, as in the present study. As a result, an increased rate of screening by MG has been reached.

Examining the possible association between awareness campaigns and new diagnoses of breast cancer is important.[1,12] In the presence of increased screening rates, if increased diagnoses are not present, there should be a clear explanation for a lack of this association. One explanation for a lack of an association is that participants who respond to awareness campaigns are at average risk, and even at low risk.[1,13] In the present study, the risk status of participants was not investigated, except for their family history of breast cancer. In our study,

both groups were similar regarding the presence of a family history of breast cancer. However, prospective studies need to be performed to examine this association.

Generally, limited breast cancer awareness at the level of general public status can result in delayed presentation.[3] BCAM is a good example of how to increase public awareness of breast cancer, and has been used for the last several decades. An increased rate of screening by MG occurs during October each year. Additionally, BCAM is expected to result in an increased rate of detection of in situ and local breast tumors.[1,3] However, the BCAM effect may not be so obvious because of widespread routine screening driven by breast cancer advocacy movements after the mid-1990s, as in the present study.[1,4] In Jacobsen's study, although there was a general upward trend in the rate of diagnoses of breast cancer from 1974 to 2000, the number of diagnoses remained approximately steady from 2000 to 2005.[1] Total awareness may cause loss of the impact of BCAM on breast cancer diagnoses and women become less responsive to further awareness of any type, such as BCAM. Although it is impossible to gather data with regard to the development of interval breast cancer in these participants or to evaluate the accuracy of the imaging techniques for breast cancer with comparable studies, it could not be possible to detect any breast cancer in both groups of this study.

The starting age for breast cancer screening differs in Eastern and Western countries. Although breast screening guidelines usually recommend screening by MG from 40 years old, Chinese studies performed these screening programs for patients older than 30 years.[14–17] Although clinical breast examinations every 1 to 3 years with breast awareness are recommended for women aged between 25 to 40 years of age as an average risk screening approach, participants older than 35 years of age were included in the present study.[18] The effect of different age groups needs to be clarified by future, large, prospective studies.

Supplemental screening of the breast by US in conjunction with MG has increased the rate of detection of cancer, as well as increased false-positive biopsy rates.[13,19] Advances in US image quality may help physicians make a more accurate diagnosis. However, little validation of the current BIRADS lexicon for US may lead to indeterminate conclusions, such as a follow-up or biopsy, especially for non-mass lesions. Additionally, use of US for characterization of breast lesions may cause some confusing issues in determining the following diagnostic steps.[11] BIRADS category 3 during US has been reported as the most common category in previous studies. [13] This finding is in contrast to the present study in which BIRADS category 2 was the most common category in US. In suspicious cases in which US evaluation is contradictory to the state requirement of an interventional procedure, physicians usually prefer to perform a histopathological examination. Raza's study showed that 14% of cases were biopsied based on imaging features of lesions, even if they were BIRADS category 3.[11] In the present study, all palpable solid BIRADS category 3 lesions were biopsied because of a preference of the participant or physicians. This approach may lead to false-positive biopsy results and incur financial and psychological costs. Although a diagnostic biopsy was chosen for every palpable and solid lesion with BIRADS category 3, this caused false-positive results in seven and three women in the non-BCAM and BCAM groups, respectively. Performing an interval US with a different examiner for these suspicious cases might lead to more accurate evaluation with greater accuracy. However, because of the retrospective nature of this study, such an evaluation could not be performed. US is operator-dependent and there is less validation of the US lexicon compared

with that of MG. Therefore, in suspected cases for requirement of an interventional diagnostic procedure, a close follow-up US evaluation with a different examiner should be considered. Consequently, the decision to perform a biopsy should not be performed solely by US in evaluation of a palpable solid lesion.[11] In accordance with Raza's conclusion, a short-term follow-up is an appropriate approach for patients with palpable solid lesions if characteristic findings of US are benign.[11]

This study has some limitations, the main one being the retrospective nature of the study. A small number of participants in both groups and a lack of data preventing risk group analysis for breast cancer were other limitations.

Conclusion

Because of widespread use of routine screening programs, public awareness campaigns may lose their impact on detecting breast cancer. However, such awareness campaigns still lead to increased rates of screening with MG and/or US. Therefore, the beneficial effect of screening campaigns by public or private institutions is controversial.

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Declaration of conflicting interest

The Authors declare that there is no conflict of interest.

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