

RESEARCH ARTICLE

Factors that Influence Awareness of Breast Cancer Screening among Arab Women in Qatar: Results from a Cross Sectional Survey

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Abstract

Background: Breast cancer is the most common cancer among women in the State of Qatar. Due to low participation in breast cancer screening (BCS) activities, women in Qatar are often diagnosed with breast cancer at advanced stages of the disease. Findings indicate that low participation rates in BCS activities are significantly related to women's low level of awareness of breast cancer screening. The objectives of this study were to: (1) determine the factors that influence Qatari women's awareness of breast cancer and its screening activities; and (2) to find ways to effectively promote breast cancer screening activities among Arabic speaking women in Qatar. **Materials and Methods:** A multicenter, cross-sectional quantitative survey of 1,063 (87.5% response rate) female Qatari citizens and non-Qatari Arabic-speaking residents, 35 years of age or older, was conducted in Qatar from March 2011 to July 2011. Outcome measures included participant awareness levels of the most recent national recommended guidelines of BCS, participation rates in BCS activities, and factors related to awareness of BCS activities. **Results:** While most participants (90.7%) were aware of breast cancer, less than half had awareness of BCS practices (28.9% were aware of breast self-examination and 41.8% of clinical breast exams, while 26.4% knew that mammography was recommended by national screening guidelines. Only 7.6% had knowledge of all three BCS activities). Regarding BCS practice, less than one-third practiced BCS appropriately (13.9% of participants performed breast self-examination (BSE) monthly, 31.3% had a clinical breast exam (CBE) once a year or once every two years, and 26.9% of women 40 years of age or older had a mammogram once every year or two years). Awareness of BCS was significantly related to BCS practice, education level, and receipt of information about breast cancer and/or BCS from a variety of sources, particularly doctors and the media. **Conclusions:** The low levels of participation rates in BCS among Arab women in this study indicate a strong need to increase awareness of the importance of breast cancer screening in Qatari women. Without this awareness, compliance with the most recent breast cancer screening recommendations in Qatar will remain low. An increased effort to implement mass media and public health campaigns regarding the impact of breast cancer on women's health and the benefits of early detection of breast cancer must be coupled with an enhanced participation of health care providers in delivering this message to Qatar population.

Keywords: Breast cancer - Arab women - screening - factors influencing awareness

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Introduction

Knowledge of breast health and the benefits of breast cancer screening are important in facilitating breast cancer screening behavior (Bener et al., 2002; Soskolne et al., 2007). Early detection of breast cancer through regular screening activities such as breast self examination (BSE), clinical breast examination (CBE), mammography, improvement of the quality of the screening activities, and enhanced treatment have been found to decrease mortality

rates by 25-30% (Tabar et al., 2000; Jemal et al., 2011; Ravert and Huffaker, 2010).

Breast cancer incidence rates in Middle Eastern countries are increasing, Arab women are being diagnosed with breast cancer at younger ages, and cancer is being diagnosed at more developed stages (El Saghier et al., 2007; Tarabeia et al., 2007; Jemal et al., 2011). Low or inadequate levels of knowledge of breast cancer screening have been reported in studies conducted in Middle Eastern countries (Milaat, 2000; Rashidi and Rajaram, 2000;

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Alam, 2006; Dandash and Al-Mohaimeed, 2007; Soskolne et al., 2007; Montazeri, et al., 2008; Amin et al., 2009; Ahmed, 2010; Azaiza et al., 2010). Studies indicate that doctors often do not offer BCS services to women. Other health care providers (HCP) might not have adequate knowledge of BCS and risk factors related to breast cancer in the Middle East, thus limiting their ability to encourage patients to engage in BCS activities (Bener et al., 2001; Haji-Mahmoodi, 2002; Madanat and Merrill, 2002; Dow Meneses and Yarbrow, 2007; Alkhasawneh et al., 2009; Jaradeen, 2010; El Hajj and Hamid, 2011). Previous studies in the region indicate low participation rates in breast cancer screening activities among women (Bener et al., 2001; Bener et al., 2002; Azaiza and Cohen, 2008; Bener et al., 2009). Accurate and varied sources of information about breast health and BCS from health care providers (especially physicians), mass media, and social networks can positively influence women’s knowledge and practice of BCS (Al-Qattan, et al., 2007; Dandash and Al-Mohaimeed, 2007; Montazeri, et al., 2008; Hoffman et al., 2010). Facilitators of BCS behavior include having support from male relatives, receiving information about breast cancer or BCS from health care professionals (HCP) other than doctors, and having a doctor’s recommendation (Haji-Mahmoodi, 2002; Madanat and Merrill, 2002; Cohen and Azaiza, 2005; Azaiza and Cohen, 2006; Shirazi et al., 2006; Dandash and Al-Mohaimeed, 2007; Dow Meneses and Yarbrow, 2007; El Saghir et al., 2007; Alkhasawneh et al., 2009; Gürsoy et al., 2009; Jaradeen, 2010; El Hajj and Hamid, 2011).

The International Agency for Cancer Research and GLOBOCAN 2008 indicate that Qatar has the third highest incidence and mortality rates in the Gulf Cooperation Council (GCC) (IARC, 2008; Al-Hamdan et al., 2009) (Figure 1). It is important to note that while breast cancer incidence rates are lower in Middle Eastern countries than in North America and European countries, mortality rates are disproportionately higher in Middle East. Although a population based national breast cancer screening program is being developed in Qatar, screening for breast cancer is presently opportunistic. Breast cancer screening recommendations are also currently being revised in Qatar; previously, monthly BSE and yearly CBE

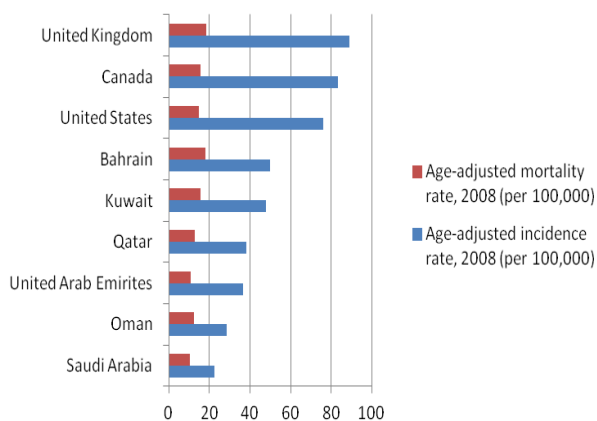


Figure 1. Age-Adjusted Breast Cancer Incidence and Mortality Rates of Selected Countries. Data are from Globocan 2008

for women 35+ years, and mammography every two years for women aged 40-69 years was recommended, unless otherwise indicated by physicians (Donnelly et al., 2012).

Knowledge of breast cancer and breast screening activities can increase women’s participation in BCS activities. The factors that influence Arab women’s awareness of breast cancer prevalence and the benefits of early diagnosis are as yet undetermined (Azaiza and Cohen, 2008; Akhtar et al., 2010; Baron-Epel, 2010). Knowledge of these factors will enable the development of effective intervention programs that will promote BCS and increase screening activities.

The goal of this study is to develop, implement, and sustain a culturally-appropriate intervention program aimed at raising awareness of breast cancer and increasing women’s participation in breast cancer screening activities. The ultimate goal is to reduce the morbidity and mortality due to breast cancer in women living in Qatar. The Multiple Intervention Program (MIP) (Edwards et al., 2004) is a three-phase research program developed to (1) understand breast health issues as experienced by Arab women living in the State of Qatar (Phase I); (2) identify and implement strategies that will motivate women to participate in breast cancer screening activities (Phase II); (3) evaluate, facilitate, and sustain Arab women’s participation in breast cancer screening activities (Phase III) (Donnelly et al., 2012). The MIP in Qatar is currently in Phase I. This paper reports factors that influence Arab women’s awareness of breast cancer screening (BCS) activities in Qatar.

Materials and Methods

Ethics approval was obtained from the Hamad Medical Corporation Research Committee (Ethics Approval Reference No: RC/1744/2010), the Qatar Supreme Council of Health (Ethics Assurance No: SCH-A-UCQ-050), and the University of Calgary’s Conjoint Health Research Ethics Board (Ethics ID: E-23551). The study was conducted by interviewing participants individually. Interviews followed a structured questionnaire. Consent to participate in the study was obtained from each participant. Prior to conducting an interview, the study was explained to each participant and her rights according to the standard interview guideline were made known to her. Participants were assured that all information would remain confidential and that interview questionnaires would be stripped of identifying information to preserve confidentiality.

Study population

To ensure that information gathered reflected the experiences of women living in various areas in Qatar, participants were recruited from and were interviewed in urban hospital settings and community health clinics in the capital of Qatar (Doha) and semiurban areas south and north of Qatar. Based on Qatar 2010 census data (Qatar Census, 2010), the study’s sample size was calculated using a 95 percent confidence level and Cochran’s formula for sample size (Cochran, 1977).

Participants were invited to be included in the study

if they were 35 years of age or older (as previously recommended by Qatar guidelines for BSE and CBE), had the ability to speak Arabic, were recruited from one of seven designated health centers in Qatar, and had maintained residence in Qatar for at least 10 years. Using a nonprobability convenient sampling technique, 1,215 self-identified Arab women who met the study's inclusion criteria were invited to participate in the survey; 1,063 women (40% more than the required sample size calculation using margin of error of 3.5%) participated in a 30-minute face-to-face interview (87.5% response rate).

Questionnaire and data collection method

Data were obtained from interviews of participants that used a structured survey questionnaire. Interviews were conducted in Arabic by seven female nurses fluent in English and Arabic and trained by the lead author (TD). Survey questionnaire items were obtained from peer-reviewed surveys on breast cancer research in the U.S. and Australia with permission from the authors (TD and others); after field-testing in Qatar, the questions were refined to satisfy regional and situational requirements and incorporated in the survey questionnaire (McPhee et al., 1997; Cheek et al., 1999; MCPhee and Nguyen, 2000; MCPhee et al., 2002; Donnelly, 2004; Donnelly, 2006; Donnelly, et al., 2009).

Awareness and practice of BCS were defined by the most promulgated recent recommendations. For example, participants were assessed with mammogram awareness if they knew the age at which women should begin having mammograms (40-50 years old) and how often women should have them (every 1-2 years). Participants were assessed with having practiced BCS appropriately if they performed BSE monthly, or had undergone a CBE within the past two years. If they were 40 years or older, they were assessed with having practiced BCS appropriately if they had undergone a mammogram within the past two years (Donnelly et al., 2012). Forward- and back-translations of the survey questions into Arabic and English were carried out to ensure lexical equivalence.

Statistical analysis

Descriptive statistics (mean, standard deviations for interval variables, frequency with percentages for categorical variables) were performed. To determine associations between categorical dependent variables and categorical predictors, Chi-Square tests were performed. Multicollinearity for all covariates significant at bivariate analyses was tested before using them in the multivariate logistic regression analyses. Simultaneous multivariate logistic regression analyses using the "Enter" method was used to further assess the association of preselected factors related to sociodemographics, health care, and health care providers, and sources of information about BCS with binary dependent variables (e.g., awareness of clinical breast examination, awareness of breast self examination, awareness of mammogram). Statistical significance levels were established at $\alpha=0.05$. Data analyses were conducted with SPSS version 20.

Results

Demographic characteristics of participants

Participants were 35-82 years of age ($M=44.9$, $SD=8.4$, $n=1061$). The majority of participants were married, Muslims, had children, and resided in urban areas. Approximately one third of the participants were university-educated, had husbands who were university-educated, and were employed.

By nationality, 52.1% of the participants were Qatari citizens and 47.9% were non-Qatari residents from the greater Middle Eastern region. Non-Qatari participants were citizens of other Arab peninsular/GCC countries (Saudi Arabia, UAE, Kuwait, Oman, Bahrain, Yemen), Levant countries (Syria, Lebanon, Palestine, Jordan), North African countries (Egypt, Libya, Tunisia, Algeria, Morocco), or other countries (Sudan, Iraq, Iran, Somalia, Mauritania, Pakistan). Two thirds of the participants had lived in Qatar for 30 or more years.

Regarding the health care experiences of participants, approximately one third of the participants had exclusively female doctors, while less than 10% had exclusively male doctors. Approximately one quarter of the participants reported their doctors talked to them about breast cancer; two thirds stated that their doctor's message was understandable. The majority of the participants would want to know if they have been diagnosed with cancer and would make an appointment for a mammogram if their doctor recommended it. Over half of the participants stated that they would make an appointment if they received a letter from their HCP recommending a mammogram.

Table 1 summarizes BCS awareness and participation levels. While the majority (90.7%) of participants were aware of breast cancer, less than one half had awareness of Qatar present BCS recommendations for BSE (28.9%), CBE (41.8%), or mammography (26.4%). Less than half of the participants knew the age at which it is recommended to begin mammogram screenings or how often to have a mammogram. Only 7.6% of the participants were assessed with having basic knowledge of all three breast cancer screening activities. Less than one third of the participants practiced BCS according to the guidelines recommended

Table 1. Awareness, Basic Knowledge, and Practice of Breast Cancer Screening (N=1063)

Assessment variable	Yes n (%)	No n (%)
Awareness of breast cancer*	964 (90.7)	98 (9.2)
Awareness of breast cancer screening		
Awareness of BSE	307 (28.9)	756 (71.1)
Awareness of CBE	444 (41.8)	619 (58.2)
Awareness of mammography	281 (26.4)	782 (73.6)
Basic knowledge of breast cancer screening	81 (7.6)	982 (92.4)
Practice of breast cancer screening as recommended by recent guidelines in Qatar**		
BSE Practice	148 (13.9)	915 (86.1)
CBE Practice	333 (31.3)	730 (68.7)
Mammogram practice	187 (26.9)	508 (73.1)
(≥40 years old only; n=696)*		

*participant did not answer enough questions to qualify for this variable;

**Although breast cancer screening guidelines are currently being revised to reflect Qatar's health context and to meet the need of cancer care for women, the most recent guidelines were used for this study and indicate monthly BSE; CBE for women aged ≥35 within the last 1-2 years; mammogram for women aged ≥40 within the last 1-2 years

by Qatar Breast Cancer Screening program. Over half of the participants interviewed reported that they had never participated in any BCS activities.

Tables 2 and 3 present univariate and chi-squared analyses of dependent factors (BCS awareness) and selected independent variables (demographic and health care experience characteristics).

Higher education levels (participant or husband) were significantly related to having awareness CBE or mammography. This was also true for participants who were married to husbands with higher education levels. In addition, participants with CBE awareness were significantly more likely to be between the ages of 40-49

years and married. Those with mammogram awareness were significantly more likely to be non-Qatari residents, live in urban areas, and be employed (Table 2).

Participants who reported that their doctor had talked to them about breast cancer were significantly more likely to have CBE or mammogram awareness. Those who understood their doctor's message about breast cancer were more likely to have CBE awareness. The gender of the participant's doctor was not significantly related to BCS awareness.

Participants who received information about BCS from any of four main categories (media, family/friends, doctors, other health care providers) were significantly

Table 2. Univariate Analysis of Selected Factors Related to Awareness of Breast Cancer Screening

Variables	CBE Awareness			Mammogram Awareness		
	Yes n (%)	No n (%)	P-value	Yes n (%)	No n (%)	P-value
Age						
35-39 years	113 (31.0)	252 (69.0)	$\chi^2(2, N=1061) = 29.35, p<0.001$	107 (29.3)	258 (70.7)	$\chi^2(2, N=1061) = 5.37, p=0.068$
40-49 years	200 (50.1)	199 (49.9)		109 (27.3)	290 (72.7)	
50+ years	129 (43.4)	168 (56.6)		64 (21.5)	233 (78.5)	
Nationality of Participants						
Qatari citizen	223 (40.3)	331 (59.7)	$\chi^2(1, N=1063) = 1.09, p=0.296$	130 (23.5)	424 (76.5)	$\chi^2(1, N=1063) = 5.24, p=0.022$
Non-Qatari resident	221 (43.4)	288 (56.6)		151 (29.7)	358 (70.3)	
Marital Status						
Single	63 (28.1)	161 (71.9)	$\chi^2(1, N=1063) = 21.72, p<0.001$	49 (21.9)	175 (78.1)	$\chi^2(1, N=1063) = 3.03, p=0.082$
Married	381 (45.4)	458 (54.6)		232 (27.7)	607 (72.3)	
Living Area						
Urban	386 (40.9)	557 (59.1)	$\chi^2(1, N=1063) = 2.40, p=0.122$	264 (28.0)	679 (72.0)	$\chi^2(1, N=1063) = 10.47, p=0.001$
Semi-urban	58 (48.3)	62 (51.7)		17 (14.2)	103 (85.8)	
Education Level of Participant						
≤Primary/Intermediate school	126 (35.1)	233 (64.9)	$\chi^2(2, N=1063) = 13.34, p=0.001$	36 (11.1)	319 (88.9)	$\chi^2(2, N=1063) = 87.79, p<0.001$
Secondary/Trade school	146 (41.7)	204 (58.3)		79 (26.3)	258 (73.7)	
University	172 (48.6)	182 (51.4)		149 (42.1)	205 (57.9)	
Education Level of Husband						
≤Primary/Intermediate school	90 (32.6)	186 (67.4)	$\chi^2(2, N=896) = 21.37, p<0.001$	36 (13.0)	240 (87.0)	$\chi^2(2, N=896) = 43.09, p<0.001$
Secondary school	139 (47.6)	153 (52.4)		79 (27.1)	213 (72.9)	
University	165 (50.3)	163 (49.7)		120 (36.6)	208 (63.4)	
Employment Status - Participant						
Employed	158 (43.6)	204 (56.4)	$\chi^2(1, N=1063) = 0.800, p=0.372$	128 (35.4)	234 (64.6)	$\chi^2(1, N=1063) = 22.48, p<0.001$
Unemployed	286 (40.8)	415 (59.2)		153 (21.8)	548 (78.2)	

Table 3. Univariate Analysis of Selected Factors Related to Health Care Providers, Sources of BCS Information and Awareness of Breast Cancer Screening

Variables	CBE Awareness			Mammogram Awareness		
	Yes n (%)	No n (%)	P-value	Yes n (%)	No n (%)	P-value
Gender of participant's doctor(s)						
Male	51 (50.5)	50 (49.5)	$\chi^2(2, N=1056) = 3.83, p=0.147$	19 (18.8)	82 (81.2)	$\chi^2(2, N=1056) = 4.26, p=0.119$
Female	121 (39.4)	186 (60.6)		78 (25.4)	229 (74.6)	
Both male and female doctors	272 (42.0)	376 (58.0)		183 (28.2)	465 (71.8)	
Doctor has talked to participant about breast cancer						
Yes	201 (77.6)	58 (22.4)	$\chi^2(1, N=1063) = 180.82, p<0.001$	89 (34.4)	170 (65.6)	$\chi^2(1, N=1063) = 11.07, p=0.001$
No	243 (30.2)	561 (69.8)		192 (23.9)	612 (76.1)	
Participant understands doctor						
Yes	343 (48.6)	363 (51.4)	$\chi^2(1, N=1063) = 40.14, p<0.001$	198 (28.0)	508 (72.0)	$\chi^2(1, N=1063) = 2.81, p=0.094$
No	101 (28.3)	255 (71.7)		83 (23.2)	274 (76.8)	
Family member or friend						
Yes	321 (55.9)	253 (44.1)	$\chi^2(1, N=1063) = 102.8, p<0.001$	201 (35.0)	373 (65.0)	$\chi^2(1, N=1063) = 47.27, p<0.001$
No	123 (25.2)	366 (74.8)		80 (16.4)	409 (83.6)	
Media						
Yes	360 (54.1)	306 (45.9)	$\chi^2(1, N=1063) = 110.7, p<0.001$	235 (35.3)	431 (64.7)	$\chi^2(1, N=1063) = 71.83, p<0.001$
No	84 (21.2)	313 (78.8)		46 (11.6)	351 (88.4)	
Doctor						
Yes	400 (60.2)	264 (39.8)	$\chi^2(1, N=1063) = 248.2, p<0.001$	211 (31.8)	453 (68.2)	$\chi^2(1, N=1063) = 25.96, p<0.001$
No	44 (11.0)	355 (89.0)		70 (17.5)	329 (82.5)	
Other HCP						
Yes	285 (57.0)	215 (43.0)	$\chi^2(1, N=1063) = 90.05, p<0.001$	163 (32.6)	337 (67.4)	$\chi^2(1, N=1063) = 18.45, p<0.001$
No	159 (28.2)	404 (71.8)		118 (21.0)	445 (79.0)	

Table 4. Association between Selected Factors and Awareness of Breast Cancer Screening

	Adjusted OR (95% CI)	P value
Predictors of CBE Awareness		
Age (Wald $\chi^2(2)=21.53$)		<0.001*
35-39 years (reference)	1	
40-49 years	1.93 (1.34-2.76)	<0.001*
50+years	2.73 (1.74-4.28)	<0.001*
Marital Status		
Single (reference)	1	0.002*
Married	1.90 (1.26-2.86)	
Doctor has talked to participant about breast cancer		
No (reference)	1	
Yes	4.92 (3.39-7.13)	<0.001*
Doctor is understandable		
No (reference)	1	
Yes	1.63 (1.17-2.27)	0.004*
Source of information about BCS-Doctor		
No (reference)	1	
Yes	6.14 (3.97-9.48)	<0.001*
Source of information about BCS-Media		
No (reference)	1	
Yes	1.55 (1.03-2.32)	0.035*

Model summary		
-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1033.55	0.32	0.43

Predictors of Mammogram Awareness

Education of Participant (Wald $\chi^2(2)=38.27$)		<0.001*
≤Primary/intermediate school(reference)	1	
Secondary/Trade school	2.54 (1.62-3.99)	<0.001*
University	4.46 (2.77-7.17)	<0.001*
Source of information about BCS-Family or Friend		
No (reference)	1	
Yes	1.52 (1.03-2.24)	0.034*
Source of information about BCS-Media		
No (reference)	1	
Yes	2.39 (1.56-3.65)	<0.001*

Model summary		
-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1079.37	0.13	0.19

*Significant at alpha=0.05 level

more likely to have awareness of CBE or mammography. Of participants who had received BCS information, approximately two thirds had received BCS information from the media (62.7%) or their doctor (62.5%), while approximately half had received BCS information from a family member or friend (54%) or a HCP other than a doctor (47%) (Table 3).

Further bivariate analyses indicate that non-Qatari resident participants were significantly more likely than Qatari citizen participants to report that their doctors had talked to them about breast cancer, that they understood their doctor's message about breast cancer, and that they had received information about BCS from any source (all items were reported with $p \leq 0.05$).

Association between selected factors and awareness of clinical breast examination and mammograms

Table 4 summarizes multivariate logistic regression analyses results performed with selected independent factors that may be used as indicators to predict participant awareness of clinical breast examination and mammography.

CBE Awareness

CBE awareness was higher for married women 50 years or older, whose doctor had talked to them in a way they could understand about breast cancer and who had received BCS information from their doctor or the media than for participants who were younger than 50 years and unmarried. Participants who had received information about BCS from a doctor had more than six times the odds of having awareness of CBE (OR, 6.14; 95% CI, 3.97-9.48; $p < 0.001$) than those who did not.

Mammogram awareness

The odds of having mammogram awareness were higher for women who were university educated or who received information about BCS from a family member/friend or the media. Women with a university education had over four times the odds of having mammogram awareness than those with primary/secondary school or less (OR, 4.46; 95% CI, 2.77-7.17; $p < 0.001$).

Discussion

A previous study in Qatar indicated that women have "adequate" knowledge of breast cancer (Bener et al., 2009). The present study finds that women's levels of knowledge of the most recent national guidelines for breast cancer screening practices in Qatar is low. Approximately three quarters (73.6%) of the women interviewed were unaware of mammography, the guidelines recommended for this procedure, and 73.1% of the women 40 years of age or older had not had a mammogram within the past two years. Less than one half of the participants were aware of the most recent national guidelines for BCS, and less than one third of the participants had participated in BCS.

This study indicates that the strongest predictors for having BCS awareness were having a doctor who talked to patients about breast cancer and its screening, and a higher education level (secondary/trade school and up). Yet, two thirds of the women interviewed did not have a college degree and three quarters stated that their doctor had not talked to them about breast cancer. Having BCS awareness was also related to receiving information about BCS from HCPs other than doctors, such as nurses and health educators. Yet, the majority of women did not receive information about BCS from these health care providers. Thus, a multidisciplinary team approach that involves doctors, nurses, health educators, and pharmacists and includes regular discussions about breast cancer screening with patients would facilitate increased awareness and participation in BCS activities among women (Cohen and Azaiza, 2005; Alam, 2006; Al-Qattan et al., 2007; Dandash and Al-Mohaimed, 2007; Dow Meneses and Yarbrow, 2007; Montazeri et al., 2008; Ahmed, 2010; Al-

Hamdan and Mohamed, 2011; Ravichandran et al., 2011).

In addition to the education level of the participant, a higher education level of the husband was associated with participant awareness of BCS. To our knowledge, no other study has analyzed the effects of husband education levels with female BCS awareness in the Middle East. Given this finding and the important role relatives play in Arab women's lives, a husband's support for BCS might be an effective enabler (Petro-Nustas, 2001; El-Saghir, 2007). Thus, it is imperative to gain the support of Arab males in the promotion of BCS. Discussion of breast cancer and the benefits of early detection by male physicians with their male patients may encourage male support of BCS for their female relatives. Educational campaigns can improve patient motivation and physician initiative for early detection, and positively influence BCS practice. However, having awareness and knowledge of breast cancer and its screening may not be enough (Sadler et al., 2001; Yavari et al., 2006; El-Saghir, 2007; Hartman et al., 2009; Nasseri, 2009). Perceived risk of cancer and effectiveness of BCS have been found to influence screening behavior (Baron-Epel, 2010; Tavafian et al., 2009). Breast cancer is often asymptomatic in its early stages, making it difficult for women to appreciate the risk involved in a delayed cancer diagnosis and recognize the benefits of BCS. Arab women are reluctant to practice BCS or discuss breast cancer because they perceive that the risk of cancer is low, they are embarrassed by the physical examination nature of BCS, or they are afraid of a cancer diagnosis; the same factors might limit the information or support they receive from family members (Sadler et al., 2001; Azaiza and Cohen, 2006; Soskolne et al., 2007; Dow Meneses and Yarbrow, 2007; Azaiza and Cohen, 2008; Baron-Epel, 2010;). Additional research on cultural values and beliefs are needed to further understand the complex factors that affect Arab women's awareness of BCS and promote effective, long-term compliance.

The authors of this paper are aware that breast self examinations are no longer recommended for early detection of breast cancer in many countries. However, the implications of removing BSE altogether from intervention programs in countries such as Qatar where awareness and screening rates are low are unpredictable and thus of concern. BSE is a natural and private activity that brings the risk of cancer to personal consciousness, even though it might not be effective diagnostic procedure as compare to CBE and mammography. The authors conclude it might be important to include BSE as part of an intervention plan to promote greater awareness of breast health in early intervention programs. Over-use and over-diagnoses might themselves become risks once national screening programs are put in place, particularly for women whose health concerns are high. The authors suggest monitoring the risks/benefits of BSE should be an on-going process in Qatar.

Our results agree with those of previous studies that found that participants who received information about BCS from any source (family/friend, doctor, media, or other HCP) were significantly more likely to have awareness of BCS (Dandash and Al-Mohaimeed, 2007; Montazeri et al., 2008; Hoffman et al., 2010). Public health

and media campaigns must therefore be multifaceted and culturally-appropriate, targeting both younger and older women and men. Television, radio,, newspapers and magazines, pamphlets, and SMS messages, can be used effectively to raise awareness of BCS (Yavari et al., 2006). Although only 1.1% of the participants indicated that the Internet was a significant source of information, we suggest that BCS awareness could be raised in younger populations through the Internet and in this way spread to elder female relatives.

Current findings indicate non-Qatari women were significantly more likely to have BCS awareness than Qatari women, although nationality was not significantly related to practice (Donnelly et al., 2012). It has been suggested that the Qatari government promotes health care and screening services to all of its residents at free or subsidized costs; therefore, Qatari citizens and non-Qatari residents do not experience differences in BCS practice (Donnelly et al., 2012). However, significantly fewer Qatari citizens than non-Qatari residents reported that their doctors talked to them about breast cancer (19.3% and 29.9%, respectively) or had received information about BCS from a doctor (59% and 66.2%) or other HCPs (43.9% and 50.5%). This suggests that health care information in Qatar might not adequately reach Qatari citizen women.

Since the majority of health clinics and hospitals in Qatar and in the GCC offer services conducted by female health care professionals for female patients, the gender of one's doctor is not a barrier to obtaining BCS awareness or practicing BCS (Donnelly et al., 2012). Female doctors are therefore in an ideal position to raise awareness about BCS activities with their female patients. Promotional information should address the importance of early detection in the absence of symptoms, as well as concerns about privacy and fear of diagnosis. Educational materials and messages should clearly explain how early detection of breast cancer can increase women's treatment options and survival rates in the language and manner that is most suitable to the target culture (Donnelly 2006; Donnelly et al., 2013).

Although living area (urban versus semiurban) was not significantly related to participation in BCS, women living in urban areas were more likely to be aware of the use and benefits of mammography (Donnelly et al., 2012). Addition of screening centers in various locations in Qatar would undoubtedly increase residents' breast cancer and BCS consciousness.

The high response rate (87.5%) of the study helped us to clearly define participant awareness and practice of BCS activities according to the most recent national guideline recommendations. The nonprobability convenience sampling technique limits the ability to generalize the survey results to other populations. Randomly-selected times were chosen to approach all potential interview participants from the seven different health center sites to avoid bias to some extent (CDC, 1999; Watters and Biernacki, 1989). Because data were collected from self-reports it is subject to social-desirability response bias related to BCS practice.

In conclusion, Qatar is a rapidly growing country

with the world's highest GDP per capita. The Qatari government provides subsidized or free health care services in modern, state-of-the-art medical facilities for all residents; however, awareness of and participation in BCS activities are low. To promote breast health and awareness of national recommendations for BCS, we submit the following suggestions: (1) health care providers must be encouraged to talk to patients about breast cancer and the benefits of BCS, (2) a population based national screening program with guidelines specific to Qatari social, cultural, and health care contexts, (3) an enhanced national cancer registry, (4) multisectorial and multidisciplinary intervention programs devoted to raising awareness of breast cancer and breast cancer prevention, and (5) research programs that evaluate the effectiveness of these intervention strategies in addressing breast cancer in Qatar.

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