RESEARCH ARTICLE

Addressing Factors Associated with Arab Women's Socioeconomic Status May Reduce Breast Cancer Mortality: Report from a Well Resourced Middle Eastern Country

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Abstract

    Differences in socioeconomic status (SES) such as income levels may partly explain why breast cancer screening (BCS) disparities exist in countries where health care services are free or heavily subsidized. However, factors that contribute to such differences in SES among women living in well resourced Middle East countries are not fully understood. This quantitative study investigated factors that influence SES and BCS of Arab women. Understanding of such factors can be useful for the development of effective intervention strategies that aim to increase BCS uptake among Arab women. Using data from a cross-sectional survey among 1,063 Arabic-speaking women in Qatar, age 35+, additional data analysis was performed to determine the relationship between socioeconomic indicators such as income and other factors in relation to BCS activities. This study found that income is determined and influenced by education level, occupation, nationality, years of residence in the country, level of social activity, self-perceived health status, and living area. Financial stress, unemployment, and unfavorable social conditions may impede women's participation in BCS activities in well resourced Middle East countries.

Keywords: Breast cancer - breast cancer screening - income - influence of socioeconomic factors - Arab women

Introduction

    The Middle East region has experienced considerable development and life-style changes in the past few decades, largely driven by oil and natural gas wealth (Bener et al., 2008). It is home to a diverse and growing number of people of different nationalities, especially, in the State of Qatar. The State of Qatar is situated on the Gulf coast of the Arabian Peninsula. With a population of nearly 2 million (Qatar Statistics Authority, 2013), Qatar has the world's fastest growing economy (19.4% in 2010) with the highest gross domestic product (GDP) per capita due to its abundant oil and natural gas revenues. Qatar's Supreme Council of Health administers modern, subsidized, cost-effective public health care for all residents of Qatar. Studies indicate risks of diseases such as cancer can vary between socioeconomic and ethnicity/race groups in Canada and in the U.S. (Ginsburg et al., 2012; Long et al., 2013). Ensuring health care equality to achieve maximum health has become a priority worldwide. As it is in many parts of the world, breast cancer is the most common cancer among women in Qatar. Breast cancer mortality rates in Qatar are disproportionally high compared to

Western and European countries (International Agency for Research Cancer, 2012). Cost and limited availability of health care insurance have been found to act as barriers to health care seeking behaviors in other parts of the world (Petro-Nustas, 2001; Lamyian et al., 2007; Alkhasawneh et al., 2009) but are not expected to be barriers in Qatar, where health care costs are free, subsidized, or covered by insurance (Bener et al., 2001; Bener et al., 2009; Donnelly et al., 2013).

    Ecological perspective and behavioral models suggest that the physical evironment, intrapersonal interactions, and other social determinants influence the health care behavior of individuals (Green et al., 1996; Hamilton and Bhatti, 1996; Vollman et al., 2008). To promote and maintain population health, societies must (a) provide the information and promote the life skills necessary for individuals to make informed health care decisions, (b) offer economic and social conditions conducive to health and healthy lifestyles, and (c) increase individuals' access to social goods and services.

    To adequately understand and effectively promote early detection of breast cancer, we investigated how economic and social factors influence Arab women's

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health care choices and BCS practice. We found that both awareness and practice of BCS is low in Qatar, and that socioeconomic status is a predictor of BCS practice (Table 1). As our findings indicated that increased socioeconomic status is positively related to BCS uptake (Donnelly et al., 2015), we further investigated factors that influence socioeconomic status among women in Qatar. We hypothesized that age, nationality, living area, number of years of living in Qatar, education level, occupation, health status, and extent of social activity are related to women's socioeconomic status. The information gathered in this project has given us a deeper understanding of how socioeconomic status might shape Arab women's participation in BCS activities which could lead to development of more effective intervention strategies.

Materials and Methods

Participant inclusion criteria included being a female of 35 years or older (as previously recommended by national guidelines for breast self examination and clinical breast examination), an ability to speak Arabic, recruitment from one of seven designated research sites in Qatar, and residence in Qatar for at least 10 years. Using a non-probability convenient sampling technique and

Table 1. Association between Annual Income and BCS Practice (significant at alpha=0.05 Level)*

	Adjusted OR (95% CI)	P value
Predictors of CBE Practice (n=445)		
Annual Income (Wald χ^2(2)=11.90)		0.003*
<USD $29,390	1	
USD $29,390 - $78,560	1.89 (1.07 – 3.36)	0.029*
>USD $78,560	2.84 (1.56 – 5.15)	0.001*
Model summary		

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	
574.21	0.028	0.038	

	Adjusted OR (95% CI)	P value
Predictors of Mammogram Practice (40+ years, n=267)		
Annual Income (Wald χ^2(2)=11.52)		0.003*
<USD $29,390	1	
USD $29,390 - $78,560	2.67 (1.11 – 6.45)	0.029*
>USD $78,560	4.63 (1.87 – 11.47)	0.001*
Model summary		

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	
320.91	0.048	0.067	

Cochran's formula to calculate sample size (Cochran et al., 1977), 1,215 self-identified Arabic women who met the study's inclusion criteria were invited to participate in the survey; of this sample, 1,063 women (40% more

Table 2. Selected Socio-demographic characteristics of participants (N=1,063)

Characteristic	No. (%) of Participants
Age (years) [1]	
35-39	365 (34.4)
40-49	399 (37.6)
50+	297 (28.0)
Nationality	
Qatari citizen	554 (52.1)
Non-Qatari resident	509 (47.9)
Other GCC/Peninsular	116 (10.9)
Levant	170 (16.0)
North African	107 (10.1)
Other	116 (10.9)
Living Area	
Urban	943 (88.7)
Semi-urban	120 (11.3)
Years Living in Qatar	
10-29 years	180 (17.0)
30-49 years	551 (51.8)
50+ years	332 (31.2)
Education Level of Participant	
Primary/Intermediate	359 (33.8)
Secondary/Trade School	350 (32.9)
University	354 (33.3)
Education Level of Participant's Husband (n=896)	
Primary/Intermediate	276 (30.8)
Secondary/Trade School	292 (32.6)
University	328 (36.6)
Employment Status of Participant	
Employed	362 (34.1)
Unemployed or Homemaker	701 (65.9)
Occupation - Participant [2]	
Unemployed	75 (7.2)
Management, Science, Arts	225 (21.5)
Sales and Office	59 (5.6)
Services, Production, Construction, Transportation, Other	62 (5.9)
Homemaker	626 (59.8)
Occupation - Husband (n=896) [3]	
Unemployed or Retired	122 (14.3)
Management, Business, Science, Arts	305 (35.7)
Services	105 (12.3)
Sales and Office	130 (15.2)
Construction, Production, Transportation, Other	104 (12.2)
Military	89 (10.4)
Annual Household Income [4]	
< QAR 107,000/< USD $29,390	138 (23.9)
QAR 107,000 - 286,000/USD $29,390 - $78,560	274 (47.5)
> QAR 286,000/> USD $78,560	165 (28.6)
Self-reported Health Status [5]	
Poor - Fair	252 (23.8)
Good - Excellent	809 (76.2)
Participates in activities with [6]	
No one else	106 (10.0)
Only family or with religious community	329 (31.0)
With family, neighbors, and religious community	625 (59.0)

*[1] 2 participants did not answer this question; [2] 16 participants did not answer this question; [3] 41 participants did not answer this question. [4] 486 participants did not answer this question; [5] Two participants did not answer this question; [6] Three participants did not answer this question

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than the required sample size calculation using a margin of error of 3.5%) participated in a 30-minute face-to-face interview (87.5% response rate).

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-AUCQ-050), and the University Conjoint Health Research Ethics Board (Ethics ID: E-23551). Participation in the study was voluntary and consent was obtained from each participant; participants' rights were explained to them according to the standard interview protocol and participants were assured anonymity and confidentiality.

Questionnaire and data collection method

Survey questionnaire items were incorporated from previous peer-reviewed surveys connected with breast cancer screening research studies in Canada, the U.S., and Australia with permission from the authors, and were further field-tested in Qatar (McPhee et al., 1997; Cheek et al., 1999; McPhee and Nguyen, 2000; McPhee et al., 2002; Donnelly, 2006; Donnelly et al., 2009). Forward- and back-translations of the survey questionnaire into Arabic and English were carried out to ensure lexical equivalence.

Statistical analysis

Descriptive statistics (mean, standard deviations for

Table 3. Select Factors and Income Level of Participants

Variables	Income Level			P-value
	<QAR 107,000 <USD $29,390 n (%)	QAR 107,000 - 286,000 USD $29,390 - $78,560 n (%)	>QAR 286,000 >USD $78,560 n (%)	
Age (years)				χ^2(4, N=576)
35-39	48 (34.8)	105 (38.5)	68 (41.2)	= 7.45
40-49	51 (37.0)	114 (41.8)	71 (43.0)	p=0.114
50+	39 (28.3)	54 (19.9)	26 (15.8)	
Nationality				χ^2(8, N=577)
Qatari citizen	50 (36.2)	132 (48.2)	120 (72.7)	= 54.95
Other GCC/Peninsular	21 (15.2)	30 (10.9)	8 (4.8)	p<0.001*
Levant	21 (15.2)	54 (19.7)	18 (10.9)	
North African	19 (13.8)	34 (12.4)	10 (6.1)	
Other	27 (19.6)	24 (8.8)	9 (5.5)	
Living Area				χ^2(2, N=577)
Urban	118 (85.5)	230 (83.9)	151 (91.5)	= 5.20
Semi-urban	20 (14.5)	44 (16.1)	14 (8.5)	p=0.074
Years Living in Qatar				χ^2(4, N=577)
10-29 years	57 (41.3)	88 (31.4)	46 (27.9)	= 13.50
30-49 years	58 (42.0)	158 (57.7)	102 (61.8)	p=0.009*
50+ years	23 (16.7)	30 (10.9)	17 (10.3)	
Education Level of Participant				χ^2(4, N=577)
Primary/Intermediate	74 (53.6)	63 (23.0)	18 (10.9)	= 128.52
Secondary/Trade School	43 (31.2)	110 (40.1)	30 (18.2)	p<0.001*
University	21 (15.2)	101 (36.9)	117 (70.9)	
Education Level of Participant's Husband				χ^2(4, N=481)
Primary/Intermediate	57 (52.8)	52 (23.0)	15 (10.2)	= 81.96
Secondary/Trade School	28 (25.9)	87 (38.5)	36 (24.5)	p<0.001*
University	23 (21.3)	87 (38.5)	96 (65.3)	
Occupation – Participant				χ^2(8, N=568)
Unemployed	7 (5.2)	17 (6.3)	19 (11.6)	= 73.46
Management, Business, Science, Arts	15 (11.2)	63 (23.3)	76 (46.3)	p<0.001*
Sales and Office	6 (4.5)	25 (9.3)	10 (6.1)	
Service, Construction, Production, Transportation	11 (8.2)	14 (5.2)	12 (7.3)	
Homemaker	95 (70.9)	151 (55.9)	47 (28.7)	
Occupation – Husband				χ^2(10, N=458)
Unemployed or Retired	15 (17.0)	16 (7.2)	9 (6.0)	= 28.48
Management, Business, Science, Arts	25 (28.4)	92 (41.6)	83 (55.7)	p=0.002*
Services	8 (9.1)	31 (14.0)	18 (12.1)	
Sales and Office	15 (17.0)	35 (15.8)	11 (7.4)	
Construction, Production, Transportation	15 (17.0)	28 (12.7)	15 (10.1)	
Military	10 (11.4)	19 (8.6)	13 (8.7)	
Self-reported Health Status				χ^2(2, N=577)
Poor – Fair	44 (31.9)	49 (17.9)	10 (6.1)	= 34.17
Good – Excellent	94 (68.1)	225 (82.1)	155 (93.9)	p<0.001*
Participates in activities with				χ^2(4, N=576)
No one else	32 (23.2)	21 (7.7)	12 (7.3)	= 27.47
Only family or with religious community	46 (33.3)	92 (33.6)	54 (32.9)	p<0.001*
With family, neighbors, and religious community	60 (43.5)	161 (58.8)	98 (59.8)	

Table 4. Association between Selected Factors and Income: Using Ordinal Logistic Regression (Significant at Alpha=0.05 Level)*

Predictors of Income (n=445)	Adjusted OR (95% CI)	P value
Nationality ($\chi^2(4)$=60.77)		<0.001*
Qatari citizen (reference)		
Non-Qatari - Other	0.07 (0.03-0.16)	<0.001*
Non-Qatari - Other GCC and Yemen	0.24 (0.12-0.51)	<0.001*
Non-Qatari - Levant	0.13 (0.06-0.25)	<0.001*
Non-Qatari - North Africa	0.10 (0.05-0.22)	<0.001*
Living Area		
Semi-urban (reference)		
Urban	2.06 (1.13-3.76)	0.019*
Education Level of Participant ($\chi^2(2)$=10.20)		0.006*
≤Primary/Intermediate (reference)		
Secondary/Trade School	0.98 (0.54-1.77)	0.934
University	2.33 (1.15-4.75)	0.020*
Education Level of Participant's Husband ($\chi^2(2)$=26.44)		<.001*
≤Primary/Intermediate (reference)		
Secondary/Trade School	2.68 (1.43 - 5.04)	0.002*
University	6.84 (3.26 - 14.34)	<0.001*
Occupation - Participant ($\chi^2(4)$=25.69)		<0.001*
Unemployed (reference)		
Housewife	0.38 (0.16 - 0.88)	0.025*
Management, Business, Science, Arts	1.55 (0.63 - 3.82)	0.345
Sales and Office	1.54 (0.50 - 4.68)	0.449
Services, Construction, Production, Transportation	0.96 (0.31 - 3.03)	0.951
Occupation - Husband ($\chi^2(5)$=9.64)		0.086
Unemployed or retired (reference)		
Military	3.05 (1.08 - 8.63)	0.035*
Management, Business, Science, Arts	2.32 (0.95 - 5.67)	0.064
Services	2.86 (1.08 - 7.54)	0.034*
Sales and Office	1.22 (0.46 - 3.19)	0.699
Construction, Production, Transportation, Other	2.07 (0.79 - 5.45)	0.139
Self-reported Health Status		
Poor - Fair (reference)		
Good - Excellent	1.95 (1.09 - 3.51)	0.025*
Participates in activities with ($\chi^2(2)$=17.43)		<0.001*
No one else (reference)		
Only family or with religious community	4.19 (2.04 - 8.61)	<0.001*
With family, neighbors, and religious community	3.95 (2.00 - 7.77)	<0.001*

Test of parallel lines is performed with $\chi^2(25)$=32.136, p=0.154, it satisfies the proportional odds assumption of ordinal logistic regression; The set of predictors used in the ordinal logistic regression significantly predict the income with $\chi^2(25)$=252.092, p<0.001; Nagelkerke Pseudo R-Square(a measure of strength of association with the predictors)=0.496 sindicate a moderate fit.

interval variables and frequency with percentages for categorical variables) and chi-square tests (two-tailed) were performed. Multicollinearity testing of all covariates significant at bivariate analyses was performed before using them in the multivariate logistic regression analyses. Simultaneous multivariate ordinal logistic regression analysis was used to further assess the association of preselected factors (i.e., education level, employment, occupation, living area, nationality) related to income. Statistical significance levels were established at alpha=0.05. Data analyses were supervised and conducted by two senior biostatisticians using SPSS version 20.

Results

Selected demographic characteristics of participants
Participants were between the ages of 35-82 years (M=44.9, SD=8.4, n=1063). The majority of the 1,063 participants were married (78.9%), had children (84.8%, M=5.3, SD=2.5, n=902), and resided in urban areas (88.7%); 83% had resided in urban areas for at least 30 years. Just over half (52.1%) of the participants were Qatari citizens whereas 47.9% were non-Qatari citizens from the greater Middle Eastern region, that is, 10.9% came from other Gulf Cooperation Council (GCC) or regional countries (Saudi Arabia, UAE, Kuwait, Oman, Bahrain, Yemen), 16% were from the Levant region (Syria, Lebanon, Palestine, Jordan), 10.1% were from North Africa (Egypt, Libya, Tunisia, Algeria, Morocco), and 10.9% were from other countries (Sudan, Iraq, Iran, Somalia, Mauritania, Pakistan).

Approximately one-third of the participants were university-educated and had husbands who were university-educated and their husbands were employed. Over half (58.9%) of the women reported they were homemakers while one-fifth (21.5%) worked in management, science, or arts fields; about one third (35.7%) of participants' husbands worked in similar fFields. Of 577 participants who reported their annual household income, 47.5% reported a mid-income range of QAR 107,000 - 286,000

(USD $29,390 - $78,560) and 28.6% reported an upper income range of >QAR 286,000 (>USD $78,560).

Three-quarters of all participants described their health status as good-excellent (76.2%). The majority also stated they participate in activities with families, neighbors, and religious communities (59%), whereas only 10% stated that they do not socialize with anyone (Table 2).

Selected factors associated with socioeconomic status

Bivariate analysis was conducted to examine the association between income level and selected characteristics (age, nationality, living area, number of years of living in Qatar, education level, occupation, health status, and social activity level). Compared to women with lower annual household income, those with higher income were significantly more likely to be Qatari citizens, to have lived in Qatar for 30-49 years, to have a higher education level, to work in management, to have a husband with a higher education level, to have a husband who works in management, to perceive their health status to be good-excellent, and to participate in activities with their family, neighbors, and religious communities. Almost three-quarters of participants in the highest income group were Qatari citizens (72.7%), had a university education (70.9%) or their husbands had a university education (65.3%), whereas 94% of the participants in the highest income group reported their health was good-excellent. Almost two-thirds (61.8%) of those with the highest income level had lived in Qatar for 30-49 years. Approximately half of those with the highest income reported that they worked in management (46.3% of participants, 55.7% of their husbands) and/or participated in social activities with families, neighbors, and religious communities (59.8%). Although age was not significantly related to income level, living area (urban versus semi-urban) approached significance (p=0.074) in the presence of other predictors; 91.5% of participants who reported the highest incomes lived in urban areas (Table 3).

Additional bivariate analysis findings indicated that women who reported they were unemployed were more likely to have a university education than women who reported their occupation as housewives. Housewives were more likely to be from other GCC countries and to have lower education levels (and their husbands were more likely to be from other GCC countries and to have low education levels as well). Participants from North Africa and from Levant were more likely to be unemployed and least likely to be housewives, to have university education, and to work in management. Husbands of women from North African and Levant countries were more likely to work in management than husbands of women from Qatar or women from other GCC countries.

Multivariate analysis of predictors of socioeconomic status

When simultaneous multivariate ordinal logistic regression analyses was conducted with the independent variables age, living area, years in Qatar, nationality, education level, occupation group, social activity level, and perceived health status, several significant predictors of higher income were discovered: Qatari nationality, higher education level (for participants or their husbands), living in an urban area, perceiving oneself to have good-excellent health, and participating widely in social activities. Although women participants' occupations were not found to be significant predictors of income, being a housewife was a predictor for having lower income than women who were unemployed. However, the participant's occupation had an overall effect on income level. The participant's husband's occupation was found to have an overall slightly significant effect on the annual household income (Table 4).

Discussion

The State of Qatar has the highest gross domestic product (GDP) in the world and provides free or heavily subsidized gender-appropriate health care services to all of its residents in state-of-the-art hospitals. In addition, Qatari citizens receive stipends for housing, education, and health care. While it was expected that education level and occupational field would be significantly related to income, present finding indicates that nationality also predicts one's socioeconomic status in Qatar. Qatari citizens reported higher income levels than any other nationality group living in Qatar, a finding that can be partly explained by the fact that Qatari citizens' costs of living are highly subsidized by the government.

The occupation of a woman and the occupation of the woman's husband were both significantly related to income level; however, neither the occupation of the participant nor the occupation of the participant's husband were strong predictors of higher income level. This finding could also be due to the Qatari government's provision of monetary stipends for all Qatari citizens. Bivariate analyses of the data showed that living area (urban/ semi-urban) is slightly significantly (p=0.074) related to income level. However, ordinal regression analyses results indicated that living area is a significant predictor of income. These contradictory findings can be explained by the slightly smaller number of cases used in the regression analysis (n=444 versus n=577 for bivariate analysis), and are not due to multicollinearity issues; another reason for the contradictory findings is that in Table 3, income level is treated as a categorical variable, but for the ordinal logistic regression (Table 4) it is treated as an ordinal variable.

Women in the highest income group also reported participating in wider social activities than women in lower income groups. This agrees with previous studies which found that women with greater social support or social integration have lower risks of disease mortality and lower socioeconomic status (Gunusen et al., 2013; Tay et al., 2013). This finding suggests that working with influential community members to develop wider social networks' connection and support might help to raise awareness of breast cancer risk and the benefit of BCS activities in women who are less socially active in countries like Qatar.

Due to potential challenges of reaching the study population, convenience sampling was used which may limit the ability to generalize survey results. However, larger sample size and randomly-selected times were

chosen for the face-to-face interviews, and attempts were made to approach all potential respondents in each interview location to reduce this bias. This resulted in a response rate of 87.5%. However, since 45.7% of the women interviewed did not volunteer their income level, this reduced our sample size when conducting logistic regression analyses (n=445). Also, data collected from self-reported face-to face interviews may be subject to recall or social-desirability response bias (Donnelly et al., 2015).

Similar to a previous study from the West (Donnelly et al., 2009), this study demonstrates that women's health care behaviors, specifically toward BCS, are not only influenced by their health beliefs, cultural values, and awareness of disease, but are also influenced by factors that shape women's socioeconomic status. Health care providers and policy makers need to recognize the impact of low socioeconomic status on women's breast cancer screening behavior. Even when health care services are fully available and heavily subsidized by the government, financial stress, unemployment, and unfavorable social conditions may impede women's participation in breast cancer screening activities. Raising awareness may not be enough to address breast cancer issues; additional -less obvious barriers, such as socioeconomic status, socio-cultural practices, and socio-demographic characteristics that influence women's income levels may contribute to the overall accessibility of cancer screening and health care facilities. Thus it is imperative that health care policy makers pay attention to those less obvious barriers and incorporate access-enhancing strategies in planning intervention program to address low participation rates in breast cancer screening activities.

Qatar has an opportunity to take the lead in theory and evidence-based health promotion and disease prevention programs that can be a model for GCC countries and other countries in the Middle East region. The government of Qatar has made health care research a priority; close to 3% of its annual GDP ($3.5 billion USD), a higher percentage than any other country in the world, is allocated to funding research. Therefore, health care programs and research studies aimed at addressing cancer in Qatar can significantly impact the Middle East region and Muslim or Arab women living worldwide. Similar to many other countries in the world, Middle Eastern countries are currently faced with major transformations in health care, research priorities, and practices that aim to combat issues related to disparities, low awareness, and low practice of cancer screenings. As national cancer strategies, cancer registries, and population-based screenings get underway, it is important to note that socioeconomic status and lower income levels do impede women's participation in BCS. Thus, providing free mammograms at locations within or closer to communities where women live (i.e. mobile screening facility) might increase Arab women's utilization of mammogram. Other access-enhancing strategies such as sending screening invitation cards or phone call to women requiring mammogram screening and drawing on support of social networks and influential community members can help raise awareness of the benefits and utilization of breast cancer screening services among women living in countries like Qatar. The authors recommend more in-depth understanding of how social and cultural factors influencing women's SES such as income can be useful for the development of effective intervention strategies that aim to increase BCS uptake among Arab women. In addition, further intervention and evaluation studies are needed in this area to develop socially and culturally sensitive strategies, and assess the cost-effectiveness and long-term sustainability of the intervention programs.

Acknowledgements

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