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The impact of breast cancer knowledge and attitudes on screening and early detection among an immigrant Iranian population in southern California

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Abstract

Background—Few studies explore factors influencing breast cancer screening and early detection behaviors among immigrant Iranian women residing in the United States.

Methods—Using a cross-sectional survey, a convenience sample of 319 Iranian-American women was selected to explore the impact of breast cancer knowledge and attitude on screening. A self-administered questionnaire assessed: breast cancer screening knowledge, attitude, and mammography use (ever, previous year and future intention).

Results—79 % of the women in the study reported ever-receiving at least one mammogram and 74 % received a mammogram in the past year. Personal attitude had an independent significant effect on: mammography use in the last year, ever use of mammography and future intention to screen. Knowledge and morality-induced attitude influenced screening behavior but not significantly.

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Conclusion—Interventions targeting breast cancer screening among immigrant Iranian women in the US should focus on enhancing personal attitudes in order to influence actual screening behavior.

Keywords

Screening; Early Detection; Immigrant Population; Iranian Women

Introduction

Breast cancer is the most common non-cutaneous malignancy and the second leading cause of death among women in the United States (Siegel *et al.* 2012). Approximately, one in eight women will develop breast cancer during her lifetime (Alexandraki and Mooradian 2010). In 2013, a total of 232,340 new cases and 39,620 deaths are estimated to arise due to breast cancer (Smith *et al.* 2013).

Between 2010 and 2030, the overall cancer incidence is expected to increase by 45%, with the greatest burden falling on older adults and minorities (28% of all cancers) (Smith *et al.* 2009). Although Caucasian women have a higher incidence of breast cancer in the U.S., women from minority groups have consistently higher mortality rates (Ghafoor *et al.* 2003, Chlebowski *et al.* 2005). The majority of women that compose minority groups in the U.S. have either immigrated to the U.S. or are second-generation immigrants.

While many studies are focused on improving screening rates among the majority of racial and ethnic groups (like African Americans and Hispanic Americans), very few research studies actually focus on less common immigrant ethnic groups, such as Iranian immigrants. The Iranian population began immigrating to Western countries, including the U.S., after 1979. It is now estimated that approximately one million Iranian immigrants resides in the U.S. (Anon 2005). Since, the U.S. Census does not separately classify Iranian Americans; it is difficult to accurately estimate the total number of Iranians residing in the U.S. It is well established that the largest group of Iranian immigrants in the U.S. resides in southern California.

Migrant studies in Australia, Netherlands, Sweden, Germany, and Canada have shown that breast cancer incidence rates among immigrant populations range between the rates in their home and host countries (McCredie *et al.* 1994, Hemminki *et al.* 2002, Zeeb *et al.* 2002, Visser *et al.* 2004, Yavari *et al.* 2006). In Iran, cancer is the third leading cause of death and breast cancer is the second most common cancer among women (Mousavi *et al.* 2009). Its incidence has doubled during the last 30 years (Yavari *et al.* 2003). A high proportion of breast cancer patients in Iran present at least 10 years earlier than their counterparts in developed countries, and are often observed to have advanced disease at initial diagnosis (Yavari *et al.* 2006). In Iran, barriers to screening include personal attitudes towards screening, fear, perceived severity, lack of knowledge, self-efficacy, lack of access, convenience, cost, and competing priorities at home (Montazeri *et al.* 2008, Noroozi *et al.* 2011). Presentation of cancer at initial diagnosis as well as factors influencing screening and early detection among immigrant Iranian women in the U.S. could be postulated to follow similar trends observed in Iran. Additionally, influences of the host country on cancer initial

presentation, like acculturation, should be also considered. This is supported by a number of immigration studies that show the risk of cancer diagnosis to be associated with age at time of migration, duration of stay, and acculturation in the diet and was of lie in the host country (Noroozi *et al.* 2011). Similarly, a study conducted in British Columbia noted that the incidence of breast cancer among female Iranian immigrants was between the rates found in Iran and those found in Canada (Andreeva *et al.* 2007).

Since preventative health behavior is not homogenous across populations, population specific analysis of preventive health seeking behaviors is essential for creating sound interventions. Only one study investigating screening behaviors of Iranian Americans was identified (Shirazi *et al.* 2006). This study by Shirazi et al. (2006) noted the need to conduct more research among Iranian Americans to be able to better understand their screening behaviors. In an exploratory study of 39 Middle Eastern Muslim women that assessed the influence of knowledge on frequency of breast cancer screening in the U.S., results showed that none of the women had ever undergone mammography. The women completed a questionnaire based on the Champion's Breast Self Examination Questionnaire and despite the fact that 85% of the women had heard of breast self-examination, 74% indicated that they do not practice self-breast exam. Furthermore, none of the women reported undertake regular self-breast exams on a monthly basis (Rashidi and Rajaram 2000).

Muslim women tend to be frequently portrayed as a homogenous group. Yet, it is important to highlight that distinct social, cultural, and ethnic differences actually exist among them. These differences may influence knowledge, attitudes, and behavior towards screening. Thus, they should be taken into consideration in order to truly understand immigrant Iranian American's knowledge, attitudes, and behaviors pertaining to breast cancer screening and early detection.

This paper aims to describe the extent of knowledge of breast cancer and its risk factors among a selected sample of immigrant Iranian women residing in southern California. It also aims to explore the impact of personal attitudes, religion (morality-induced attitudes), knowledge, and socio-economic determinants on breast cancer screening and early detection among these women.

Methods

Target population, study design, and sample

Between 2006 and 2007, a cross-sectional survey to assess breast cancer knowledge, attitudes, and screening behavior was conducted among immigrant women, 40 years of age and older, who self-identified themselves as Muslim from Arab, Iranian, South Asian, or African American cultural backgrounds, and resided in southern California. A convenience sample of six hundred and thirty two Muslim women representing these groups was selected from different Muslim community organizations and Mosques. 570 women completed the questionnaire (yielding a 90% survey response rate). The total sub-sample of Iranian women in this survey was 319 women.

The sample was chosen based on the following eligibility criteria: immigrant women who self-identified as Muslim (from Arab, African American Iranian, or South Asian origin), aged 40 years or above, coupled with a working understanding of Arabic, English, Farsi and Urdu for signing an informed consent.

The eligible women who provided informed consent were asked to complete a self-administered questionnaire. Women's recruitment was facilit ated by the different community stakeholders and took place at their own facilities. The questionnaire assessed socio demographic characteristics, breast cancer screening knowledge, breast cancer attitudes (personal and religious (morality-induced)), intention to screen (among which using mammography), and mammography utilization (ever, and in the previous year).

The main outcome variable for this survey was screening and early detection of breast cancer using mammography. This was assessed in three ways: ever screened (using mammography), mammography screening in the previous year, and future intention to be screened. These are described in detail in the measures section.

The main independent variables included breast cancer related knowledge, personal attitudes towards breast cancer screening and early detection, as well as religion (morality-induced attitudes). These are also further discussed in the measures section.

It should be noted that the operationalization of the different questionnaire constructs pertaining to breast cancer knowledge, attitudes (personal and religion), and intention to screen was guided by existing literature, focus groups and consultations with experts from the community and academia on content and cultural adequacy. Breast cancer screening knowledge questions were based in part on Champions' Breast Self Examination Questionnaire; however, only items that received consensus among the different study experts were included in the final version of the questionnaire (Champion 1990). Following translation into Arabic, Farsi, and Urdu by professional translators, the instrument was further face-validated by pre-testing it on a sample of 40 Muslim women. This pre-testing led to the final adoption of the questionnaire for use in this survey.

This study protocol of this survey was reviewed and approved by the institutional review board (IRB G05-03-113-01) of UCLA.

Measures

As already noted above, the main outcome variable in this study was breast cancer screening behavior by using mammography. This was assessed in three different ways. The first two inquired about mammography utilization (ever use and use in the previous year). The third inquired about future intention to screen, which entailed the construction of a non-weighted index that assessed personal induced behaviors towards breast cancer screening and early detection, using five different questions pertaining to screening and mammography use. A perfect score was 5 points, indicative of a high intention to screen in the future, and the poorest score was 24, indicative of no intention to screen. The lower the score, the more favorable the intention to screen. The answers to these questions were rated on a five-points Likert-scale (ranging from 1-strongly agree to 5-strongly disagree). Some examples of

questions used in this index include: “I have never thought about getting a mammogram” and “I cannot remember to schedule a mammogram”.

The main independent variables included knowledge of breast cancer related risk factors, personal attitudes and religion (morality-induced attitudes). Knowledge was operationalized by correctly specifying the risk factors for breast cancer. A non-weighted index consisting of 23 questions was constructed. A true answer for each of the first 20 questions was given a score of 1 and a false or don’t know answer was given a score of 0. The remaining three questions in this index were assessed using a five-points Likert-scale (ranging from 1-strongly agree to 5-strongly disagree). A perfect score was 34, which meant that all 23 questions were answered correctly. The higher the score, the better is the knowledge. Some examples of measures comprising this index include “Breastfeeding lowers risk”, “early menarche increases risk”, and “I am afraid to have a mammogram because I do not what will be done”.

Personal attitudes was operationalized using a non-weighted index that consisted of a total of 16 questions assessing the women’s personal attitude in relation to early detection of breast cancer, primary (prior to any diagnosis), and secondary prevention (following diagnosis). A perfect score on this index was 16 and the poorest score was 77. The lower the score, the more favorable is the personal attitude towards breast cancer screening and early detection. The answers to these questions were rated on a five-points Likert-scale (ranging from 1-strongly agree to 5-strongly disagree). Some examples of measure in this index include “Women should be actively encouraged to screen for breast cancer”, “doing breast self-examination will make me worry about breast cancer”, and “having a mammogram is too embarrassing”.

Religious (morality-induced) attitudes were operationalized in terms of fatalism; more specifically, a helpless perception derived from religion about the status of the woman’s health and a belief that there is nothing that the woman can do in order to affect her own health status. A non-weighted index consisting of 15 questions assessed religious (morality-induced) attitude in relation to early detection of breast cancer, primary, and secondary prevention. A perfect score was 15 and the poorest score was 70. The lower the score, the more favorable religious (morality-induced) attitude towards screening and early detection. The answers to these questions were rated on a five-points Likert-scale (ranging from 1-strongly agree to 5-strongly disagree). Some examples of questions used in this index include “Not being a good person”, “a woman is more likely to get breast cancer”, “In addition to medical treatment, I must observe religious obligations (prayer, zakat, etc) to ensure good health”, and “I surrender to sickness because it is part of my faith to surrender to fate (Qadar)”.

Other co-variates include socio-demographic characteristics, such as age, length of stay in the U.S., marital status, educational level, employment status, household income in the last year, and health insurance coverage.

Data analysis

Data was entered and analyzed using the statistical package for social sciences (SPSS). Means for continuous variables and frequencies for categorical variables were utilized to describe baseline characteristics for all women. Binary outcomes were analyzed using logistic regression models. Continuous outcomes were related to continuous and categorical predictors using linear regression. The 95% confidence intervals and p-values were calculated using standard maximum Likelihood asymptotics. Multivariate analyses adjusted by age, number of years in the U.S., income, marital status, schooling and relative or friends with breast cancer, as those variables were identified as potential confounders. When behavioral, attitude, religion and knowledge scores were considered as predictors of screening behavior, the variables were standardized to have a mean of 0 and a standard deviation of 1 to facilitate interpretation and comparison of effect sizes.

Results

A total of 319 Iranian-American women between the ages of 40 and 70 were interviewed. The majority (91%) of women interviewed received more than 10 years of education and only 9% of our sample declared a household income below $10,000. Most women (86%) declared to have some form of health insurance. Other baseline characteristics including descriptive statistics associated with attitude, religion, knowledge and behavioral scores are listed in Table 1. All sample characteristics are reported for the overall sample and stratified by groups associated with primary screening behavior (received at least one mammogram versus never had a mammography).

Probability of Having Received at Least One Mammogram

The baseline probability of screening is estimated to be 79% (95%CI: 72% - 85%). This probability corresponds to 3.6-to-1 odds of getting screened for breast cancer at least once. Table 2 (a) summarizes our findings about the effect of knowledge, attitude, religion and behavior on the likelihood of screening. We find that the odds of getting screened for women with an attitude score that is 1-SD higher than the average decreases by a factor of 0.51 (95% CI: 0.34 – 0.93). This means that only 65% of women with a poorer attitude are likely to get screened, as compared to 79% in the baseline. A similarly large effect size is associated with a poor behavioral score (1-SD higher than average), with odds of getting a mammogram decreasing by a factor of 0.52 (95% CI: 0.28 – 0.96) with respect to the baseline odds. Poorer knowledge of the disease and higher than average religious attitudes are also associated with an average decrease in the probability of getting screened, but are not found to be statistically significant, with religion being a potentially significant predictor in larger samples.

Probability of Receiving a Mammogram in the Year Prior to Interview

The baseline short-term probability of screening for breast cancer is estimated to be 74% (95% CI: 66% - 81%). Table 2 (b) summarizes our findings about how this probability relates to attitude, knowledge, religion and behavior. We find that poor attitude (1-SD above average) is associated with a significant decrease in the odds of short-term screening by a factor of 0.56 (95% CI: 0.34, 0.93). Similarly, poor screening behavior (1-SD above

average) is associated with a decrease in the odds of short-term screening by a factor of 0.47 (95% CI: 0.30, 0.74). We do not find any significant effect of knowledge and religion on short-term screening behavior.

Intention to Screen Behavioral Score

We estimate the average baseline behavioral score to be 10.40 (95% CI: 10.14, 10.67). Table 3 summarizes our findings about the effect of knowledge, attitude and religion on intention to screen behavior. We find that poor personal attitude is associated with poorer behavior in the measure of a 1.05 (95% CI: 0.77, 1.34) increase in the expected behavioral score per 1-SD increase in the attitude score. Religion has a similar effect on behavior, with higher religious concerns predicting poorer screening behavior. Specifically a 1-SD increase in the religion score is associated with a 0.51 (95% CI: 0.19, 0.83) increase in the behavioral score. We do not find any significant effect of knowledge on breast cancer screening behavior.

Discussion

In this study, 79% of the Iranian women reported ever receiving at least one mammogram and 74% reported having a mammogram in the past year. Of those with a poorer personal attitude, 65% of Iranian women were likely to have received at least one mammography, as compared to 79% of women with better personal attitude. A poorer personal attitude (1-SD above average) was associated with a significant decrease in the odds of short-term screening by a factor of 0.56. Poor personal attitudes were also associated with poorer screening behavior in the measure of a 1.05 (95% CI: 0.77, 1.34) increase in the expected behavioral score per 1-SD increase in the attitude score. Knowledge and religious (morality-induced) attitudes showed some influence on screening behavior; however, their effect was not statistically significant. Religious (morality-induced) attitudes could become significant with an increase in power. Personal attitudes were the only statistically significant predictor, throughout the different models (ever, recent, and intention to screen) assessed in this study, when controlling for knowledge, religious attitude, and demographic characteristics.

These results have important implications for immigrant Iranian women in the U.S. Tailoring interventions to improve breast cancer screening among immigrant Iranian women in the U.S. should specifically focus on improving personal attitudes (rather than knowledge) in order to influence actual screening behavior. Providers should recognize that while Iranian patients might have knowledge about screening, attitudinal barriers might prevent them from obtaining screening. The literature notes that multifaceted, culturally sensitive interventions can enhance beliefs and personal attitudes towards breast cancer (Hall *et al.* 2007, Kim *et al.* 2009). Rauscher *et al.* (2004) implemented an intervention to increase positive attitudes and found an association with greater mammography utilization. In fact, the effect was greatest for women with the poorest attitudes and worse mammography utilization behavior (Rauscher *et al.* 2004). Interventions and screening providers should focus on decreasing fear and shame and utilize female peers to create attitudinal changes (Sabih *et al.* 2012).

Attitudinal barriers to screening are also found among Iranian women in Iran. For example, a study by Simi *et al.* (2009) found out that 43% of Iranian women's self-breast examination

behavior is explained by their attitudes alone; where by 9% of the women indicated that they do not perform breast self-examination out of fear of a positive outcome, and 34% perceived breast self-examination as useless and unnecessary. Along the same lines, Lamyian *et al.* (2007) found out that barriers to screening included a fear of cancer and fatalism and protective factors like optimism and spiritual factors. Jarvandi *et al.* (2002) also found out in their study of Iranian teachers that fear was a big deterrent of screening.

In a U.S. study by Shirazi *et al.* (2006), issues of modesty and confidence to discuss breast cancer with a physician were noted to be important predictors. The study indicated that language levels and acculturation were significant predictors of breast self-examination and clinical breast examination. Since culture often shapes personal attitudes, this is well aligned with our research findings. One possible explanation is that if the Iranian culture were shaping a negative personal attitude towards breast cancer screening, acculturation could alter personal attitudes and potentially lead to increased screening behavior. This is particularly important given the fact that many behavior change models do not actually consider or incorporate the influences of culture, attitudes, and emotions when assessing illness and subsequent health seeking behaviors.

A study by Russell *et al.* (2003) that looked at the role of culture in behavioral models for predicting breast cancer screening stressed the importance of culture to be able to better predict mammography screening initiation and sustainability. Additionally, cultural factors can provide a greater insight on how to design interventions that address attitudes to potentially increase cancer screening rates (Russell *et al.* 2003). Our study demonstrated the importance of personal attitudes for an Iranian subgroup. It also highlighted the importance of future work assessing the impact culture on personal attitudes towards breast cancer screening for Iranians. Such an assessment is equally important also among other Muslim immigrant populations in the U.S.

Strengths of this study include the ability to assess screening behavior in three different time frames (use of mammography in the last year, ever use of mammography, and the intention to screen in the future). This has clearly highlighted the independent effect of personal attitudes on mammography utilization. Also, the utilization of focus groups, to inform the development of the assessment questionnaire, demonstrated the value of measures used.

Despite these strengths, there are also some limitations to consider. Specifically, selfreported data is associated with social desirability in reporting (particularly among women aware of the mammography screening guidelines), and recall bias (Etzi *et al.* 1994, Russell *et al.* 2003, Bancej *et al.* 2004, Cronin *et al.* 2009). However, work that compares self reports of breast cancer screening with that of patient records notes the accuracy of self-reports of screening (Caplan *et al.* 2003). Additionally to minimize on social desirability, the questionnaire was self-administered (as opposed to face-to-face interview). Women were put at ease to answer the questions at their own pace and in their own language of preference, in a private space to ensure that all participants felt comfortable.

In conclusion, personal attitudes influenced mammography utilization among immigrant Iranian women in the U.S. Therefore, when designing health interventions, the focus should

be on enhancing personal attitudes to improve screening and early detection of breast cancer among U.S. immigrant Iranian women.

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Table 1

Baseline Demographics and Sample Characteristics

	All participants (N = 319)		PS subsample (n = 249)		NS subsample (n = 69)	
Characteristic	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Age (years)	51.38	11.40	54.83	9.46	38.74	8.82
Marital Status						
Married (%)	64%		67%		49%	
No. of years in the US	20.60	9.49	22.25	8.51	15.52	10.77
Income						
<= $50,000 (%)	43%		41%		51%	
$50,000 – $100,000 (%)	27%		27%		27%	
> $100,000 (%)	30%		32%		22%	
Schooling (years)	15.24	4.21	14.99	4.11	16.03	4.50
Relative or Friends with BC						
Yes (%)	73%		82%		39%	
Age at first Screening	38.29	13.30	38.29	13.30		
Had a mammogram in the past year						
Yes (%)	76%		77%		0%	
Attitude Score	47.20	11.63	45.73	9.70	53.06	16.07
Range	(26 – 106)		(26 – 73)		(27 – 106)	
Knowledge Score	10.84	1.17	10.58	1.60	11.52	1.86
Range	(7.5 – 19)		(7.5 – 17)		(8 – 19)	
Religion Score	31.88	6.84	31.81	6.47	32.29	8.02
Range	(17 – 61)		(17 – 58)		(20 – 61)	
Behavioral Score	10.36	2.28	10.03	2.20	11.58	2.16
Range	(5 – 20)		(5 – 17)		(6 – 20)	

Characteristic	All participants (N = 319) Mean	SD	PS subsample (n = 249) Mean	SD	NS subsample (n = 69) Mean	SD
Insured (%)	86%		88%		77%	

Abbreviations: BC, Breast Cancer; PS, previously screened; NS, never screened; SD, standard deviation

- Knowledge Score: Higher Score means better knowledge
- Personal Attitude Score: Lower Score means better Attitude
- Religious (Morality Induced) Score: Lower Score means better Attitude
- Behavioral Score: Lower Score means better intention to screen in the future

Table 2

Probability of Receiving a Mammogram as Related to Religion, Knowledge, Attitude and Behavior

a. Probability of having had at least one mammogram

Predictor		SE*	95% CI	P
Baseline Odds of screening	3.67 Effect Size**	0.21	[2.38, 5.64]	<0.001
Attitude	0.51	0.29	[0.29, 0.90]	0.020
Knowledge	0.81	0.24	[0.51, 1.30]	0.370
Religion	0.58	0.28	[0.33, 1.01]	0.060
Behavior	0.52	0.31	[0.28, 0.96]	0.042

b. Probability of having had a mammogram in the year prior to the interview

Predictor		SE*	95% CI	P
Baseline Odds of screening	3.03 Effect Size**	0.20	[2.05, 4.49]	<0.001
Attitude	0.56	0.25	[0.34, 0.93]	0.035
Knowledge	1.09	0.23	[0.70, 1.72]	0.681
Religion	0.77	0.24	[0.49, 1.23]	0.274
Behavior	0.47	0.23	[0.30, 0.74]	0.001

Abbreviations: CI, Confidence Interval; P, P-value; SE, Standard Error

*The Standard Error is defined in the logit scale

**Multiplicative effect (per 1 SD change in the predictor) on the odds of screening

- Knowledge Score: Higher Score means better knowledge
- Personal Attitude Score: Lower Score means better Attitude
- Religious (Morality Induced) Score: Lower Score means better Attitude
- Behavioral Score: Lower Score means better intention to screen in the future

Table 3

Behavioral Score as Related to Religion, Attitude and Knowledge

Predictor		SE	95% CI	P
Average Behavioral Score	10.40 Effect Size *	0.13	[10.14, 10.67]	<0.001
Attitude	1.05	0.14	[0.77, 1.34]	<0.001
Religion	0.51	0.16	[0.19, 0.83]	0.004
Knowledge	0.019	0.16	[−0.28, 0.32]	0.90

Abbreviations: CI, Confidence Interval; P, P-value; SE, Standard Error

* Additive effect (per 1-SD change in the predictor) on the average behavioral score

- Knowledge Score: Higher Score means better knowledge
- Personal Attitude Score: Lower Score means better Attitude
- Religious (Morality Induced) Score: Lower Score means better Attitude
- Behavioral Score: Lower Score means better intention to screen in the future