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ORIGINAL PAPER

Knowledge of Breast Cancer and Screening Practices Among Iranian Immigrant Women in Toronto

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Abstract Breast cancer is a leading cause of mortality and morbidity in Canada. Secondary prevention through screening may enable early identification and treatment, but this is suboptimal among all Canadian women, particularly minority immigrant women. This cross-sectional exploratory study assessed breast health knowledge and practices among Iranian immigrant women residing in Toronto. Our sample included 50 adult women with no history of breast cancer. Results showed that, overall, participants had limited knowledge of breast cancer and screening practices. More than two-thirds had low knowledge scores; 22% did not know that the risk of breast cancer increases with age; about 50% did not know the recommended time interval for screening mammography; 72% did not know how frequently to undergo a clinical breast examination. Length of stay in Canada was associated with self-reported breast health practices. These findings highlight the need to educate Iranian immigrants about the role of screening to promote early identification of breast cancer in the absence of symptoms. Culturally sensitive educational materials should be developed to address their specific needs. Healthcare providers should also be educated about how to communicate breast health information effectively to immigrant women. Opportunistic teaching during each health encounter should be encouraged and reinforced.

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Introduction

In Canada, 1 out of 9 women will be diagnosed with breast cancer during her lifetime and 1 in 28 will die of it [1]. Currently, the best way to reduce breast cancer mortality is through early detection using recommended breast health practices (e.g., mammography screening, clinical breast examination, and "breast awareness" or a woman knowing what her breasts normally look and feel like) [2, 3].

Several studies have demonstrated that while women from minority ethnic groups have a lower incidence of breast cancer compared with white women, they have a higher prevalence of advanced breast cancer, poorer five-year survival, and higher rates of breast cancer mortality; these results have been linked to the women's limited knowledge and use of breast health practices in the disease's early detection [4, 5]. Despite tremendous efforts to fight breast cancer and the wealth of resources available in Canada, minority women disproportionately underutilize breast screening services [6–8]. For example, the 2008 Canadian Community Health Survey reported that 72% of women had a mammography in the past 2 years, up from 40% in 1990. However, mammography use was less common among subgroup populations including immigrant women. In 2008, 57% of recent immigrants (residing in Canada <10 years) were non-users, compared with 26% of Canadian-born women [9]. The underutilization of breast cancer screening by minority women warrants particular attention in countries with increasingly diverse populations like Canada. In 2006, Canada included over 200 different

ethnic groups, and 16.2% of the total population was a visible minority [10].

Kagawa-Singer and Kassim-Lakha [11] noted that "every culture defines what health is for its members, determines the aetiology of disease, establishes the parameters within which distress is defined and signalled, and prescribes the appropriate means to treat the disorder both medically and socially" (p. 578). Immigrants' health practices can remain heavily shaped and influenced by their homeland values and their expected code of practices. Studies of immigrant Asian women focusing on breast cancer and screening report that certain culturally-based norms, beliefs, and values hinder breast cancer screening. For instance, common beliefs among this population that cancer can be caused by simply thinking or talking about it may impede effective breast health communication [12–14]. Similarly, people who maintain culturally-based fatalistic beliefs about health, including some Africans, Hispanics, and Asians may be reticent to seek breast health information and/or care [15–17]. Moreover, homeland political and socio-economic conditions, in conjunction with linguistic and economic challenges after migration, could significantly affect minority women's awareness and knowledge about breast cancer and the available preventive services in their host country. For instance, the idea of prevention and early detection of a disease may be quite unfamiliar to non-European immigrants, particularly those from developing countries [18]. Empirical evidence also shows that after migration, immigrants encounter a variety of challenges when accessing health services (i.e., cultural, linguistic, economic, legal, systemic, and informational), which are linked to their underutilization of health services [19, 20]. These same factors may contribute to their underutilization of breast health screening services.

This study investigated knowledge of breast cancer, breast health practices, and barriers to breast health practices among Iranian immigrant women residing in Toronto, Ontario. Iranians are a fast-growing and relatively new community in Canada: census records from 1996 to 2006 reveal a 147% increase in the number of Persian-speaking Iranians living in Canada (154,385 in 2006; average annual growth rate of 14.7%). According to the 2006 census, about 60% of Iranians in Canada lived in Ontario; of those, 73,845 resided in Toronto. Canadian cancer data does not specify ethnicity. There is limited information about breast cancer prevalence among Iranian immigrant women residing in Canada, but studies conducted in Iran report breast cancer as one of the three leading causes of death among Iranian women, contributing to 14% of all deaths [21, 22]. Those studies also report a high proportion of advanced breast cancer in Iran and attribute this to women's poor awareness and knowledge of breast cancer and screening and the lack of early detection screening programs [23].

Our cross-sectional study was among the first to explore breast cancer and screening knowledge and self-reported breast screening practices among Iranian immigrant women. We also investigated the relationship between women's knowledge of breast health and their breast health practices. The results yielded useful information that can be utilized by healthcare providers and researchers.

Methods

Design

The study was part of a comprehensive investigation of Iranian immigrant women's beliefs, knowledge and practices related to breast cancer and screening, and their breast health information needs and preferred communication medium. This paper focuses on breast cancer knowledge and self-reported breast health practices.

Sample, Recruitment Strategies, Participants and Settings

Because this was an exploratory study, a convenience sample of 50 women was recruited using three methods: an advertisement was placed in community newspapers; posters about the study and contact information was placed at a variety of Iranian community centers and ethnic stores (Iranian senior and women centers, Iranian hair salons, and Iranian grocery stores) and participants were asked to identify additional eligible subjects (snowball sampling). We recruited from a wide variety of settings to reduce selection bias and generate a more representative sample. The target population was women who: (1) resided in Toronto; (2) were 25 years of age or older (due to the high proportion of advanced breast cancer reported in this population); (3) could communicate in Persian; (4) had emigrated from Iran to Canada <10 years ago; and (5) had no history of breast cancer.

Data Collection

The study protocol received ethics approval from Ryerson University. Data were collected over a four-month period (June–September 2008) during face-to-face interviews conducted in Persian by a bilingual research assistant (RA). The RA assessed the eligibility of participants, obtained consent, and set a convenient time and place for the interview. Responses to two questionnaires were gathered during the interviews, which took approximately 1 h. Both questionnaires were translated into Persian and back-translated into English by two bilingual researchers; the

accuracy of the translated version was checked by the author, who is fluent in Persian, and pilot-tested for flow, clarity, and comprehension.

The first questionnaire was a modified version of the Breast Cancer Knowledge Test (BCKT) [24]. Because this was developed while breast self exam (BSE) was commonly recommended, we deleted or modified some questions related to BSE as a screening method to capture newer breast awareness recommendations (we retained the term breast self exam). Several organizations such as the Canadian Breast Cancer Foundation and American Cancer Society support breast cancer awareness programs. These programs are based on the premise that when women are familiar with how their own breasts normally look and feel, they will be more likely to notice abnormal changes, enabling earlier detection of breast cancer [2, 25]. In place of some questions referring to BSE we asked questions to determine participant's awareness of breast cancer risk factors, its warning signs, and recommended screening practices. The final questionnaire contained 19 multiple-choice questions about breast cancer awareness and breast health practices. Only one option for each question was correct, and so a correct response was scored as "1" and an incorrect response was scored as "0." Each participant's overall baseline knowledge was assessed using her total score, which could range from 0 to 19.

The second questionnaire had two parts: a section on socio-demographic and clinical characteristics and breast health practices; and a section on views about breast health awareness (BSE) and practices (CBE, and screening mammography) including perceived benefits and barriers of undertaking those practices. Socio-demographic data included age, education, marital status, income, and length of stay in Canada (as a proxy for acculturation since none of the existing acculturation scales have been validated for this population). Length of stay has been used previously as a proxy for acculturation [26]. Clinical data included family history of breast cancer, self-reported health status, and personal breast health problems. Outcome variables (Breast awareness (BSE), CBE, screening mammography) were first defined and then participants responded to questions such as "Ever examined your breasts" (Yes/No), "Ever had CBE" (Yes/No) and "Ever had screening mammography" (Yes/No). Women who responded affirmatively were asked to include the date of their last examination. Open-ended questions were also used to elicit any perceived barriers and benefits of undertaking breast health practices.

Analysis

Data were analyzed using SPSS version 16.0. Descriptive statistics summarized participants' socio-demographic/clinical health characteristics and their knowledge. Next, bivariate statistics (chi-square and Student's *t*-test) were used as appropriate to test for overall knowledge differences by some of the socio-demographic/personal health characteristics. Mean overall baseline knowledge score across "yes" or "no" self-reported screening subgroups were compared using a *t*-test. When possible, logistic regression was used to assess the extent to which the variance in participants' self-reported breast health screening practices could be explained by their breast health knowledge in conjunction with other potential covariates that may be associated with breast screening practices. Due to our small sample size, only socio-demographic variables that were significantly associated ($P \leq 0.05$) with breast health practices at the bivariate level were used in the regression analysis. The probability of making a type I error was set at 0.05 with a two-sided significance for each of the statistical tests. However, the overall probability may be greater than 0.05 because several statistical tests were run during this research. Income was not included in analyses because 48% of subjects refused to disclose it.

Comments in response to open-ended questions and accompanying field notes were content-analyzed using constant comparison. We systematically read the text, highlighted important passages and words, and organized these into relevant themes and categories. Integrity in coding and data interpretation was maintained through strategies of credibility (i.e., peer debriefing). Frequency counts of respondents' perceived usefulness and barriers for each breast health practice were also obtained.

Results

Of the 62 women who expressed interest in the study, 50 completed both surveys (response rate: 80%). Of the 12 women who did not complete the surveys, 8 indicated they were not interested but did not provide a reason, and four cited lack of time.

Socio-Demographic and Clinical Characteristics

Participants' age ranged from 29 to 66 (mean 45) years (Tables 1, 2). Most subjects were married (64%); 56% had completed university (bachelor degree or higher) and about 16% had a grade 12 education or less. On average, subjects had lived in Canada for 6 years; 30% had been in Canada under 5 years. Approximately 42% rated their English proficiency as "poor." Of those who reported income, 42% reported a family income of <$30,000. About 78% rated their health as "good" to "excellent." Fewer than 25% reported a family history of breast cancer.

Table 1 Socio-demographic/clinical characteristics of participants

Socio-demographic/ clinical characteristics	Overall group $N = 50$
Age	Mean 45 ±10 (SD); Min 29, Max 66
29–49	33 (66%)
50–66	17 (34%)
Education	
Grade 12 or less	8 (16%)
Some university/some or completed college	14 (28%)
Bachelor degree or higher	28 (56%)
Marital status	
Married/common law	32 (64%)
Single/divorced/widow	18 (36%)
Length of stay in Canada	
<than 5 years	15 (30%)
≥5 years	35 (70%)
Household income	
Low (<$30,000)	11 (22%)
Medium ($30,000 ≤ 60,000)	10 (20%)
High (> $60,000)	5 (10%)
Not stated	24 (48%)
Self-reported health status	
Excellent	21 (42%)
Good	18 (36%)
Poor	11 (22%)
English language ability	
Limited ability to communicate in English	21 (42%)
Good ability to communicate in English	29 (58%)
Family history of breast cancer	
Yes	11 (22%)
No	39 (78%)

Table 2 Frequency of breast self-examination and clinical breast examination and screening mammography

BSE	
Ever examined breasts	32 (64%)
At least once a month	8 (16%)
Once every 2–3 months	9 (18%)
2–3 months	15 (30%)
CBE	
Ever had CBE	34 (68%)
Once a year	14 (28%)
Only once	12 (24%)
Other (e.g., only when they hurt/pain)	8 (16%)
Screening mammography	
Eligible women aged 50 and older	17 (34%)
Of eligible women aged 50 and older who ever had mammography	9 (18%)
Every 1 year	0
Every 2 years	0
2 years or more	5 (10%)
Other (e.g., only when they hurt/pain)	4 (8%)

Knowledge of Breast Cancer and Screening

Overall, participants had limited baseline knowledge about breast cancer and screening practices. Knowledge scores ranged from 5 to 18 (mean 9.8, median and mode 10, standard deviation of 2.9); no participant obtained a perfect score. Distribution was slightly negatively skewed (0.61) but this was not significant (Kolmogorov–Smirnov test, $P = 0.69$). Most (70%) participants had low scores, responding correctly only to 5–10 of the 19 questions. Analysis of the individual questions revealed that the majority of participants did not know at what age to start BSE, how or when to perform BSE (before, during, or after their menstrual period), or what signs/symptoms to look for. Over 72% of participants erroneously associated breast pain with early breast cancer. About 42% did not know that CBE could help identify early breast cancer, and about 72% were not aware of the appropriate time interval for CBE. Many did not know the difference between a mammography and other methods of breast cancer prevention or the appropriate time interval for mammography. Over 22% were unaware that breast cancer risk increases with age and nearly 30% were unaware that regular breast cancer screening can have a considerable effect on disease outcome.

Mean overall baseline knowledge differed across subgroups (e.g. age groups of 29–49 vs. 50–66, marital status, education, length of stay in Canada, English proficiency, self-reported health status), but the differences were not statistically significant.

Breast Health Practices and Perceived Usefulness

Being Breast Aware (BSE)

Approximately 64% ($n = 32$) of participants indicated they performed BSE, but only 16% of them did so regularly (monthly). Those who had performed BSE had significantly higher mean knowledge scores than those who had not (Table 3). Participants who had lived in Canada over 5 years were more likely to report performing BSE than those residing in Canada under 5 years (74% vs. 40%, $\chi^2 = 5.36$, P-value = 0.02). Of those with limited English skills, 48% did not perform BSE, compared with 28% of those with good English skills, but this difference was insignificant. BSE rates did not differ significantly by age, marital status, education, or self-reported health.

Table 3 Knowledge of breast cancer and screening by breast health practices

	n	Mean knowledge scores (SD)	Min, Max	*P*-value
BSE				
Ever performed BSE	32	10.72 (2.8)	6, 18	$t = 2.89$
Did not perform BSE	18	8.39 (2.6)	5, 14	$P = 0.006$
CBE				
Ever had CBE	34	10.29 (2.4)	6, 17	$t = 1.47$
Did not have CBE	16	9.00 (3.7)	5, 18	$P = 0.15$
Screening mammography (overall sample)				
Ever had mammography	9	12.11 (1.8)	10, 14	$t = 2.67$
Did not have mammography	41	9.39 (2.9)	5, 18	$P = 0.01$
Screening mammography (eligible women 50–56)				
Ever had mammography	9	12.11 (1.8)	10, 14	$t = 5.54$
Did not have mammography	8	7.75 (1.5)	5, 9	$P < 0.001$

The majority (98%) considered BSE to be useful if done properly whether or not they actually performed BSE. The main reason provided was that it helps familiarize women with their own bodies, helping them detect abnormalities. Many women reported that they lacked the knowledge and skills required to perform BSE. The top four barriers to performing BSE were "insufficient knowledge and skills to perform BSE" (72%), "not knowing what to look for" (58%), "fear of finding a lump" (56%), and "lack of time to dedicate to one's health" (48%). Those who did not perform BSE believed either that it was pointless to find the disease when there is no cure or that they cannot change their destiny when God had decided for them to have the disease.

We conducted a backward stepwise multiple logistic regression with "ever having BSE" as the outcome variable. Due to our small sample size, we included only variables with a significant association to BSE status at the bivariate level: breast cancer knowledge, length of stay, and interaction between knowledge and length of stay. The omnibus tests of the final model coefficients were statistically significant (*P*-value = 0.001). The variables in the final model explained only 34% of variation in the predicted variable ($R^2 = 34\%$). The main correlates of BSE appeared to be knowledge of breast cancer and screening practices ($P < 0.001$) and the interaction between women's knowledge and their length of stay in Canada ($P = 0.02$) (Table 4). The likelihood of "ever performing a BSE" increased by 59% with a 1-unit increase in knowledge. Women who had lived in Canada under 5 years were 16% less likely to report ever performing a BSE than those who had not. We cross-tabulated Iranian women length of stay by their knowledge and BSE and found that a longer stay in Canada appears to be associated with a greater likelihood for ever performing BSE (Table 5). Women with low breast health knowledge (total score ≤10) who had lived in Canada 5 years or more were nearly twice as likely (63% vs. 36%) to report ever performing a BSE than those with low breast health knowledge who had lived in Canada for under 5 years.

Table 5 Interaction between knowledge, length of stay in Canada, and BSE

Length of stay	Low overall knowledge score (≤10)		High overall knowledge score (≥11)	
	% Ever performed BSE	% Not performed BSE	% Ever performed BSE	% Not performed BSE
Under 5 years	36.4	63.6	50%	50%
5 years or more	62.5	37.5	100%	0%

Table 4 Logistic regression analysis: correlates of breast self-examination

	Regression coefficient (B)	Std. error (SE)	Wald test	*df*	*P*-value	Odds ratios	95% confidence interval for odds ratios	
							Lower	Upper
Knowledge of breast cancer and screening	0.464	0.166	7.832	1	0.005	1.59	1.149	2.201
Overall knowledge by years lived in Canada	−0.174	0.076	5.204	1	0.023	0.84	0.723	0.976
Constant	−3.254	1.467	4.923	1	0.027	0.39		

Clinical Breast Examination

Approximately 68% (34) of participants reported ever having CBE, but only 28% of these reported having regular CBE (once a year). Women who reported having CBE had a higher mean knowledge score than those who did not, but this result was not statistically significant (Table 3). Participants who had lived in Canada over 5 years were more likely to report having CBE, albeit not regularly, than those residing in Canada under 5 years (77% vs. 47%, $\chi^2 = 4.48$, $P = 0.034$). Women who had lived in Canada under 5 years were 74% less likely to report ever having CBE than those who had lived in Canada over 5 years. Of those with limited English skills, 38% reported never undergoing CBE compared with 28% of those with good English skills, but this difference was not significant. CBE rates did not differ significantly by other SES and clinical characteristics. We found a slight but significantly positive correlation between BSE and CBE (Spearman correlation coefficient = 0.3, *P*-value = 0.042). Of those who had ever undergone CBE, 74% also reported performing BSE, compared with only 44% of those who had never undergone CBE.

Whether or not our participants underwent CBE, the great majority (98%) considered it to be useful because they strongly believed in physicians' ability to detect of any abnormalities. The major barrier to having CBE, mentioned by approximately half of participants, was "lack of time to devote to one's health/wellbeing." They reported that limited social support, being the primary family caregiver, and financial worries after migration left them minimal time to think about their own health. Several stated that they were not used to going to a doctor (and 'wasting the physician's time) if they were not experiencing any health problem.

They also reported systemic barriers such as "insufficient information and care by attending physicians" (34%) and personal barriers such "limited English proficiency" (38%) and "limited knowledge about available breast health resources" (36%).

Screening Mammography

About 66% ($n = 33$) of participants were excluded from mammography screening due to their age, but most had heard about mammography as a useful diagnostic, but not screening, tool. About half were unaware of recommended screening guidelines and the need for screening in the absence of symptoms. Some were concerned about false positive results and radiation. Of the 17 subjects aged 50 and older who were eligible to undergo screening mammography, only 9 reported having had a mammogram; of these, 6 had it because they had experienced breast problems. Of the remaining 3, only 1 reported having a mammography within the past 2 years. Overall knowledge was significantly greater among those aged 50 and over who had undergone mammography than those who had not (Table 3). Our analyses were limited due to the small sample of women who reported undergoing mammography.

Discussion

This was among the first research to explore knowledge of breast cancer and breast health practices among Iranian immigrant women. The study had some limitations. First, the small sample size and lack of random sample diminishes generalizability to the total population of immigrant Iranian women. Selection and participation biases might have resulted in a non-representative sample of Iranian women, which could also have compromised the generalizability of the results. Although not ideal, the convenience sampling method was necessary because no sampling frame was available for this hard-to-reach population.

Second, some women seemed slightly uncomfortable during interviews, so this approach to data collection may have influenced their full disclosure of subject matter. Iranians, like South Asians, Chinese, and Hispanics, tend to avoid discussing cancer for fear of bad luck [12–14, 17, 27]; this may have caused discomfort. Some may have also been concerned about providing the 'right' answers and not appearing uninformed, or may have provided answers they thought meshed with the interviewer's medical background. However, some shared their views and practices after good rapport was established. Third, many statistical tests were run on small sample during this research, and so the overall probability of committing a Type I error may be much greater than 0.05. Future large-scale longitudinal studies would be beneficial to determine the true nature of associations reported here. Finally, approximately 48% of the participants refused to disclose their income, which hindered the inclusion of income in the data analysis.

Despite these possible limitations, our study demonstrated the limited breast health knowledge among immigrant Iranian women. Many study participants were unaware of important risk factors for breast cancer. Over 50% of participants did not know when or how to perform breast self-examination or what the recommended guidelines were for CBE or screening mammography. If we had asked subjects to provide information in their own words, their levels of knowledge about breast cancer and screening may have been considerably lower than estimated. Our use of a multiple-choice questionnaire may have prompted the selection of the correct response. Nevertheless, the knowledge gap about breast cancer and screening practices is concerning: two-thirds of subjects responded incorrectly to over half the questions, despite relatively high levels of education. Their

limited breast health knowledge may be partly related to their homeland health-care experiences. The Iranian healthcare system requires patients to bear the burden of costs, and so they seek medical treatment only when experiencing symptoms that cannot be managed through home remedies; in addition, it has few screening programs or policies for early disease detection and does not focus prevention [23]. Iran's high cost of living, high unemployment rate (12.5% in 2008, according to the Iranian government), and its lack of universal health care may impede the adoption of preventative health behaviours and may partially explain the observed low knowledge levels among our participants despite socio-demographic differences.

Our research highlights a knowledge gap and inadequate skills related to being breast aware (BSE) and other modes of breast cancer screening in our study population. Although this study corroborates findings from studies conducted in Iran [23, 28] it is among the first to demonstrate that this knowledge gap continues to exist among Iranian women even after migration to a host country with universal health care and abundant breast health resources. Overall mean knowledge scores did not differ significantly by length of stay in Canada. One possible explanation for this finding is that existing Canadian breast health programs/services may not culturally be diversified to address the specific information needs of its multiethnic cohabitants. This warrants a thorough examination of the cultural appropriateness of existing breast health information, services, mode of delivery, and presentation to the Iranian population. Mere translation is insufficient to generate changes in knowledge, attitudes, and skills; many ethnic groups require culturally-specific information that respects their customs and rituals and addresses their distinct health information needs [29]. Thus, tailoring breast health information to address Iranian women's knowledge gaps may facilitate their knowledge and uptake of breast screening practices.

Knowledge is considered to be an important factor in health-related behaviour [30]. However, our results substantiate earlier studies that suggest the adoption of preventive health behaviours may not solely be dependent on knowledge of breast cancer and screening and factors like cultural practices, linguistic and structural barriers may play a significant role in accessing breast health services [12–16]. Self-reported BSE, CBE were significantly higher among non-recent than recent Iranian immigrants. Similarly, although a very small proportion of participants reported undergoing mammography (used as a diagnostic versus screening tool), rates were also higher among non-recent than recent immigrants. Length of stay in Canada (proxy for acculturation) appeared to be the main correlate for CBE and an effect modifier (interaction with knowledge) for BSE. Thus our findings possibly suggest that immigrant women's breast health *practices* might be influenced by their acculturation process, regardless of their actual knowledge of breast health. In Canada, CBE is part of a woman's annual physical exam; if women are not having regular CBEs, they may not be having annual physical exams. This also highlights a lack of preventive health behaviour. In our study, time in Canada increased the likelihood of participants ever having a CBE and/or ever performing BSE, but did not increase the likelihood of them following recommended breast health guidelines (annual CBE). This highlights the need to inform and educate healthcare professionals about the communication needs of minority women, and the need to take advantage of each health encounter to communicate preventive breast health practices. Iranian women are often more concerned with the health of their family than their own, and so prominent displays of breast health/disease prevention information in doctor's offices may promote knowledge among women seeking care for their children.

Many participants reported seeing a physician only if they experienced symptoms; this cultural attitude may have contributed to the lack of association between CBE and breast cancer knowledge. Furthermore, unlike BSE, CBE requires travelling to a physician's office and a functional level of English proficiency to communicate with the healthcare provider. Some subjects relied on husbands/family/friends to interpret during medical appointments. Some reported that their physician did not provide them with breast health information. Several studies have found that breast screening practices are associated with a physician's recommendation [31, 32], and lack of physician recommendation has been identified as a major barrier to accessing screening services [4]. Dunn et al. [33] examined primary physicians' likelihood of discussing screening tests and the factors that influence the quality of these discussions; 34% of physicians reported that they did not discuss screening tests (including mammography) with their patients. The most common barriers to these discussions were lack of time, complexity of the topic, and language barriers. Therefore, healthcare professionals need to be educated about the breast health needs of immigrant clients, to provide information opportunistically during health encounters, and to notify women when they are due for their annual check-up.

Very few participants reported undergoing mammography, but their comments revealed that many Iranian women consider mammography to be a diagnostic method recommended by their physician to confirm the disease rather than a screening tool. The significantly higher levels of breast cancer knowledge among women who reported undergoing mammography may be related to the threat of breast cancer that they have faced. Given Iranian women's lack of information in terms of preventive measures and

their health habits, they are less likely to perceive themselves as at risk for breast cancer and less likely to believe that breast cancer could be asymptomatic.

Many breast health information materials focus on symptoms. This approach is important to raise awareness, but it may not address the specific breast cancer screening needs of minority women. Breast health communication information should focus on issues that are culturally relevant, important, and useful to minority women such as clarification of asymptomatic breast cancer.

Our results indicate that regardless of whether participants engaged in screening practices, most considered both BSE and CBE to be useful. Social desirability bias may have influenced their responses; in view of the interviewer's medical background, subjects may have provided responses that they felt would be acceptable and appropriate. Also, more barriers were identified by women who reported performing BSE or having CBE compared with those who did not. One explanation for this is the use of open-ended questions to elicit their opinions: women who had not engaged in the screening practices may have been at a disadvantage as they did not have any actual experience with the practice. It is possible that those who did not perform BSE or had only undergone CBE reported only the barriers that prevented them from undertaking the activity, but those who did perform BSE or undergo CBE may have been able to provide a better account of the barriers encountered both before and during the activity.

Conclusions

This study provides insights into the breast cancer knowledge and breast health practices of Iranian immigrants in Toronto. Our findings revealed that their awareness and knowledge of breast cancer and effective screening methods (CBE and mammography) was inadequate. Breast health education is urgently required to raise this group's awareness of breast cancer and screening methods. However, culturally sensitive and appropriate breast health educational materials are required to address the specific information needs and to challenge the pre-existing beliefs about breast cancer and screening. For instance, using the third person, positive framing and non-fear provoking messaging to communicate breast health information could be effective in breast health communication with ethnic minority women such as Iranians who may view breast cancer as a deadly disease and believe that cancer can be caused by simply discussing it [12, 14]. It may also be useful to highlight how breast cancer can occur in the absence of symptoms. Physicians and other healthcare providers should also be educated about breast health communication with minority women and be encouraged to incorporate breast health teaching during each health encounter. Physicians should also send reminders to patients about their annual check-up and use the encounter to promote health prevention behaviours. Large-scale prospective longitudinal studies will be needed to clarify the true nature of associations reported here and to identify the breast health information needs and preferred method of communication within this community.

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