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Research Article

Breast Cancer Risk Perception and Screening Behaviors of Iranian Women

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Abstract

Background: Previous studies have shown that breast cancer (BC) risk perception could be a motivation for screening behaviors. This study was conducted to compare the level of BC risk perception of women aged between 30-40 and 41-60 years, and to determine the factors affecting screening behaviors and examine the association between BC risk perception and BC screening behaviors.
Methods: This cross-sectional study was performed using a Rutherford instrument for BC risk perception on 754 women aged 30 to 60 years with no history of BC in 2018. The questionnaire included demographic information, risk factors of BC, screening practice, and risk perception of BC. The association between screening behaviors with women's BC risk perception and some other variables were assessed utilizing pathway analysis method with the Structural equation modeling (SEM), which summarized the results by odds ratio index.
Results:The mean score of BC risk perception was 28.9±24.3, which was 31.2±24.4 in women aged 30 to 40 and 25.9±23.9 in women aged 41 to 60 years (P value = 0.003). The association between mammography with risk perception was (OR:1 [95%CI: 0.9, 1]). According to this study, the most important variables affecting mammography were increased clinical examination (OR: 34.6 [95%CI: 16.3, 73.7]), age (OR: 8.8 [95%CI: 4.9,16]), family history of breast cancer (OR: 4 [95%CI: 1.3, 12.9]), and higher education level ([OR: 1.4[95%CI: 1.1,1.9]).
Conclusions: The results of our study indicated that younger women had higher BC risk perception. BC risk perception was not found to have any direct effects on mammography. This survey revealed that physicians had an important role in encouraging women to perform mammography.

***Keywords*:** Breast cancer, Risk perception, Mammography, Iran

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1. Introduction

Breast cancer (BC) is the most prevalent type of cancer among women in 143 countries and the leading cause of cancer-related mortality among women in 112 countries. An estimated 2,000,000 new cases of BC were reported globally in 2017 (1). BC is the third most common cancer among all cancers in Iran (2). Certain studies have reported an increase in BC incidence in women younger than the age of 40 over the recent years (3). The increase in screening cases has been reported as one of the factors influencing the increase in the incidence of BC in the recent years (4, 5). On the other hand, screening tests are the most important factors in reducing BC morbidity and mortality (6).

Risk perception is a cognitive judgment about the risk of getting sick (7). Some studies have identified risk perception as one of the most important components affecting preventive behaviors related to health and disease (2, 8, 9). Risk perception could be a motivation for screening tests (7). Researchers have reported diverse results of the association between risk perception and BC

screening tests such as mammography (10-12). Mammography screening in the ages between 40 and 49 has been shown to reduce BC deaths by 15% to 20% (6). A survey conducted on families on the risk of BC indicated that the adherence of screening tests was 83% in Germany (12). On the other hand, in a study done on women aged 35 to 69 years in Iran, the adherence of women to recommended mammography in the screening programs was 3.8% in urban and 16.3% in rural areas (13). The BC screening test is performed for free in public health centers of Iran. The target group of BC screening program in Iran are women aged 30 to 69 years. The Health Ministry of Iran recommends that BC screening test be performed as follow: (1) annual mammography in women aged 40 years and older; (2) annual clinical examination in women aged 40 years and older and in women between the age of 30 and 40 years every 2 years; and 3) breast self-examination in women aged 20 and older every month (14).

This study aimed to compare the level of BC risk perception of women aged 30 to 40 and 41 to 60 years, specify the factors affecting BC risk perception and screening behaviors, and examine the association of BC risk perception with BC screening behaviors.

2. Methods

This cross-sectional study was conducted to evaluate women's BC risk perception and BC screening behaviors and to investigate certain factors affecting them in 2018, in Kerman, Iran. Kerman, in the southeast of the country, is one of the largest provinces of Iran.

The inclusion criteria for the contributors comprised females, in the age range of 30 to 50 years, residing in Kerman, and not having breast cancer. We selected women in the age range of 30 to 60 years since various studies have reported an increase in the BC incidence, specifically in young women, over the recent years. Therefore, we chose this age group to compare the risk perception and screening behaviors in women aged between 30 and 40 to those in women aged between 41 and 60 years and to specify the factors affected by screening behaviors in this age group. The base sample size to run this study was 414 people, based on previous studies considering the mean and standard deviation of women's BC risk perception (23.7 ± 13.4, d=1.3, α=0.05) and the design effect (1.2) (15). Given the fact that the data analysis was performed based on six variables (1. age, 2. marital status, 3. education level, 4. occupation, 5. insurance status, and 6. evaluation of underlying risk factors for BC), for each variable, 10% was added to the base sample size and the final sample size was calculated to be 747 people (16).

A multistage stratified sampling was done, through which Kerman was divided into three districts based on low, medium, and high socioeconomic status, according to the opinions of the governorate experts. Subsequently, in each district, five streets were randomly selected and the interviews were conducted in crowded streets. In each street, 50 women were recruited, out of whom 25 were 30 to 40 years old and 25 were 41 to 60. They were selected via convenient sampling method. To reduce the sampling error, we employed the stratified sampling method based on socioeconomic level, age, and education level of the individuals. In addition, the interviews were done in different weeks and day times.

Measures

The interview was conducted using a four-section instrument tool. The first section included demographic characteristics (age, marital status, education level, employment status, and insurance status). The second section was about BC risk factors; the items were based on the screening checklist of Iran Health Ministry, including gynecological history (the first menstruation before the age of 12, childbirth after the age of 30, and history of infertility), history of breast benign disease, breast biopsy, radiotherapy of chest, and BC family history (responses to these items were yes/no). The third section was about BC screening tests of women at least once or more by yes/no answers (self-examination, clinical examination, and mammography). Finally, BC risk perception was measured with Rutherford questionnaire (17). The questionnaire was translated to Persian and retranslated to English by two different translators. The content and face validity of the questionnaire were tested by 12 experts and 30 participants through CVR and CVI index. The CVI and CVR index of the questionnaire were 65% and 84%, respectively. The internal consistency of the questionnaire was assessed using Chronbach's alpha, which was 72%. The BC risk perception instrument inquires about the likelihood of developing BC during lifetime by Likert scale and giving a score of 0 to 100, with 0 indicating definitely will not get breast cancer to

100 indicating definitely will get breast cancer. Based on the above-mentioned questionnaire, by excluding family history of BC, the risk factors were categorized into three groups: low risk group if there were no risk factors, medium risk if there was one risk factor, and high risk if there were two or more risk factors.

Trained female interviewers carried out face to face interviews with the subjects. The interview was done after explaining the purpose of the study and obtaining verbal consent from the participants. The study protocol was approved by the Ethics Committee of Kerman University of Medical Sciences (IR.KMU.REC.1396.1617).

Statistical analysis

The difference between the two age groups of 30 to 40 and 41 to 60 was evaluated utilizing Chi-square for grouped variables and t test for numerical variables. The factors were associated with BC risk perception and mammography was examined with pathway analysis using the SEM model were summarized by estimating odds ratio index (OR) and respective 95% confidence interval (CI). In the SEM model, the direct association between age, education level, high risk group, family history of breast cancer, insurance status, and job and BC risk perception and mammography was assessed. Moreover, the indirect association of these variables on mammography through risk perception was examined. We also investigated the direct association of BC risk perception on breast self-examination and clinical examination. In addition, the indirect association of BC risk perception on mammography was determined through breast self-examination and clinical examination. The descriptive analysis and pathway analysis were carried out via STATA14 software at a significance level of less than 5%.

3. Results

In the present study, 778 questionnaires were completed and the response rate was 91%. Following data cleaning, according to inclusion and exclusion criteria, 24 cases were excluded due to having BC or being over 60 years old; therefore, 754 cases were analyzed. Herein, about 58% (N = 441) of women were aged 30 to 40, most of whom (78%) had academic education, which was significantly higher than that in those aged 41 to 60 years (64%) (P value <0.001). Furthermore, two out of three subjects lived in the middle and lower socioeconomic areas (63%) and were housewives (60%) and most of them had health insurance (95%). The mean score of BC risk perception in these women was 28.9±24.3 with mean 0 and maximum 100. The BC risk perception score of those aged 30 to 40 was significantly higher than that in those with 41 to 60 years of age (P value =0.003; Table 1).

Table 1: Demographic characteristics of the participants

Variable	Category	Women 30-40 years old (N=441)		Women 41-60 years old (N=313)		P value
		N	%	N	%	
Education	Illiterate	39	8.8	31	9.9	<0.001
	Intermediate	18	4.1	42	13.4	
	High school	41	9.3	38	12.1	
	Under graduate	195	44.4	123	39.2	
	Graduate	148	33.6	79	25.2	
Region of residence	High	165	37.4	115	36.9	0.9
	Medium	135	30.6	92	22.5	
	Low	141	31.9	105	33.6	
Job	Home care	252	57.1	194	61.9	0.183
	Employed	189	42.9	119	38.02	
Insurance	No	29	6.6	10	3.2	0.04
	Yes	412	93.4	303	96.8	
Marital status	Married	367	83.2	262	83.7	<0.001
	Single	54	12.2	12	3.8	
	Divorced	11	2.5	8	2.6	
	Widow	9	2.04	31	9.9	
Risk Perception (Mean± SD)		31.2	24.4	25.9	23.9	0.003

Breast cancer risk factors

In the present study, 56% (426 people) of the participants reported a family history of BC and there were no significant differences between the women aged 30 to 40 years and 41 to 60 years. The history of at least one pregnancy in those aged 41 to 60 years was significantly higher than that in those aged 30 to 40 years (P value <0.001).

We observed no significant differences between the women aged below 40 and older women and 93% (590 people) had their first delivery at the age of 30 or younger. The age of the first menstruation in 89% of women were at least 12 years old (672 people) and less than 3% of them had a history of breast biopsy.

In both of these variables, there were no significant differences between the subjects aged younger than 41 years old and those older than that age. About two out of three women aged 30 to 40 and 41 to 60 years had at least one risk factor (Table 2).

Women's performance in breast cancer screening tests

According to this study, 46% (N=203) of the women aged 30 to 40 and 54% (N=237) of those aged 41 to 60 years did breast self-examination. On average, 35% (N=154) of the participants aged 30 to 40 years and 48% (N=150) of those aged 41 to 60 years had clinical examination of the breast. Additionally, 11% (N = 48) of the women aged 30 to 40 and 35% (N = 118) of those aged 41 to 60 years had mammograms at least once (Figure 1).

The association between mammography and breast cancer risk perception and other underlying variables. According to the results of the pathway analysis, BC risk perception had a negative association with education level and older age, which was OR: -1.8 [95%CI: -3.3, -0.3] and OR: -5.8 [95%CI: -9.6, -1.9], respectively.

Table 2: Comparison of breast cancer risk factors in the subjects aged 30 to 40 and 41 to 60 years

Variable	Category	Women 30-40 years old		Women 41-60 years old		P value
		N	%	N	%	
History of breast cancer in close relative	NO	422	95.9	299	95.5	0.8
	Yes	18	4.1	14	4.5	
History of pregnancy	NO	88	19.9	24	7.7	<0.001
	Yes	353	80	289	92.3	
Delivery age	Under 31 years	324	93.9	266	92.7	0.5
	31 and Upper	21	6.1	21	7.3	
Menarche age	Under 12 years	393	89.1	279	89.7	0.8
	12 years and upper	48	10.9	32	10.3	
History of radiotherapy	NO	434	98.4	300	95.9	0.03
	Yes	7	1.6	13	4.1	
History of Breast Biopsy	NO	432	97.9	304	97.1	0.5
	Yes	9	2	9	2.9	
High Risk Group a	Low (0)	237	69.3	194	65.3	0.5
	Medium (at list one factor)	88	25.7	83	27.9	
	High (two factor or more)	17	4.9	20	6.7	

Risk perception (OR: 3.3 [95%CI: 0.04, 6.5]) had a direct positive relationship with a family history of breast cancer (OR: 12.7 [95%CI: 2.8, 22.7]) (Table 3, Figure 2).

Mammography was also found to have a direct association with education level (OR: 1.4 [95%CI: 1.02,1.9]), age (OR: 8.8 [95%CI:4.9, 16], high risk group (OR: 1.6 [95%CI: 1, 2.4], family history of BC breast cancer (OR: 4 [95%CI: 1.3, 12.9], and clinical examination (OR: 34.6[(95%CI:16.3, 73.7]). Risk perception was indirectly correlated with mammography through its impact on breast self-examination and clinical examination (Table 3, Figure 2).

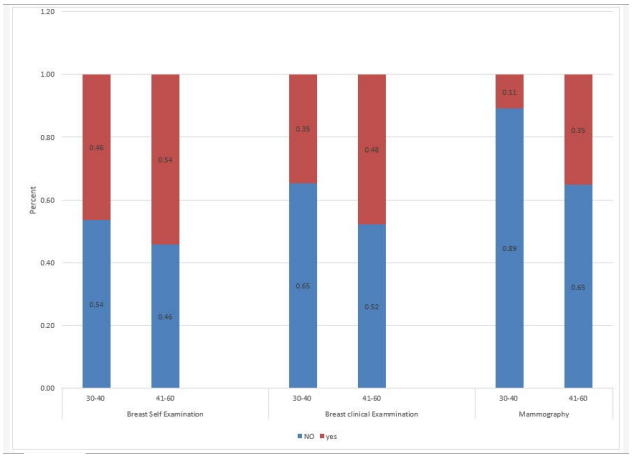

Figure 1: The figure shows comparison of screening behaviors in the participants aged 30 to 40 and 41 to 60 years.

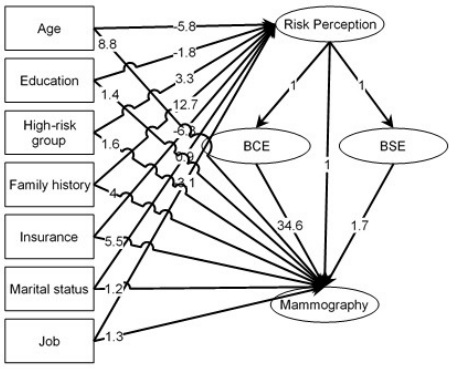

Figure 2: The figure shows the association between breast cancer risk perception and breast cancer screening behaviors and some underlying variables in the participants aged 30 to 40 and 41 to 60 Years.
*(BCE: Breast Clinical Examination; BSE: Breast Self-Examination)

Table 3: The association between breast cancer risk perception and breast cancer screening behaviors and some underlying variables in the subjects aged 30 to 40 and 41 to 60 years

Predictor of Variable	Trough	Causal Effect of Mammography (OR)[a]			Causal Effect of Risk Perception (OR)[a]
		Direct	Indirect	Total	Direct
Education (Illiterate)	Risk perception	1.4 (1.02,1.9) *	(0.8 ,-2.4) -0.8	0.6 (-1.4, 2.7)	-1.8 (-3.3, -0.3) *
High risk group (Low)	Risk perception	1.6 (1, 2.4) *	(7.5 ,0.9) 4.4	5 (1.9, 9.9) *	3.3 (0.04, 6.5) *
Family History of breast cancer (No)	Risk perception	4 (1.3, 12.9) *	** (23.7 ,3.7) 13.7	17.7 (5, 36.6) **	12.7 (2.8, 22.7) *
Age (30-39 vs 40-50 years)	Risk perception	8.8 (4.9, 16) **	(-0.8 ,-8.7) -4.8	4 (3.8, 15.4) **	-5.8 (-9.6, -1.9) *
Insurance status (No)	Risk perception	5.5 (0.4, 76.1)	(3.6 ,-14.3) -5.3	0.2 (-13.9, 79.7)	-6.3 (-15.2, 2.6)
Job (home care)	Risk perception	1.3 (0.7, 2.3)	(-6.4,2.1) -2.1	-0.8 (-5.7, 4.4)	-3.1 (-7.3, 1.1)
Marital status (single)	Risk perception	1.2(0.9, 1.6)	(5 ,-0.8) 2.1	3.3 (0.1, 6.6)	0.9 (-1.7, 3.4)
BSE [b](No)	_____	1.7 (0.9, 2.9)	_____	_____	_____
BCE [c](No)	_____	34.6 (16.3, 73.7) **	_____	_____	_____
Risk perception	_____	1 (0.9, 1)	_____	_____	_____
Risk perception	BSE [b]	1.0009 (0.9, 1.007)	1.7 (1.8, 2) *	2.7 (2.7,3) *	_____
Risk perception	BCE [c]	1.004 (0.9, 1.009)	34.6 (16.9, 74.7)*	35.6 (17.8, 75.7) **	_____

a: Odds Ratio, b: Breast Self-Examination, c: Breast Clinical Examination, * P value<0.05%, ** P value<0.01%

4. Discussion

This work was conducted to specify the BC risk perception in women and its association with screening behavior. According to the present study, the mean score of risk perception of BC among the participants was 28.9 ± 24.3 and the variables that directly affected mammography were older age, higher education level, high risk breast cancer group, family history of BC, and clinical examination. A Canadian study on 205 cases had a sister newly diagnosed with BC, which assessed the risk perception applying the same method as we did, reported that the average risk perception in sisters of BC patients was 34.6 with a minimum value of 0 and a maximum of 100 (18). The average of BC risk perception of the participants in this research was relatively low. Given that several studies have reported an association between risk perception and a family history of BC (10, 19-21), higher risk perception in the Canadian study may be due to the study group. Most studies aligned with our study have suggested a significant association between mammography and family history of BC,

clinical examination, and upper education level (19, 20, 22, 23).

Considering the fact that women with a family history of BC are more likely to develop BC, they are more likely to do a mammogram or repeat it. Our survey indicated a strong association between mammography and the advice of health professionals. Certain studies have also confirmed the fact that women who underwent a clinical examination for BC screening were more likely to have a mammogram (24).

Our study revealed the indirect effect of BC risk perception on mammography through clinical examination and breast self-examination. Some studies have reported a direct association between risk perception and mammography (20, 24, 25), yet some others have suggested that it was an indirect predictor of mammography or its repetition (10, 23). According to the behavioral theories that are based on the health belief models, the increase in the risk perception of a disease could lead to failure to perform the behavior such as mammography (7). In a qualitative study, one of the obstacles to perform mammography was the fear of BC in Iran (26). Weinstein believes that risk perception alone is not effective on changing behaviors and that risk belief is of great necessity to change certain behaviors (27).

For justifying these contradictions, some points have been mentioned. There are different criteria to measure risk perception and different studies have examined different outcomes. The outcome in certain studies was mammography while some measured repetition of mammography and some examined mammography after the age of 50. In the current paper, BC risk perception was inversely related to age and education level; meanwhile, the high-risk group and family history of BC had a positive effect. Based on most studies, a family history of BC increases BC risk perception (20, 21).

A qualitative research in Iran indicated that women with a lower education were more afraid of BC and its fatality (26). Herein, risk perception in the women aged 30 to 39 years was significantly higher than that in those aged 40 to 50 years. Some studies have suggested a positive association between BC risk perception and age (21) and some others showed a negative association between them (28). Higher risk perceptions in younger women may be due to their increased awareness of BC. On the other hand, the advent of developed diagnostic equipment and running screening tests may increase the incidence of BC and reduce the age of diagnosis.

Therefore, higher BC risk perception in young women may be due to the experience of BC in their colleagues or friends' network.

In this work, about 35% of the women aged 40 to 50 years had mammograms at least once. In a study on midwives and nurses, the results showed that 43.6% of them had a history of mammography in Turkey (20). In Saudi Arabia, 23% of women had regular mammograms (28). A number of studies have reported mammography to be in the range of 5% to 44% in the distinct cities of Iran in 2011 (19, 29). The first factors that can cause notable differences in the results of studies, probably on account of the age groups studied and different mammography measures, the studies that examined only the history of mammography reported higher percentages than those reporting regular mammography.

Strengths and limitations

A few studies have surveyed the correlation between BC risk perception and screening behaviors through pathway analysis. In addition, a few studies have examined screening tests in women with 30 to 40 years of age. This study had certain limitations. Primarily, our work was conducted only in Kerman and in an urban area; thus, generalization of the results to rural areas and other areas in Iran might not be possible.

Secondly, in view of the cross-sectional nature of the study, it was not possible to evaluate the effect of time priority of independent variables on BC risk perception ad mammography. Thirdly, the use of a researcher-made instrument tool was one of the limitations of the study, which should be considered when interpreting the data.

5. Conclusions

The findings obtained herein revealed that younger women have a higher BC risk perception. According to this study, the most important variables affecting mammography were older age, higher education level, high risk group of breast cancer, family history of BC, and clinical examination. The participants' BC risk perception did not have a direct effect on mammography.

This survey indicated the physicians' important motivating role in encouraging women to perform mammography. It could be suggested that in future studies, the effective factors on risk perception and screening behaviors be assessed in a cohort study.

Furthermore, the impact of risk perception as a motivation for the onset or continuation of a behavior should be investigated.

Ethical Approval

The study was approved by the Ethical Committee of Kerman University of Medical Sciences (IR.KMU.REC.1396.1617) and conducted in accordance with its standard criteria.

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Conflict of Interests

The authors declared no conflict of interest

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