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DOI: 10.4103/jehp.jehp_339_20

# Determinants of mammography screening in Tehranian women in 2018 based on the health belief model: A cross-sectional study

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Received: 10-04-2020  
Accepted: 26-07-2020  
Published: 31-03-2021

## Abstract:

**BACKGROUND:** Breast cancer is the most common type of cancer among women. Mammography is the most sensitive and important method for screening and early diagnosis of breast cancer. Considering the importance of using mammography in breast cancer screening, this study was performed to evaluate mammographic determinants.

**MATERIALS AND METHODS:** In the cross-sectional study, we surveyed 985 women over 40 years in Tehran concerning demographic characteristics: age, socioeconomic status, a problem in the breast, alcohol use, drug use, and health belief model. Logistic regression was used to identify determinant factors associated with mammography performance.

**RESULTS:** The results of this study showed that 42.1% (95% confidence interval [CI]: 38, 45) participant performed mammography at least once during their lifetime. Age (odds ratio [OR] = 4.252; 95% CI = 2.041–8.857); housing situation (OR = 1.706; 95% CI = 1.178–2.469); having breast problems (OR = 5.224; 95% CI = 3.501–7.795); socioeconomic status (OR = 1.855; 95% CI = 1.035–3.325); family income level (OR = 1.998; 95% CI = 1.028–3.884); alcohol consumption (OR = 2.676; 95% CI = 1.344–5.328); smoking (OR = 2.824; 95% CI = 1.418–5.623); self-efficacy (OR = 1.935; 95% CI = 1.242–3.015); perceived barriers (OR = 2.017; 95% CI = 1.348–3.019); self-care (OR = 4.901; 95% CI = 3.152–7.620); perceived susceptibility (OR = 1.971; 95% CI = 1.271–3.057) and perceived severity (OR = 1.830; 95% CI = 1.170–2.860) were mammography behaviors determinants.

**CONCLUSION:** The findings indicated that the rate of mammography screening among Tehranian women is low and highlights the need for developing a comprehensive national breast cancer control program, which should be considered as the priority for health-care providers. Furthermore, the identification of these factors can help to design an appropriate educational intervention that focuses on the benefits of mammography screening.

## Keywords:

Breast cancer, health belief model, mammography, screening, women

## Introduction

Cancer is one of the noncontagious diseases that lead to huge mortality in human societies and after cardiovascular

disease, the second cause of death. 9.6 million people die from cancer every year. Among all types of cancer, breast cancer is the most common cancer among women and accounts for a considerable percentage of cancer death.<sup>[1]</sup> In sum, breast cancer

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**How to cite this article:** Rezaeimanesh M, Solhi M, Azar FE, Sajjadi H, Rafiey H, Nejad FN, *et al.* Determinants of mammography screening in Tehranian women in 2018 based on the health belief model: A cross-sectional study. *J Edu Health Promot* 2021;10:119.

is the second cause of death due to cancer, after lung cancer.<sup>[2,3]</sup> Annually, 2.09 million women suffering from breast cancer and 627000 of them will die.<sup>[4]</sup> In Iran, the incidence of breast cancer is 22.6 per 100,000<sup>[5,6]</sup> and 45–54 years, which is the most common age for catching that is 10 years lower than in developed countries.<sup>[7]</sup>

Cancer prevention and early diagnosis are vital factors in disease controlling and survival enhancing.<sup>[8]</sup> prevention and screening will reduce catching and mortality.<sup>[9]</sup> In association with breast cancer, secondary prevention has basic importance and leads to early diagnosis and prevention of its progress.<sup>[10]</sup> Frequent screening lead to secondary prevention and avoid from progress. According to the American Cancer Society's recommendation, breast self-examination, mammography, and clinical examination by a physician are important and effective methods for secondary prevention of breast cancer.<sup>[11]</sup> Mammography is the most important and best screening method for breast cancer in the world<sup>[12]</sup> and can detect masses <0.5 cm.<sup>[13]</sup> Base on this, regular and routine mammography after 40 years is recommended annually.<sup>[14]</sup> Mammography diagnosis accuracy for hiding and early-stage tumor is much greater than clinical examination. Mammography is the best way to diagnose breast cancer without touching,<sup>[15]</sup> Mammography can detect about 80%–85% of breast cancers.<sup>[15,16]</sup> About 35%–50% of breast cancers can be detected in the early stages with mammography,<sup>[17]</sup> and mammography is the best method for early diagnosis in asymptomatic women, and it is recommended that women over 40 years perform it at intervals of 1–2 year in the world.<sup>[18]</sup> Researches show that the use of mammography in 40 years women and older, reduce breast cancer mortality by 24%–33%.<sup>[19]</sup> Accordingly, 1% of death in 50–70 years women can be delayed by screening mammography.<sup>[8]</sup> Despite the desirable effects of mammography screening and its availability, few women perform it and its incidence in Iranian women is reported about 1.6% to 30/5%.<sup>[20]</sup> Brown and Lehlbach showed that lack of insurance, shortage in taking care, fear of radiotherapy, fear of test result, cultural barriers, and misconceptions about cancer are factors that reduce mammography performance rate.<sup>[21]</sup> In Dezhm *et al.*, 2015 and Bakhtariagdam *et al.*, 2012, poor awareness of breast screening methods, lack of breast problem and lack of need feeling, low socioeconomic and high cost of mammography, embarrassment and pain during mammography, and diagnostic anxiety were identified as Barriers to performing mammogram in Iranian women.<sup>[22,23]</sup> Age, literacy level, socio-cognitive factors,<sup>[24]</sup> knowledge about breast cancer, perceived benefits and social support<sup>[25]</sup> are also associated with mammography. The health belief model (HBM) is a model that predicts preventive behaviors and is one of the models that is used to explain health behaviors

such as screening mammography. Many studies have been showed importance and application of the HBM in mammography screening behavior in Iran.<sup>[26-29]</sup>

Regarding the high prevalence of breast cancer in Iranian women and mammography Proprietary in breast cancer diagnose, it is necessary to encourage women to perform mammography. In this context, detection of the effective causes and factors on mammography is important. Considering that every society's beliefs and sanitary behaviors are based on the social and cultural context of its people, investigation for a referral or no-referral reasons to mammography can provide appropriate background information for screening intervention. Accordingly, this study was conducted to investigation of the determinant factors of mammography screening in Tehranian women in 2018.

## Materials and Methods

This study was a descriptive, analytic cross sectional was carried out from august to July 2018. 985 women over 40 years old, who were selected through multi-stage sampling, after taking written testimonial and explain the purpose of study, complete self-report questionnaires.

Initially, according to one study,<sup>[30]</sup> in which Tehran divided into five socioeconomic zones, two regions were randomly selected from each zone. Then, two areas from each region and one district from each area also randomly were selected. In the next step, the educated questionnaires dispatched to the selected neighborhoods and filled out the questionnaires based on the sample size. The sample selection criteria were as follows: first, an alley from the neighborhood was randomly selected, and then the first door from the right side of the alley selected as the first sample and the rest of the samples were selected as one in the middle based on the first door number and continued until the completion of the samples.

Information about the relationship between the HBM<sup>[30]</sup> and mammography performance were obtained from Taymoori *et al.*, 2012.<sup>[31]</sup> The lowest value of the odds ratio (OR = 0.7) for investigating mammography was used to obtain the maximum sample size. With a two-sided test,  $\alpha = 0.05$ , 80% of power and design effect of 1.3; the final sample size was estimated 859 women.

## Data collection and ethics

This study was approved by the Ethics Committee of the University of Social Welfare and Rehabilitation sciences with the IR. USWR.AC.IR.1396.274 code. Participants filled out the forms on their own in approximately 45 min. People over the age of 40, with the ability to read, who consciously consented to participate in the

study, was entered. A comfortable and suitable place was provided for completing the questionnaire, we reassured the participants about the confidentiality of the questionnaire and answers, at the end of completing the questionnaires, if a question arising, they would be answered as much as possible, and if necessary, they would be referred to a specialist.

Data were collected by using five questionnaires (demographic questionnaire, and four standard Persian questionnaires about the health beliefs and model, attention to the body, tendency toward modernity and Fatalism). We measured mammography using the questions with yes/no option related to mammography in the past 2 years and throughout the life. Data were collected using a face-to-face interview with the women who live in Tehran of households.

The Champion HBM scale for breast cancer screening, has been developed by Champion in 1984 and revised in 1993, 1997 and finally in 1999 for the health beliefs concerning breast self-examination and mammography screening of breast cancer, and it was translated into Persian by several researchers and culturally adapted for use with the Persian population. This study used the Persian version of the Champion HBM developed in multiple studies.<sup>[30]</sup> This particular version includes 58 Likert-type items in six subscales: perceived sensitivity, perceived severity, and benefits of breast self-examination, breast self-examination barriers, self-efficacy and health motivation and cue to action. The participants were asked to rate each item on a five-point scale: 1, I strongly disagree; 2, I disagree; 3, I am undecided; 4, I agree, and 5, I strongly agree. The highest scores on each subscale are: 3–15 for perceived sensitivity, 6–30 for perceived severity, 4–20 for benefits of breast self-examination, 8–40 for breast self-examination barriers, 10–50 for self-efficacy, and 5–25 for health motivation.

The Cronbach's alpha values in this study were: 0.89 for sensitivity, 0.85 for severity, 0.80 for health motivation, 0.86 for breast self-examination benefits, 0.81 for breast self-examination barriers, 0.91 for breast self-examination self-efficacy, 0.73 for mammography benefits, and 0.88 for mammography barriers. The scores were assessed as a continuous variable and the total mean score based on individual scores for each scale was derived.

The dependent variable was Mammography performance, which was ascertained by the yes/no question by participants' self-report on the question, "Have you perform routinely mammography?"

The tendency to modernity questionnaire was made by a researcher and includes 24 questions with a five-point

Likert scale as follows: (1) I strongly disagree; (2) I disagree; (3) I am undecided; (4) I agree, and (5) I strongly agree. The lowest score for each phrase was 1, which means strongly disagrees, and the highest score 5, for choosing the completely agreed. Therefore, a higher score means more tendency. The questionnaire included six dimensions of attention to social problems, progressivism, and freedom of thought, patriarchy, parental independence, and national conscientiousness. The minimum score of the questionnaire was 24, and the maximum score was 120. Cronbach's alpha as the reliability of the questionnaire also was 0/75, and its internal correlation coefficient was reported as 0/80.

Fatalism questionnaire was developed by Cohen, 1997 to identify the status of individual destiny and was translated into the Persian language by Niazi and Shafaei Moghaddam 2014<sup>[32]</sup> and validated. It consists of seven questions with one dimension and 5 Likert scales. The minimum score of the questionnaire was 7, and the maximum score was 35, and all the scorings applied with a negative effect. Thus the lowest score for each phrase 1 means completely disagree, and the highest score 5 articulates completely agree. A higher score represents a more fatalistic orientation. Cronbach's alpha as the reliability of the questionnaire also was 0/79, and its internal correlation coefficient was reported as 0/82.

Attention to body questionnaire, was created by Abbaszadeh, 2012<sup>[33]</sup> to measure the amount of attention to women's bodies in the form of 12 items and two dimensions with a Likert spectrum. The first dimension includes 8 questions and named as attention to health, and the second dimension includes four questions and named as body awareness. Cronbach's alpha or reliability coefficient of this questionnaire is reported Cronbach's alpha as reliability of the questionnaire also was 0/75, and its internal correlation coefficient was obtained 0/81 in the retest as 0/7.

Eligibility criteria include: the ability to read, write and speak in Persian, residence in Tehran for at least 5 years and have no history of breast cancer, and exit criteria were unwillingness to participate in the study, cognitive disorders such as Alzheimer and mental illnesses such as psychosis and having breast cancer.

First descriptive statistics were conducted, and Chi-square tests were applied to test for associations between socioeconomic factors and dependent variables (mammography). Collinearity testing was performed before introducing independent variables into the multivariate analysis. Multivariate logistic regression analyses (to estimate the odds ratio for each variable, ever mammography performing during the lifetime [yes/no]) using the forward method were

used to further assess to the association of preselected socioeconomic and demographic factors with binary dependent variables. All statistical tests were two-sided with significance established on  $\alpha$  at 0.05 ( $P \leq 0.05$ ). IBM SPSS version 21.0 Statistical package (International Business Machines Corporation, New York, United States) and STATA version 12 (StataCorp LLC, 4905 Lakeway Drive College Station, Texas 77845-4512 USA) were used in data analysis.

### Results

Descriptive results showed that 40% of the participants were 51–59 years old. 96/6% were married, and 53.3% of participants were non-Persian. Furthermore, 51.2% of them had rented accommodation and 88% of participants were urbanist 47.5% of women were employed, 42.5% were housewives, 6.3% were unemployed, and 3.7% were retired. 36/9% of participants had family income between \$180–250, 31/1% had more than \$300 and 20/5% earned between \$250–300, the other had family income >\$180. In economic status, 42/5% assessed their status as high, 39/7% as low level and 17/8% as average. 12% of participants consumed alcohol and were smoker, also —% were drug abusers. 69/5% of them had not any problem in breast and 53/8% had a high level in self-care. The other descriptive characteristics of respondents are listed in Table 1.

Table 2 shows the significant relationship between independent variables and mammography performance among women. Accordingly, mammography performance had a meaningful statistical relationship with variables such as age, housing status, employment status, having breast problem, socioeconomic status, self-care, perceived barriers ( $P = 0.001$ ), marital status, perceived intensity ( $P = 0.003$ ), family income, self-efficacy ( $P = 0.05$ ), birthplace ( $P = 0.02$ ), attitude toward modernity ( $P = 0.009$ ), and smoking ( $P = 0.04$ ). However, there was no significant correlation between mammography and variable such as ethnicity, attention to the body, alcohol consumption, drug use, perceived susceptibility and perceived benefits, breast cancer history, and cue to action ( $P > 0.05$ ).

Table 3 shows multiple regressions of determinant factors of mammography behaviors. Based on results, the odds ratio for mammography in individuals aged 51–59 was more 4.1 times than those are in 40–45 years (OR = 4.157; 95% confidence interval [CI] = 2.332–7.413) and the odds ratio of who are over 61 years old were 4.2 times more than those under 40–45 years (OR = 4.252; 95% CI = 2.041–8.857). Individuals with personal housing 1.7 times more likely to have mammography screening (OR = 1.706; 95% CI = 1.178–2.469). People with a breast problem,

**Table 1: Descriptive characteristics of the study participants**

Characteristics	n (%)	Characteristics	n (%)
Age		Family income	
40–45	128 (14.9)	<180\$	99 (11.5)
46–50	274 (31.9)	180–250	317 (36.9)
51–59	344 (40.0)	250–300	176 (20.5)
61 and over	113 (13.2)	>300	267 (31.1)
House status		Attention to body	
Personal home	419 (48.8)	Low	29 (3.4)
Rental house	440 (51.2)	High	830 (96.6)
Ethnicity		Alcohol use	
Persian	401 (46.7)	No	756 (88.0)
Others	458 (53.3)	Yes	103 (12.0)
Birth location		Smoking	
Urban	756 (88.0)	No	756 (88.0)
Rural	103 (12.0)	Yes	103 (12.0)
Marital status		Drug use	
Married	830 (96.6)	No	830 (96.6)
Single	29 (3.4)	Yes	29 (3.4)
Employment status		Self-care	
Housewife	365 (42.5)	Low	397 (46.2)
Employed	408 (47.5)	High	462 (53.8)
Unemployed	54 (6.3)		
Retired	32 (3.7)		
Problem in the breast		Self-efficacy	
Yes	262 (30.5)	Low	445 (51.8)
No	597 (69.5)	High	414 (48.2)
Socioeconomic position		Perceived severity	
Low	341 (39.7)	Low	187 (21.8)
Medium	153 (17.8)	High	672 (78.2)
High	365 (42.5)		
Attitude to modernity		Perceived benefits	
Low	20 (2.3)	Low	17 (2.0)
High	839 (97.7)	High	842 (98.0)
Perceived susceptibility		Perceived barriers	
Low	271 (31.5)	Low	272 (31.7)
High	588 (68.5)	High	587 (68.3)
Breast cancer history		Cue to action	
Yes	52 (6.0)	Low	396 (46.1)
No	807 (94.0)	High	463 (53.9)

perform mammography 5.2 times more than people who had no problem in their breast (OR = 5.224; 95% CI = 3.501–7.795) Chance of mammography among people in high socioeconomic status is 1.85 times more than those in low socioeconomic status (OR = 1.855; 95% CI = 1.035–3.325). In terms of family income level, the odds ratio of mammography in a participant with family income over \$300 is 1.99 times more than who had family income <\$180 (OR = 1.998; 95% CI = 1.028–3.884). The odds ratio for mammography in people who do not consume alcohol is 2.67 times more than alcohol users (OR = 2.676; 95% CI = 1.344–5.328) and this chance for nonsmokers is 2.82 times more than smokers (OR = 2.824; 95% CI = 1.418–5.623). The odds ratio for mammography in people with

**Table 2: The bivariate analyses of variables associated with mammography among women**

Characteristics	Ever had a mammography		P	Characteristics	Ever had a mammography		P
	No (n=497)	Yes (n=362)			No (n=497)	Yes (n=362)	
	n (57.9%)	n (42.1%)			n (57.9%)	n (42.1%)	
Age				Family income			
Lower 45	102 (79.7)	26 (20.3)	0.001	<180\$	62 (62.6)	37 (37.4)	0.05
36–50	204 (74.5)	70 (25.5)		180–250	194 (61.2)	123 (38.8)	
51–59	151 (43.9)	193 (56.1)		250-300	103 (58.5)	73 (41.5)	
61 and over	40 (35.4)	73 (64.6)		>300	138 (51.7)	129 (48.3)	
House status				Attention to body			
Personal home	197 (47)	222 (53)	0.001	Low	16 (55.2)	13 (44.8)	0.45
Rental house	300 (68.2)	140 (31.8)		High	481 (58)	349 (42)	
Ethnicity				Alcohol use			
Persian	231 (57.6)	170 (42.4)	0.47	No	445 (58.9)	311 (41.1)	0.06
Others	266 (58.1)	192 (41.9)		Yes	52 (50.5)	51 (49.5)	
Birth location				Smoking			
Urban	436 (56.7)	333 (43.3)	0.02	no	429 (56.7)	327 (43.3)	0.04
Rural	61 (67.8)	29 (32.2)		yes	68 (66)	35 (34)	
Marital status				Drug use			
Married	94 (68.6)	43 (31.4)	0.003	no	480 (57.8)	350 (42.2)	0.54
Single	403 (55.8)	319 (44.2)		yes	17 (58.6)	12 (41.4)	
Employment status				Self -care			
Housewife	206 (56.4)	159 (43.6)	0.001	Low	312 (78.6)	85 (21.4)	0.001
Employed	235 (57.6)	173 (42.4)		High	185 (40)	277 (60)	
Unemployed	45 (83.3)	9 (16.7)					
Retired	11 (34.4)	21 (65.6)					
Problem in the breast				Self-efficacy			
Yes	77 (29.4)	185 (70.6)	0.001	Low	268 (60.2)	177 (39.8)	0.05
No	420 (70.4)	177 (29.6)		High	229 (55.3)	185 (44.7)	
Socioeconomic position				Perceived severity			
Low	250 (73.3)	91 (26.7)	0.001	Low	125 (66.8)	62 (33.2)	0.003
Medium	90 (58.8)	63 (41.2)		High	372 (55.4)	300 (44.6)	
High	157 (43)	208 (57)					
Attitude to modernity				Perceived benefits			
Low	17 (85)	3 (15)	0.009	Low	11 (64.7)	6 (35.3)	0.37
High	480 (57.2)	359 (42.8)		High	486 (57.7)	356 (42.3)	
Perceived Susceptibility				Perceived Barriers			
Low	155 (57.2)	116 (42.8)	0.42	Low	128 (47.1)	144 (52.9)	0.001
High	342 (58.2)	246 (41.8)		High	369 (62.9)	218 (37.1)	
Breast cancer history				Cue to action			
Yes	30 (57)	22 (43)	0.33	Low	196 (49.4)	200 (50.6)	0.45
No	400 (49)	407 (51)		High	220 (47.5)	243 (52.5)	

high self-efficacy is 1.93 times (OR = 1.935; 95% CI = 1.242–3.015) compared with those who had low self-efficacy. Individuals who have low perceived impediments had a twofold mammography chance toward people with high perceived barriers (OR = 2.017; 95% CI = 1.348–3.019). Individuals who had high self-care, mammography chance were 4.9 times more than those who had low self-efficacy.(OR = 4.901; 95% CI = 3.152–7.620). The odds ratio for people with high perceived susceptibility is 1.97 times compared with people with low perceived susceptibility (OR = 1.971; 95% CI = 1.271–3.057). and this chance for who had high perceived intensity is nearly 1.83 times more than who were lower in it (OR = 1.830, 95% CI = 1.170–2.860).

## Discussion

The purpose of this study was to investigation the determinants of mammography screening among women over 40 years in Tehran. The results of the study showed that 42.1% of the participants had breast cancer mammography during their lifetime. The findings of this study showed that socioeconomic status, age, family income, housing status, self-care, self-efficacy, perceived barriers and perceived susceptibility were mammography determinants.

The results of this study showed that 57.9% of women performed mammography screening revelry. Similar

**Table 3: Multiple binary logistic regression model for determinant factors of mammography adoption**

Characteristics	AOR	95% CI		P	Characteristic	AOR	95% CI		P
		Lower	Upper				Lower	Upper	
Age					Family Income				
40–45	Ref				<180\$	Ref			
46–50	0.811	0.444	1.482		180–250	1.271	.685	2.359	
51–59	4.157	2.332	7.413	0.000	250–300	1.150	.579	2.285	
61 and over	4.252	2.041	8.857	0.000	>300	1.998	1.028	3.884	0.035
House status					Alcohol use				
Personal home	1.706	1.178	2.469	0.005	Yes	Ref			
Rental house	Ref				No	2.676	1.344	5.328	0.005
Attitude to modernity					Smoking				
Low	Ref				Yes	Ref			
High	1.360	0.335	5.529		No	2.824	1.418	5.623	0.003
Birth location					Self-efficacy				
Rural	Ref				Low	Ref			
Urban	1.135	0.591	2.179		High	1.935	1.242	3.015	0.004
Marital status					Perceived barriers				
Single	Ref				Low	2.017	1.348	3.019	0.001
Married	1.310	0.775	2.215		High	Ref			
Employment status					Self-care				
Housewife	Ref				Low	Ref			
Employed	1.263	0.815	1.958		High	4.901	3.152	7.620	0.001
Unemployed	0.573	0.227	1.442						
Retired	2.090	0.864	5.055		Perceived susceptibility				
Problem in the breast					Low	Ref			
Yes	5.224	3.501	7.795	0.000	High	1.971	1.271	3.057	0.002
No	Ref				Perceived severity				
Socioeconomic position					Low	Ref			
Low	Ref				High	1.830	1.170	2.860	0.008
Medium	1.506	0.849	2.672						
High	1.855	1.035	3.325	.038					

AOR=Adjusted odds ratio, CI=Confidence interval

to our results, 44.9% of women in Elobaid *et al.*, 2014 study,<sup>[34]</sup> and 42.6% of women in Killelea,<sup>[35]</sup> study had mammography history. But in Tavakolian *et al.* 2015, <18% of women had regular mammography history, and 82% never perform mammography.<sup>[36]</sup> In Tabrizi *et al.* 2018 research, 12% and in Mirzaei-Alavijeh,<sup>[37]</sup> 13% of women had performed mammography. A high percentage of mammography in our study is due to this question that asks women, “Are you performing mammography at least once during your life time?” Besides, health-care providers, recommended to women over 40 years, to performing mammography, because accordingly to international protocol, women over 40 years old should perform mammography every 2 years and who are at high risk for breast cancer catching, should refer to mammograms every year.

The results of this study showed that the odds ratio for breast cancer screening increases with age. Similar to this study, Eisinger *et al.*<sup>[38]</sup> women aged 50–75, and in Dourado *et al.*<sup>[39]</sup> study, women aged 45–69 were performed more mammography over the life span than 40–44 years old women. It can be concluded that the

mammography screening increases with enhancing age for various reasons, including the physician’s recommendation and the mass appearance in the breast. It can also be said that women at a younger age are considered to be immune to the illness, so perform less mammography. Another important point is that in some studies, mammography performance decreases.<sup>[31,40]</sup> The reason for this may be due to financial constraints and the priority of having routine life, no attention to health in old age, inability to refer to health centers. However, low mammography incidence requires more attention from politicians and health-care providers, and should inform women about the risks of breast cancer and the importance of mammography.

Whatever family income increase in participant, the odds ratio for mammography performance raised too. This ratio in people with a \$300 family income was nearly twice more than those who had less than \$180. In Yücel, 2005 research Furthermore, a high level of family income was associated with mammography performance.<sup>[41]</sup> In variable studies, paying for mammography was effective in its decreasing.

Therefore, since performing mammography is costly, its performance by people with higher family incomes is a predictable and justifiable phenomenon, and people who do not have enough family income may avoid mammography. It seems that health policy should go ahead to reduce tariffs of mammography performance and increasing access to mammography and health services, especially in countries where healthcare services are not free.

Individuals with private housing had nearly twice a mammography screening chance more than those who lived in Leased housing that is due to financial ability. Housing in large cities such as Tehran is a sign of higher socioeconomic status and, as a result, a higher ability to access health services.

The odds ratio for mammography in people who did not consume alcohol and cigarettes is 2.5 times more than alcohol consumers. Similar to the results of this study, other researchers have shown that smoker women perform less mammography, and nonsmokers women tend to have mammography more.<sup>[42-44]</sup> This shows that nonsmoker women give more attendance to their health, and mammography performance is probable.

The findings of this study showed that high socioeconomic status has a meaningful relationship with mammography and increases the chance of performing it. Furthermore, in other studies, socioeconomic status showed as the most important predictor of screening and mammography.<sup>[41,45,46]</sup> As regards that people who have better socioeconomic status, have economic power too and more likely have leisure time and have more contact with health source and information and give more attendance to their health, so assign a lot of time and money for that. Therefore, they perform more mammography too.

The study showed that who had a problem in the breast, had five times a mammography chance more than those without a problem. In various studies, the relationship between the problem in the breast and mammography was seen. In some studies, breast problem existence such as abscess and abnormal secretion act as a guideline for mammography and has a direct effect on its performance. Having irritation in the breast will sensitive women about their condition follow-up. However, this is important to inform them, they should be sensitive about minor pain and problem and search for disease detection before its creation.

The present study showed that people with high self-care had nearly five times more chance of mammography than low self-care patients. In Tabrizi *et al.*,<sup>[45]</sup> study, there was a significant relationship between self-care and

mammography. Wang *et al.* 2004<sup>[47]</sup> showed that people who have higher levels of perceived health (health motivation) are more involved in self-care activities. Some of the most important self-care activities include giving important to disease creation possibility, healthy diet, and physical activity doing that require the necessary interventions and training to encourage women to follow them.

Self-efficacy was one of the other important variables in mammography performance in this study. Self-efficacy in other studies also had a direct and influential effect on screening behaviors; such as mammography.<sup>[29,31,48]</sup> This situation is predictable that; whatever person has a condition, ability and more feel of this, more likely will refer for its performance. In our research, people who had low perceived barriers, i.e., imagine fewer problems for mammography, so performing it more than who perceived more problems and barriers. Similar to our results, other studies had also shown that proper understanding of the barriers and the low level of barriers to mammography can facilitate its performance.<sup>[31,49-51]</sup> Therefore, the reduction in barriers perception, plays a role in the regular implementation of mammography; training and intervention are useful for reducing mammographic barriers such as fear of mass presence, fear of painful mammography, fear of radiation hazards, and lack of familiarity with mammography centers.

The findings of this study showed that the odds ratio of mammography performance in people with high perceived sensitivity is about twice than who had a low perceived sensitivity. Various studies had shown that increased susceptibility to breast cancer consequently leads to increased mammography.<sup>[52-54]</sup> In studies Shir yazdi *et al.*,<sup>[20]</sup> Soskolne *et al.*<sup>[55]</sup> also found women who performed mammography feel they are more at risk of cancer catching. According to the HBM, whatever people's sensitivity to one disease increasing, preventive activities and health care increased too. This situation was observed about breast cancer and subsequent mammography in the participants of the study and need more attention and further interventions to strengthen it.

Similar to other studies<sup>[31,56,57]</sup> the results of the study showed the odds ratio of referral chance for mammography in people with high perceived intensity is nearly twice as high as those with low perceived intensity. Theoretically, having a problem imposes greater sensitivity and severity on the individual and encourages the person to perform screening and do preventive behaviors, and in practice, this sensitivity and severity should be increased in people by informing and providing different information to them.

## Conclusion

Despite the high prevalence of breast cancer in women and the possibility of early diagnosis and prevention of cancer with mammography and its favorable effects on breast cancer diagnosis, mammography rates are low among women, so less than half of them perform mammography during their lifetime. Various socioeconomic factors affect the low level of mammography performance, which suggests that, it seems vital to inform women about breast cancer, complications and postmortem complications and problems, screening and diagnostic methods, especially with mammography. Accordingly, women should be aware of and sensitive to breast cancer. Based on these findings, it seems that interventions are needed to make people aware of mammography and its positive functions in diagnosing cancer, especially for women in 40 age and over. Also, as being costly mammography, mammography screening programs at a national level and in a low cost can also encourage people to do it too.

## Acknowledgments

The permission was obtained from the Ethics Committee of University of Social Welfare and Rehabilitation with the IR.USWR.AC.IR.1396.274 code. The authors would like to thank all participants for their cooperation in this study. This article is part of the Ph. D. thesis of SAK. This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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