

Factors related to clinical breast examination: A cross-sectional study

Maryam Rabiei¹, Seyyed Hamid Hoseini², Shiva Khodarahmi³,
Elham Sepahvand⁴, Elham Shirali¹

¹Department of Obstetrics and Gynecology, Tehran University of Medical Sciences, Tehran, ²Department of Cardiology, 9 Dey Educational Hospital, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, ³PhD Student in Reproductive Health, Student Research Committee, Department of Midwifery and Reproductive Health, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, ⁴Department of Nursing, Lorestan University of Medical Sciences, Khorramabad, Iran

ABSTRACT

Background and Aim: Breast cancer is one of the most common types of cancer among women as well as one of the most serious and important public health issues in developing countries. The aim of the present study was to evaluate the factors related to clinical breast examination in women in Tehran. **Method:** This cross-sectional study was conducted on 859 women in Tehran, Iran in 2020. Logistic regression was applied to identify determinant factors that related to clinical breast examination. **Result:** The prevalence of clinical breast examination was 52.6%. Results indicated significant differences between those who underwent clinical breast examination and those who had a nonclinical breast examination in terms of age, housing conditions, marital status, problem in the breast, perceived susceptibility, perceived barriers, fatalism, and self-care. **Conclusion:** It is essential to inform and educate women about breast cancer and associated complications and problems after being diagnosed with breast cancer as well as about the screening and diagnostic methods, including the need for clinical breast examination by a specialist.

Keywords: Breast cancer, breast screening, clinical breast examination, fatalism, women

Introduction

Breast cancer, the most common form of cancer in women, is one of the most serious and important public health issues in developing countries.^[1] In 2018, more than 2 million new cases of breast cancer were diagnosed in the world, accounting for 11.6% of all cancers.^[2] Breast cancer accounts for 23% of all cancers in women and 14% of deaths from cancer. Breast cancer is also the most common cause of cancer-associated death in women.^[3] The prevalence of breast cancer is 21.3 per 100,000 people.^[4] Despite the

global reduction in breast cancer mortality, the mortality rate from breast cancer among the Iranian women has increased from 19% to 21.4%.^[5] Experts maintain that breast cancer in women living in less developed countries, especially in Iran, is diagnosed only in the advanced stages of cancer.^[1,6,7] As a result, breast cancer treatment imposes great costs and pressures on the health care system.

Studies have shown that delay in cancer diagnosis is associated with lower patient survival rates. Moreover, early diagnosis and appropriate and early treatment as a strategy in disease prognosis are associated with higher survival rates and quality of life.^[8] The effectiveness of routine screening methods such as breast self-examination, clinical examination, and mammography have been confirmed in previous studies.^[7] Thus, early diagnosis of breast cancer with three methods,

Address for correspondence: Dr. Elham Shirali,
Department of Obstetrics and Gynecology, Tehran University of
Medical Sciences, Tehran, Iran.
E-mail: ElhamShirali@gmail.com

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that is, self-examination, clinical examination, and mammography, can prevent its complications and patient mortality to some extent.

As self-examination is not an accurate method for diagnosing breast cancer and mammography is expensive especially in underdeveloped countries, recent studies have recommended clinical breast examination for early diagnosis as an important and vital criterion.^[7,9-11] Although cancer self-examination can increase the likelihood of diagnosis, the standard criterion for breast cancer diagnosis is visiting a specialist and conducting a clinical breast examination by a specialist and specialized examinations and referrals for advanced tests such as ultrasound, MRI, and mammography. Thus, the present study aims to determine the risk factors associated with clinical breast examination, including its facilitators and inhibitors, because determining such risk factors can greatly help with diagnosing and providing early interventions by the family physician, primary care physicians, and, thus, early treatment of breast cancer and, consequently, reducing patient mortality.

Material and Method

The present cross-sectional study was conducted on 859 women. The sampling was conducted based on a multistage stratification. First, 24 districts of Tehran were classified based on the level of socioeconomic development to increase the variance in samples. A multistage sampling was conducted based on five socioeconomic classes in Tehran in 2020. After obtaining a written consent letter, study participants were explained about the study's purpose. Later, they completed the relevant questionnaires.

Sample size

The lowest value of the odds ratio (OR = 0.7) for investigating clinical breast examination was used to achieve the maximum sample size. Using a two-sided test, $\alpha = 0.05$, an 80% power, and a design effect of 1.3, the final study sample included 859 women.

Instruments

Data were collected using a structured questionnaire. The study questionnaire consisted of three sections. The first section included demographic characteristics: age, place of residence, place of birth (city or village), marital status, housing status, employment status, socioeconomic status, and history of breast problems [Table 1]. The second section consisted of questions with yes and no options regarding participants aged above 40 who had had a breast examination done by a doctor in the previous 12 months and participant below the age of 40 who had had breast examination done by a doctor in the previous 36 months (dependent variable). The third section included questions on the health belief model and fatalism.

Health belief model (HBM scales) explore different dimensions, including perceived susceptibility, perceived benefits, perceived barriers, self-efficacy, breast cancer fear, and fatalism. All scales had been previously tested; they were confirmed to be both

Table 1: Descriptive characteristics of the study participants

Characteristics	n	Percentage
Age		
Below 35	128	14.9
35-40	274	31.9
41-50	344	40.0
51 and over	113	13.2
House status		
Personal home	419	48.8
Rental house	440	51.2
Location area		
High	413	48.1
Medium	200	23.3
Low	246	28.6
Birth location		
Urban	756	88.0
Rural	103	12.0
Marital status		
Married	830	96.6
Single	29	3.4
Employment status		
Housewife	365	42.5
Employed	408	47.5
Unemployed	54	6.3
Retired	32	3.7
Breast health literacy		
Low	341	39.7
Medium	153	17.8
High	365	42.5
Problem in the breast		
Yes	262	30.5
No	597	69.5
Socioeconomic position		
Low	341	39.7
Medium	153	17.8
High	365	42.5
Attitude to modernity		
Low	20	2.3
High	839	97.7
Perceived susceptibility		
Low	271	31.5
High	588	68.5
Perceived severity		
Low	187	21.8
High	672	78.2
Benefits perceived		
Low	17	2.0
High	842	98.0
Perceived barriers		
Low	272	31.7
High	587	68.3
Fatalism		
Low	425	49.5
High	434	50.5
Self-care		
Low	397	46.2
High	462	53.8

Contd...

Table 1: Contd...

Characteristics	n	Percentage
Self-efficacy		
Low	445	51.8
High	414	48.2

reliable and valid by Champion *et al.* in 2008.^[12] All items were scored on a 5-point Likert scale (*strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree*); then, the scores of all items for each scale were summed to provide a total individual score. The scores were then assessed as continuous variables, and a total mean score was measured based on individual scores for each scale.

Power Fatalism Inventory (PFI)

PFI was designed by Powe (1995).^[13] For the present study, a Persian modified version of PFI was used. A Cronbach's alpha of .89 was applied.

Clinical breast examination was measured by using participants' self-report on the question "Have you ever had a clinical breast examination in the past 12 or 36 months?" where participants responded on a 2-point "yes" or "no" scale.

Inclusion criteria include the ability to read and write and speak Persian, being a resident of Tehran for at least five years, and having no history of breast cancer. The exclusion criteria were being unwilling to participate in the study, having cognitive disorders such as Alzheimer's and mental illnesses such as psychosis, and suffering from breast cancer.

Descriptive statistics were conducted first, and later Chi-squared (χ^2) tests were applied to test for the relationships between demographic factors and dependent variables (clinical breast examination). Collinearity testing had been already conducted before introducing independent variables into the multivariate analysis. Multivariate logistic regression analyses were applied (for the estimation of the odds ratio of each variable for conducting a clinical breast examination in the past 12 or 36 months [yes/no]) using the forward method to further evaluate the relationship between preselected demographic factors and the binary dependent variable. All statistical tests were two-sided with a significance level established at an α of 0.05 ($p \leq 0.05$). Windows SPSS-21.0 was used for data analysis.

Ethical considerations

The research project has been confirmed by the Research Ethics Committee (protocol No IR. IUMS.AC.IR.1396.274)

Results

The majority of women in our study are 41–50 years old (40%), live in rental homes (51.2%), live in high location era (48.1), are born in urban settings (88%), are married (96.6%), are employed (47.5%), have a high-level breast health literacy (42.5%), have no problem in the breast (69.5%), have

a high socioeconomic position (42.5%), have a high attitude to modernity (97.7%), have a high perceived susceptibility (68.5%), have a high perceived severity (78.2%), have high perceived benefits (98%), have high perceived barriers (68.3%), have high fatalism (50.5%), have high self-care (53.8%), and have low self-efficacy (51.5%) [Table 1].

Chi-square test results of factors associated with clinical breast examination are shown in Table 2. The prevalence of clinically done breast examination was 52.6%. Clinical breast examination was significantly associated with age ($p < .001$), house status ($p < .001$), education ($p < .001$), location area ($p < .001$), birth location ($p < .001$), marital status ($p < .01$), breast health literacy ($p < .001$), problem in the breast ($p < .001$), socioeconomic position ($p < .001$), attitude to modernity ($p < .01$), perceived susceptibility ($p < .05$), perceived severity ($p < .001$), benefits perceived ($p < .001$), perceived barriers ($p < .001$), fatalism ($p < .001$), self-care ($p < .001$), and self-efficacy ($p < .001$). Employment status ($p < .001$) was not statistically significant with drug injecting in prison [Table 2]

The prevalence of clinical breast examination was 52.6%. Results showed significant differences between those who reported having a clinical breast examination done and those who had a nonclinical breast examination done, in terms of the following: age (41–50, OR = 3.11, 95% CI: 1.79–5.42, or aged 50 and over; OR = 2.98, 95% CI: 1.46–6.05, or aged below 35), house status (personal vs. rental—OR = 1.67, 95% CI: 1.15–2.41), birth location (urban vs. rural—OR = 2.44, 95% CI: 1.26–4.70), marital status (married vs. single—OR = 2.56, 95% CI: 1.36–3.72), problem in the breast (yes vs. no—OR = 15.08, 95% CI: 9.21–24.69), perceived susceptibility (high vs. low OR = 1.83, 95% CI: 1.22–2.76), perceived barriers (low vs. high—OR = 2.10, 95% CI: 1.40–3.15), fatalism (low vs. high—OR = 4.30, 95% CI: 2.94–6.28), self-care (high vs. low—OR = 9.06, 95% CI: 6.06–13.54) [Table 3].

Discussion

The aim of the present study was to investigate the factors related to clinical breast examination in Tehran's women. The prevalence of clinical breast examination in this study was measured to be 52.6%. In general, the prevalence of clinical breast examination in the present study was low as was expected, but this rate is higher than that of the previous studies conducted in other cities in Iran and other parts of the world. The rate of clinical breast examination done, for example, in the cities of Lorestan, Rasht, and Mazandaran, has been reported to be 20.7%, 28.3%, and 20.7%, respectively.^[4] Moreover, the rates of clinical breast examination in Turkey and Qatar have been reported to be 25%^[4] and 29.9%, respectively.

The results have indicated that older age is associated with an increased likelihood of clinical breast examination. This is in line with the findings of the studies conducted by Ghanbari

Table 2: The results of the bivariate analyses of the variables associated with clinical breast examination

Characteristics	Ever had a physician examination?		P
	No (n=407) n (47.4%)	Yes (n=452) n (52.6%)	
Age			
Lower 35	87 (68)	41 (32)	0.001
35-40	154 (56.2)	120 (43.8)	
41-50	130 (37.8)	214 (62.2)	
51 and over	36 (31.9)	77 (68.1)	
House status			
Personal home	158 (37.7)	261 (62.3)	0.001
Rental house	249 (56.6)	191 (43.4)	
Education			
Illiterate	7 (70)	3 (30)	0.001
Elementary	96 (58.5)	68 (41.5)	
Diploma	172 (64.7)	94 (35.3)	
Associate degree	32 (29.1)	78 (70.9)	
Bachelor's degree	71 (34.1)	137 (65.9)	
Master's degree and higher	29 (28.7)	72 (71.3)	
Location area			
High	223 (54)	190 (46)	0.001
Medium	89 (44.5)	111 (55.5)	
Low	95 (38.6)	151 (61.4)	
Birth location			
Rural	346 (45)	423 (55)	0.001
Urban	61 (67.8)	29 (32.2)	
Marital status			
Single	84 (61.3)	53 (38.7)	0.01
Married	323 (44.7)	399 (55.3)	
Employment status			
Housewife	175 (47.9)	190 (52.1)	0.61
Employed	181 (44.4)	227 (55.6)	
Unemployed	40 (74.1)	14 (25.9)	
Retired	11 (34.4)	21 (65.6)	
Breast health literacy			
High	7 (70)	3 (30)	0.001
Medium	276 (63)	162 (37)	
Low	124 (30.2)	287 (69.8)	
Socioeconomic position			
Yes	29 (11.1)	233 (88.9)	0.001
No	378 (63.3)	219 (36.7)	
Socioeconomic position			
Low	224 (65.7)	117 (34.3)	0.001
Medium	75 (49)	78 (51)	
High	108 (29.6)	257 (70.4)	
Attitude to modernity			
Low	14 (70)	6 (30)	0.01
High	393 (46.8)	446 (53.2)	
Perceived susceptibility			
Low	140 (51.7)	131 (48.3)	0.05
High	267 (45.4)	321 (54.6)	
Perceived severity			
Low	106 (56.7)	81 (43.3)	0.001
High	301 (44.8)	371 (55.2)	

Contd...

Table 2: Contd...

Characteristics	Ever had a physician examination?		P
	No (n=407) n (47.4%)	Yes (n=452) n (52.6%)	
Perceived barriers			
Low	95 (34.9)	177 (65.1)	0.001
High	312 (53.2)	275 (46.8)	
Fatalism			
Low	130 (30.6)	295 (69.4)	0.001
High	277 (63.8)	157 (36.2)	
Self-care			
Low	286 (72)	111 (28)	0.001
High	121 (26.2)	341 (73.8)	

n=number

Table 3: The results of the multivariate logistic regression analysis carried out for determining factors associated with clinical breast examination

Characteristics	AOR	95% CI		P
		Lower	Upper	
Age				
Lower 35	REF			
35-40	1.321	0.751	2.322	
41-50	3.118	1.792	5.424	0.000
51 and over	2.980	1.466	6.056	0.003
House status				
Personal	1.670	1.156	2.412	0.006
Rental	REF			
Birth location				
Rural	REF			
Urban	2.440	1.264	4.709	0.008
Marital status				
Single	REF			
married	2.256	1.366	3.728	0.001
Problem in the breast				
Yes	15.085	9.214	24.697	0.001
No	REF			
Perceived susceptibility				
Low	REF			
High	1.839	1.224	2.763	0.003
Perceived barriers				
Low	2.103	1.401	3.155	0.001
High	REF			
Fatalism				
Low	4.301	2.944	6.283	0.001
High	REF			
Self-care				
Low	REF			
High	9.065	6.069	13.541	0.001

AOR: Adjusted odds ratio, REF: Reference

et al. in 2020,^[4] Mittra *et al.* in 2021,^[15] and Asghari *et al.* in 2016^[6]. In general, older age is associated with an increased risk of breast cancer and, consequently, the possibility of increased care behaviors and breast screening tests, including doing a self-examination of the breast, clinical examination of the breast, and/or mammography. Previous studies have confirmed these cases.^[17-20]

Another important point is that some studies reported that the rate of participants getting a breast screening done along with mammography decreased with people higher age.^[21,22] The reasons for this may include financial constraints and priority of daily life affairs, lack of attention to health in old age, or the inability to go to medical centers. However, the low rate of clinical breast examinations calls for more attention from primary care providers, family physicians, the government, and the health authorities; women should be informed about the risks of breast cancer and the significance of getting clinical breast examinations done.

The study findings indicate people with their own houses or apartments are nearly twice as likely as those living in rented houses or apartments to have a clinical breast examination; this can be attributed to their financial ability, since having a house or an apartment in large cities, including in Tehran, indicate individuals' high socioeconomic status, and, as a result, the likelihood to receive health services is also higher. Thus, it can be concluded that high socioeconomic status is related to breast clinical examination, and it increases the likelihood of individuals undergoing clinical examination of the breast. Other studies have also indicated socioeconomic status as one of the most important predictors of breast screening and mammography.^[23-25]

In line with the results of the previous studies of Takkar *et al.* in 2017,^[26] the findings of the present study indicated that being an urban settler, compared to being a rural one, increases the likelihood of getting a clinical breast examination done; this is due to the fact that urban women have more access to a doctor and also have more information and awareness than women living in rural areas.

Married women in the present study conducted more breast examinations than the unmarried or individuals. This finding is in line with those of the studies conducted by El Asmar *et al.* in 2018,^[27] Tahergorabi *et al.* in 2021,^[5] and Hanske *et al.* in 2016.^[28] It can be stated that, compared to married women, single women undergo clinical breast examinations far less frequently because they are far less sensitive about the possibility of breast diseases and even have the misconception that the hormonal changes in the body after marriage are a cause of breast cancer and since they are unmarried they won't be affected by breast cancer.

Our study concluded that people with breast problems are more than 15 times more likely to get a clinical breast examination done than people without breast problems. Although a few studies have examined the factors associated with clinical breast examination, various studies have reported a significant relationship between breast discomfort and pain and mammography.^[23,29] Having breast discomfort and pain makes women sensitive to following up on their conditions, but informing women is of high significance because they should also be sensitive to pain and minor problems and seek to diagnose the disease before a breast problem occurs.

In line with the findings of other studies,^[21,30-34] the results of the present study showed that the odds ratio for referring to a physician for clinical examination in people with a higher perceived severity of breast cancer is almost 2 times higher than in people with a lower perceived severity. Theoretically speaking, having a higher perceived sensitivity and severity encourages a person to perform screening and engage in preventive behaviors, and, in practice, this perceived sensitivity and severity should be increased in people by informing them and providing them with appropriate information on the significance of the need for breast examination.

Other findings suggest that people with low perceived barriers are more likely to have a clinical breast examination than people with more perceived problems and barriers. Similar to our results, other studies have indicated that a correct understanding of barriers and the presence of fewer barriers in the eyes of the individual can facilitate clinical breast examination and mammography.^[4,21,33,35-38] According to the health belief model, the lower the severity of the disease and the more the barriers to screening, the less prevention and health care they will take. As a result, increasing disease-preventing behaviors requires more attention and intervention. Therefore, reduced perceived barriers play a significant role in conducting regular clinical breast examination and mammography.

The results showed that women's belief in a predetermined and inevitable fate, that is, fatalism, is one of the determining variables in referring to and conducting a clinical breast examination; women with a poor belief in fatalism are 4 times more likely to have a clinical examination than women with a strong belief in fatalism. In line with the results of the present study, other studies have identified religiosity and belief in fatalism as barriers to breast screening behaviors, including clinical breast examination and mammography.^[33,34,39,40]

The present study indicated that people with high self-care were nearly 9 times more likely to have a clinical breast examination done than people with low self-care. In the study conducted by Tabrizi *et al.* in 2018,^[23] a positive significant relationship was observed between self-care and mammography. It can be stated that studies have indicated that people with higher levels of perceived health or health motivation are more involved in self-care-related activities.^[33,34] Some of the most important self-care activities include giving importance to the possibility of disease, following a healthy diet, and doing physical activity; it is essential to provide appropriate interventions and training to encourage women to follow such self-care activities.

The main limitation of the present study is that the data were collected based on participants' self-reports. However, its main strengths were its proper sample size and diversity in sample population hailing from a wide range of socioeconomic classes.

Conclusion

Despite the high prevalence of breast cancer among women and the possibility of early diagnosis of breast cancer for increasing the chances of prevention, the rate of clinical breast examination continues to remain low. Findings show the importance of the need to educate women in order to increase their knowledge and awareness about breast cancer and its associated complications and problems as well as about the various screening and diagnostic methods available to diagnose breast cancer.

key points: This study showed that rate of getting a clinical breast examination done is related to factors such as age, housing conditions, marital status, problem in the breast, perceived susceptibility, perceived barriers, fatalism, and self-care and that primary care and family physicians should pay attention to these issues while conducting clinical examinations.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patients has given his consent for his clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity.

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Conflicts of interest

There are no conflicts of interest.

References

- Zielonke N, Kregting LM, Heijnsdijk EA, Veerus P, Heinävaara S, McKee M, *et al.* The potential of breast cancer screening in Europe. *Int J Cancer* 2021;148:406-18.
- Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin* 2018;68:394-424.
- Heena H, Durrani S, Riaz M, AlFayyad I, Tabasim R, Parvez G, *et al.* Knowledge, attitudes, and practices related to breast cancer screening among female health care professionals: A cross sectional study. *BMC Womens Health* 2019;19:122.
- Ghanbari A, Rahmatpour P, Hosseini N, Khalili M. Social determinants of breast cancer screening among married women: A cross-sectional study. *J Res Health Sci* 2020;20:e00467.
- Tahergorabi Z, Mohammadifard M, Salmani F, Moodi M. Breast cancer screening behavior and its associated factors in female employees in South Khorasan. *J Educ Health Promot* 2021;10:102.
- Rahimzadeh S, Burczynska B, Ahmadvand A, Sheidaei A, Khademioureh S, Pazhuheian F, *et al.* Geographical and socioeconomic inequalities in female breast cancer incidence and mortality in Iran: A Bayesian spatial analysis of registry data. *PloS One* 2021;16:e0248723.
- Ngan TT, Nguyen NT, Van Minh H, Donnelly M, O'Neill C. Effectiveness of clinical breast examination as a 'stand-alone' screening modality: An overview of systematic reviews. *BMC Cancer* 2020;20:1070.
- Al-Hanawi MK, Hashmi R, Almubark S, Qattan A, Puloq MH. Socioeconomic inequalities in uptake of breast cancer screening among Saudi women: A cross-sectional analysis of a national survey. *Int J Environ Res Public Health* 2020;17:2056.
- Mandrik O, Zielonke N, Meheus F, Severens J, Guha N, Herrero Acosta R, *et al.* Systematic reviews as a 'lens of evidence': Determinants of benefits and harms of breast cancer screening. *Int J Cancer* 2019;145:994-1006.
- Abeje S, Seme A, Tibelt A. Factors associated with breast cancer screening awareness and practices of women in Addis Ababa, Ethiopia. *BMC Womens Health* 2019;19:4.
- Alba LH, Díaz S, Gamboa O, Poveda C, Henao A, Perry F, *et al.* Accuracy of mammography and clinical breast examination in the implementation of breast cancer screening programs in Colombia. *Prev Med* 2018;115:19-25.
- Champion VL, Monahan PO, Springston JK, Russell K, Zollinger TW, Saywell RM Jr, *et al.* Measuring mammography and breast cancer beliefs in African American women. *J Health Psychol* 2008;13:827-37.
- Powe BD. Fatalism among elderly African Americans. Effects on colorectal cancer screening. *Cancer Nurs* 1995;18:385-92.
- Dündar PE, Özmen D, Öztürk B, Haspolat G, Akyıldız F, Çoban S, *et al.* The knowledge and attitudes of breast self-examination and mammography in a group of women in a rural area in western Turkey. *BMC Cancer* 2006;6:43.
- Mittra I, Mishra GA, Dikshit RP, Gupta S, Kulkarni VY, Shaikh HK, *et al.* Effect of screening by clinical breast examination on breast cancer incidence and mortality after 20 years: Prospective, cluster randomised controlled trial in Mumbai. *BMJ* 2021;372:n256.
- Asghari E, Nahamin M, Khoshtarash M, Ghanbari A, Parizad N, Mahdavi N, *et al.* The relationship between health belief and breast self-examination among Iranian university students. *Int J Womens Health Reprod Sci* 2016;4:110-3.
- Karimi SE, Rafiey H, Sajjadi H, Nejad FN. Identifying the social determinants of breast health behavior: A qualitative content analysis. *Asian Pac J Cancer Prev* 2018;19:1867-77.
- Rezaeimanesh M, Solhi M, Azar FEF, 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 Educ Health Promot* 2021;10:119.
- Eisinger F, Blay JY, Morère JF, Rixe O, Calazel-Benque A, Cals L, *et al.* Cancer screening in France: Subjects' and physicians' attitudes. *Cancer Causes Control* 2008;19:431-4.
- Dourado F, Carreira H, Lunet N. Mammography use for breast cancer screening in Portugal: Results from the 2005/2006 National Health Survey. *Eur J Public Health* 2013;23:386-92.
- Taymoori P, Berry T, Farhadifar F. Predicting mammography stage of adoption among Iranian women. *J Educ Health Promot* 2012;1:13.
- Babu GR, Samari G, Cohen SP, Mahapatra T, Wahbe RM, Mermash S, *et al.* Breast cancer screening among females in Iran and recommendations for improved practice: A review. *Asian Pac J Cancer Prev* 2011;12:1647-55.
- Tabrizi FM, Vahdati S, Khanahmadi S, Barjasteh S. Determinants of breast cancer screening by mammography

- in women referred to health centers of Urmia, Iran. *Asian Pac J Cancer Prev* 2018;19:997-1003.
24. Darvishpour A, Vajari SM, Noroozi S. Can health belief model predict breast cancer screening behaviors?. *Open Access Maced J Med Sci* 2018;6:949-53.
 25. Duport N, Ancelle-Park R. Do socio-demographic factors influence mammography use of French women? Analysis of a French cross-sectional survey. *Eur J Cancer Prev* 2006;15:219-24.
 26. Takkar N, Kochhar S, Garg P, Pandey A, Dalal UR, Handa U. Screening methods (clinical breast examination and mammography) to detect breast cancer in women aged 40–49 years. *J Midlife Health* 2017;8:2-10.
 27. El Asmar M, Bechnak A, Fares J, Al Oweini D, Alrazim A, El Achkar A, *et al.* Knowledge, attitudes and practices regarding breast cancer amongst Lebanese females in Beirut. *Asian Pac J Cancer Prev* 2018;19:625-31.
 28. Hanske J, Meyer CP, Sammon JD, Choueiri TK, Menon M, Lipsitz SR, *et al.* The influence of marital status on the use of breast, cervical, and colorectal cancer screening. *Prev Med* 2016;89:140-5.
 29. Banaeian S. Knowledge, attitude and practice of women referring to health centers of Brojen regarding breast cancer screening and its effect factors. *J Shahrekord Univ MedSci* 2005;7;1-5.
 30. Secginli S, Nahcivan NO. Factors associated with breast cancer screening behaviours in a sample of Turkish women: A questionnaire survey. *Int J Nurs Stud* 2006;43:161-71.
 31. Hacıhasanog˘lu R, Gzm S. The effect of training on the knowledge levels and beliefs regarding breast self-examination on women attending a public education centre. *Eur J Oncol Nurs* 2008;12:58-64.
 32. Allahverdipour H, Asghari-Jafarabadi M, Emami A. Breast cancer risk perception, benefits of and barriers to mammography adherence among a group of Iranian women. *Women Health* 2011;51:204-19.
 33. Altintas HK, Ayyildiz TK, Veren F, Topan AK. The effect of breast cancer fatalism on breast cancer awareness among Turkish women. *J Relig Health* 2017;56:1537-52.
 34. Akhigbe A, Akhigbe K. Effects of health belief and cancer fatalism on the practice of breast cancer screening among Nigerian women. *Mammography-Recent Advances* 2012:71-88.
 35. Fouladi N, Pourfarzi F, Mazaheri E, Asl HA, Rezaie M, Amani F, *et al.* Beliefs and behaviors of breast cancer screening in women referring to health care centers in northwest Iran according to the champion health belief model scale. *Asian Pac J Cancer Prev* 2013;14:6857-62.
 36. Shirzadi S, Nadrian H, Asghari Jafarabadi M, Allahverdipour H, Hassankhani H. Determinants of mammography adoption among iranian women: What are the differences in the cognitive factors by the stages of test adoption? *Health Care Women Int* 2017;38:956-70.
 37. Hall CP, Hall JD, Pfriemer JT, Wimberley PD, Jones CH. Effects of a culturally sensitive education program on the breast cancer knowledge and beliefs of Hispanic women. *Oncol Nurs Forum* 2007;34:1195-202.
 38. Abdel-Aziz SB, Amin TT, Al-Gadeeb MB, Alhassar AI, Al-Ramadan A, Al-Helal M, *et al.* Perceived barriers to breast cancer screening among Saudi women at primary care setting. *Asian Pac J Cancer Prev* 2017;18:2409-17.
 39. Racine L, Andsoy I, Maposa S, Vatanparast H, Fowler-Kerry S. Examination of breast cancer screening knowledge, attitudes, and beliefs among syrian refugee women in a Western Canadian province. *Can J Nurs Res* 2021;08445621211013200. doi: 10.1177/08445621211013200.
 40. Alatrash M. Prevalence, perceived benefits, and perceived barriers regarding breast cancer screening among three Arab American women subgroups. *J Transcult Nurs* 2020;31:242-9.