Original Article

Predictors of Breast Cancer Screening behavior in Women aged 20-69 Referred to Public Health Centers: A Cross-Sectional Study in Isfahan Province

Abstract

Background: Breast cancer is the most common cancer in women. Delay in the diagnosis of breast cancer is a major challenge that can lead to disease progression. Identifying the predictors of breast cancer screening behavior is necessary to promote early detection of breast cancer. This study aims to investigate the predictors of breast cancer screening behavior in women aged 20–69 referred to public health centers. **Methods:** This cross-sectional study was conducted on 17255 women aged 20–69 years old in Isfahan Province referred to Public Health Centers by the multi-stage random sampling method. data were collected based on the paper forms of women's care aged 20–69 at public health centers, Isfahan, Iran, in 2012. Using STATA 14, logistic regression was employed to explore predictors of breast cancer screening behavior at a 5% significance level. **Results:** The mean age of women was 36.75 ± 10.46. About 6006 (34.8%) of women had a history of breast self-examination, and among women aged over 40 years, 17.7% reported ever having a mammogram. The most important factors influencing breast self-examination were age 40–49 (OR = 1.18; 95% CI: 1.06-1.33), history of hormone consumption (OR = 1.23; 95% CI: 1.15-1.33), family history of breast cancer in first-degree relatives (OR = 14.22; 95% CI: 9.83-20.57. The most important factors influencing mammography were hormone consumption (OR = 1.26; 95% CI: 1.05-1.51), and family history of breast cancer in first-degree relatives (OR = 32.55; 95% CI: 20.08-52.70). **Conclusions:** Our findings indicated that the performance of breast self-examination and mammography was low. The frequency of BC screening behavior was higher among women with BC risk factors The results revealed the need for health authorities to pay attention to education in BC detection methods.

Keywords: *Breast neoplasms, Iran, mammography, self -examination*

Fatemeh Ebrahimi, Nasim Roohparvarzadeh[1] Ghasem Yadegarfar[2]

Department of Epidemiology and Biostatistics, Health School, Isfahan University of Medical Sciences, [1]Medical Science Education Research Center, Isfahan University of Medical Sciences, Isfahan, Iran, [2]Department of Epidemiology and Biostatistics, Health School, Isfahan University of Medical Sciences, Isfahan, Iran & University of Central Lanchashire, Preston, UK

Introduction

Breast cancer (BC) is the most common cancer in women around the world.[1] Around 2.1 million new cases of BC occur worldwide each year. In 2018, it was estimated that 627,000 women died of BC.[2] BC is the most common cancer among Iranian women with an incidence of 33.8 per 100.000 women.[3] In comparison to other countries, BC in Iran is usually diagnosed in its advanced stage, which is why it is the third leading cause of death among Iranian women.[4]

Delay in the diagnosis and treatment of BC is a major challenge that can lead to disease progression and develops mortality and also reduces the survival rate of patients; so; timely diagnosis of the disease is an important factor to prevent the mortality of BC.[5] BC screening is one of the best methods to decrease mortality through early diagnosis of disease.[6] There have been different methods recommended for BC screening, including mammography, Clinical Breast Exam (CBE), and Breast Self-Exam (BSE).[2]

Mammography is essential to achieve the highest level of success in screening, as 35–50% of the cases of BC have been diagnosed by mammography.[7] Nevertheless, in developing countries, BC is not identified in the early stage and 19–25% of the mortality of BC is due to the lack of mammography usage.[8] BSE is another type of screening method. Even though BSE is not solely adequate for the early detection of BC, it is still one of the most available methods in developing

Address for correspondence:
Dr. Ghasem Yadegarfar, Department of Epidemiology and Biostatistics, Health School, Isfahan University of Medical Sciences, Isfahan, Iran & University of Central Lanchashire, Preston, UK.
E-mail: yadegarfar@gmail.com

Access this article online

Website: www.ijpvmjournal.net/www.ijpvm.ir

DOI: 10.4103/ijpvm.IJPVM_466_20

Quick Response Code:

How to cite this article: Ebrahimi F, Roohparvarzadeh N, Yadegarfar G. Predictors of breast cancer screening behavior in women aged 20-69 referred to public health centers: A cross-sectional study in Isfahan province. Int J Prev Med 2022;13:115.

countries, because it is affordable, and it does not require any sophisticated training techniques.[9] Monthly BSE reduces BC mortality by 50%, but most women don't perform it as a regular procedure.[10]

Though BC screening is effective in reducing BC mortality, research findings in different parts of Iran have shown that performing BC screening is not common.[11]

Considering that the prevention of common cancers is deemed as one of the goals of the Fifth Development Plan of Iran, it is one of the five activities in the comprehensive health plan of Isfahan, Iran.[12] Identifying associated factors can be important in expanding interventions to promote BC screening. Therefore, this study aimed to investigate the predictors of BC screening in women aged years in Isfahan, Iran, registered at public health centers.

Methods

Study population

This cross-sectional study was conducted on women aged 20–69 in Isfahan, Iran at Public Health Centers. We have used the paper forms of women's care aged 20–69 in public health centers in Isfahan, Iran, in 2012. It is noteworthy that these forms were completed during a call-in active for women aged 20 to 69 by health centers in 2012 to participate in a program to prevent common cancers. The researcher did not play a role in designing and completing the care forms.

Sampling procedure

The multi-stage random sampling was used to select women in which 17,255 women were chosen. The sampling procedure was as follows. There was a call-in active BC screening program in 2012 by the University's Health Chancellor Department. As a result, 49,000 women from 24 townships (Strata 1) and 242 health centers (Strata 2) participated in the program and the required forms were filled for them by the health center staff. These above-mentioned forms consisted of 2450 clusters of 20 women each. The University's Health Chancellor Department provided these forms to the research team. Of 24 strata, 17 townships of Isfahan Province were randomly selected based on a proportion of the population covered by that strata. Then, among all health centers which considered as sub-strata (Strata 2), the total number of 103 health centers randomly selected based on proportion to the size of the population covered by the center. The total number of women allocated to that center determined the number of clusters of 20 women recruited by the public health centers. In total, 863 clusters of 20 (n = 17,260, 35% of all) women were studied. The main inclusion criteria to extract the data from each form was women's age (between 20 and 69) and having National Identification Number (NIN). The forms that were not completed and had a significant lack of data (5 forms) excluded.

Finally, data were extracted from care forms and entered into the computer system using STATA 14 software.

Variable measured

The outcome variables, BSE and mammography, were defined as a binary variable which coded as 1 (women who did BC screening) and 0 (women who did not BC screening) for each of the above methods.

The survey form used for data collection consists of three sections: (1) demographic data, (2) cancer risk factors, and (3) a history of chronic disease.

The first section includes NIN, marital status, education level, and age. The second section encompasses the age at menarche, age at the first marriage) it should be noted that the above-mentioned items were requested per unit of the year(, the number of children, history of Hormone Therapy (HT) (No/Yes), smoking (No/Yes/Formerly), physical activity (No/Yes), history of breast cancer in first and second- degree relatives (NO/Yes), history of other cancers (NO/Yes), history of breast surgery (NO/Yes), history of biopsy (NO/Yes), history of chemotherapy (NO/Yes), history of pap smear test (NO/Yes), history of benign breast disease in a person (NO/Yes), history of mammography use, and BSE performance (NO/Yes).

The third section encompasses type 1 and type 2 diabetes, hypertension, cardiovascular disease, sleep disorders, depression, and stress) it should be noted that the above-mentioned items were binary variables(. The collected data were explored for any errors and missing items, and then each data was coded. The eligible data were captured into STATA14 software by two well-trained persons.

Statistical analysis

To describe the outcome variable and categorical predictors, number, percentage, and 95% CI and to describe quantitative predictors of screening, mean, standard deviation, 95% CI was applied. Quantitative predictor variables were also categorized as follows: the age of the first marriage into less than 30 years old or higher; and age into five categories: 20–29, 30–39, 40–49, 50–59, and 60–69.

Logistic regression was used to evaluate the odds ratio of predicting screening by each categorical and numerical predictor. The logistic regression was applied in two steps. In the first step, the univariate logistic regression model was employed with cut-off P value = 0.1 to identify the predictors of screening. Multiple logistic regression was used and included all predictors of the univariate model with a P value less than or equal to 0.1 . The results were reported as Odd Ratio (OR) with 95% confidence interval (CI) and P value. The P value of less than 0.05 was considered statistically significant.

Ethical consideration

The present study was a part of project number of 174195 with Ethical approval number of R.MU1.REC.1394.1.175. The project also registered as a MSc Dissertation with

project number of 397769 and approved by the Research Review Board of Isfahan University of Medical Sciences with the code of ethics as IR.MUI.RESEARCH.REC. 1398.093.

Results

Demographic information

The Mean ± SD of the age of 17255 women was 36.8 ± 10.5. Of these 93.4% were married, 49% of them had a high school diploma and over 87% were housewives. In addition, the first menarche was occurred at an average age of 13.5 ± 1.5. About 6006 (34.8%) of women had a history of BSE, and among women aged over 40 years, 17.7% reported ever having a mammogram [Table 1].

About 53% of women reported having used HT. The percentages of women having relatives with BC were 1.6% and 4.8% for first-, and second-degree relatives, respectively and just about 324 (3.6%) of women had experienced benign breast disease.

Table 1: Demographic characteristics of participants

Characteristics	Mean±SD	Count (%)
Age (Year)	36.8±10.5	
20-29		4876 (28.26)
30-39		6322 (36.64)
40-49		3801 (22.03)
50-59		1632 (9.46)
60-69		624 (3.62)
Marital Status (%)		
Single		342 (2.0)
Married		16121 (93.4)
Divorced		792 (4.5)
Educational level (%)		
Illiterate		2026 (11.7)
High school		8509 (49.3)
Diploma and higher		6436 (37.3)
Occupation (%)		
Housewife		15057 (87.2)
Other		2198 (12.7)
Age of the menarche (Year)	13.5±1.5	
<12 years		1252 (7.26)
≥12 years		15453 (89.56)
Age of the first marriage (Year)	19.2±4.1	
<30 years		16370 (94.87)
≥30 years		338 (1.98)
Age of the first delivery (year)	21.2±4.3	
<35 years		15430 (89.42)
≥35 years		139 (0.81)
History of benign breast disease		
Yes		16631 (0.96)
No		624 (3.61)
History of performing mammography among women >40 years (*n*=5524)		939 (17.69)
History of doing BSE		6006 (34.81)

Predictors of mammography in women over 40

performing mammography were 26% higher among the women with a history of HT (P = 0.010). Furthermore, women with a positive family history in a first- and a second-degree relative were 32.53 and 21.07 times more likely to have had a mammogram compared to those without a family history (p < 0.0001). Other aspects like stress or a history of pap smear test may also be involved with mammography, for example, women who had taken pap smear test were more likely to have had a mammogram and the study confirms that women who had reported symptoms of stress, had a 42% increased chance of having a mammogram Also, performing mammography were 42% higher among women who had a history of stress (P = 0.015) [Table 2].

The predictors of BSE

Women aged 30–39 and 40–49 (p < 0.0001, P = 0.003) were more likely to have BSE, compared to those in the reference category (i.e., 20–29 years). performing BSE was 23% higher among the women with a history of HT (P < 0.0001). Women with a positive family history in a first, and second degree relative were 14.22 and 11.65 times more likely to have had BSE compared to those without a family history doing BSE (P < 0.0001). The results revealed that BSE performance was 29% higher in women with a history of Pap smear (P < 0.0001). And also results showed that there is no relation between chronic disease and BSE [Table 3].

Discussion

According to the results, less than a quarter of the women over 40 years had a history of undergoing mammography, and less than half of them had a history of performing BSE. Predictors of BSE and mammography were history of HT, first and second-degree relatives with a BC screening, PAP smear test,. Age and physical activity were predictors of BSE. The results of the present study were obtained on the basis of large sample and the authors believe that the results are reliable and can be generalized to the target population, which are the women aged 20 to 69.

The results showed that there was a higher rate of performing BSE than the rates reported by studies conducted in other parts of Iran such as the cities of Kermanshah and Kazeron.[13,14] However, these results are not consistent with Yadegarfar *et al.* and Kardan-Sourak *et al.*[10,15] who showed that more than half of the women in Isfahan had a history of BSE. The inconsistency between the findings of these studies may be explained by the differences between characteristics of women, the time, the measurement tools used and even the definition of BC screening. The results of the present study showed that performing mammography was undesirable among women. Inconsistent with our study, some studies in Iran also reported an unsatisfactory level of mammography.[13,14,16]

Table 2: Multiple and univariate logistic regression to determine Predictors in mammography in women over 40

Variable name	Category	Crude OR (95%CI)	*P*	Adjusted OR (95%CI)	*P*
Age (year)	40-49	1 (reference)	-	1 (reference)	-
	50-59	0.98 (0.84-1.14)	0.875	0.94 (0.73-1.23)	0.665
	60-69	0.70 (0.55-0.90)	0.005	0.74 (0.49-1.11)	0.148
Educational level	Illiterate	1 (reference)	-	1 (reference)	-
	High school	1.48 (1.26-1.74)	<0.0001	1.22 (0.98-1.52)	0.072
	Diploma and higher	2.19 (1.75-2.73)	<0.0001	1.93 (1.42-2.62)	<0.0001
History hormonotherapy	No	1 (reference)	-	1 (reference)	-
	Yes	1.31 (1.14-1.51)	<0.0001	1.26 (1.05-1.51)	0.010
The age of the first marriage (year)	<30 years	1 (reference)	-	1 (reference)	-
	>=30 years	0.42 (0.24-0.7 3)	0.002	0.63 (0.30-1.30)	0.214
History of other cancer	No	1 (reference)	-	1 (reference)	-
	Yes	1.54 (1.1 1-2.13)	0.009	0.94 (0.60-1.46)	0.785
First-degree relatives with BC	No	1 (reference)	-	1 (reference)	-
	Yes	19.12 (12.44-29.37)	<0.0001	32.53 (20.08-52.70)	<0.0001*
second-degree relatives with BC	No	1 (reference)	-	1 (reference)	-
	Yes	15.33 (11.69-20.11)	<0.0001	21.07 (15.69-28.29)	<0.0001*
history of benign breast disease	No	1 (reference)	-	1 (reference)	-
	Yes	68.02 (42.83-108.02)	<0.0001	66.39 (40.29-109.24)	<0.0001*
History of biopsy	No	1 (reference)	-	1 (reference)	-
	Yes	34.03 (17.48-66.26)	<0.0001	1.91 (0.68-5.34)	0.213
Previous BC surgery	No	1 (reference)	-	1 (reference)	-
	Yes	73.37 (29.59-181.88)	<0.0001	6.71 (1.89-23.73)	0.003*
History of chemotherapy	No	1 (reference)	-	1 (reference)	-
	Yes	24.62 (7.16-84.64)	<0.0001	3.07 (0.17-54.77)	0.445
History of doing pap-smear	No	1 (reference)	-	1 (reference)	-
	Yes	2.53 (1.97-3.26)	<0.0001	2.15 (1.57-2.95)	<0.0001*
History of depress	No	1 (reference)	-	1 (reference)	-
	Yes	1.41 (1.11-1.78)	0.004	0.91 (0.64-1.28)	0.603
History of stress	No	1 (reference)	-	1 (reference)	-
	Yes	1.64 (1.35-1.99)	<0.0001	1.42 (1.07-1.89)	0.015*
History of sleep disorder	No	1 (reference)	-	1 (reference)	-
	Yes	1.47 (1.16-1.85)	0.001	1.20 (0.87-1.67)	0.257

*0.05 level of statistical significant

Compared with the findings from other countries, in our study, performing mammography was lower than those reported in developed countries (UK: 77%, USA: 67%).[17] Lack of access to mammography facilities in developing countries like Iran could be one explanation for the low practice of mammography.

Several studies have reported different results on the effect of age on BC screening methods,. In a study conducted in Brazil,[18] it was shown that women age 40–49 were more likely to perform mammography, while in our study there was no relationship between age and desire for mammography. Furthermore, consistent with our study, a study by Sreedevi[19] revealed that women aged 35–50 were more likely to experience BSE. However, contrary to the results of the present study, there was no association between age and BC screening in Malaysia.[20] Given that Iranian women are affected by BC at least 10 years earlier than women in developed countries,[10] the observed association between age and the performing BSE in the present study may be reasonable.

In our study, there was a statistically significant correlation between BC screening (mammography and BSE) and the history of HT. Women with a history of HT were more likely to do BC screening approved by a preceding study.[21] According to a previous study,[22] HT has been suggested to be a risk factor for BC; therefore, it appears that women using HT have more regular visits to the same health care provider for BC screening.

Moreover, BSE was observed more frequently among women who had physical activity, which is in line with the results of studies by Venturelli *et al.*[23] Since regular physical activity is one of the factors that contribute to the reduction of BC risk,[24] it was suggested that such behavior can be attributed to an adequate knowledge of BC and its preventive measures.[25] Moreover, it can be shown that women who engage in physical activity are more sensitive to their health; therefore, these women could focus on their health, including cancer screening.

The results of the present study also indicated that women with a positive family history in first- and second-degree

Table 3: Multiple and univariate logistic regression to determine predictors of BSE

Variable name	Category	Crude OR (95%CI)	*P*	Adjusted OR (95%CI)	*P*
Age (year)	20-29	1 (reference)	-	1 (reference)	-
	30-39	1.25 (1.31-1.61)	<0.0001	1.16 (1.06-1.27)	<0.0001*
	40-49	1.31 (1.20-1.44)	<0.0001	1.18 (1.06-1.33)	0.003*
	50-59	1.02 (0.90-1.15)	0.689	0.88 (0.71-1.09)	0.280
	60-69	0.87 (0.73-1.05)	0.712	0.77 (0.57-1.02)	0.074
Marital status	Single	1 (reference)	-	1 (reference)	-
	Married	0.80 (0.64-1.00)	0.054	0.63 (0.43-0.91)	0.016*
	Divorce	0.71 (0.54-0.94)	0.014	0.61 (0.41-0.91)	0.017*
Educational level	Illiterate	1 (reference)	-	1 (reference)	-
	High school	1.14 (1.03-1.27)	0.011	0.98 (0.86-1.11)	0.790
	Diploma and higher	1.19 (1.07-1.33)	0.001	1.13 (0.97-1.35)	0.095
History hormonotherapy	No	1 (reference)	-	1 (reference)	-
	Yes	1.25 (1.17-1.33)	<0.0001	1.23 (1.1 5-1.33)	<0.0001*
The age of the first marriage (year)	<30 years	1 (reference)	-	1 (reference)	-
	>=30 years	0.77 (0.60-0.98)	0.034	0.85 (0.65-1.1 0)	0.227
History of other cancer	No	1 (reference)	-	1 (reference)	-
	Yes	1.4 4 (1.21-1.72)	<0.0001	1.17 (0.97-1.42)	0.103
First-degree relatives with BC	No	1 (reference)	-	1 (reference)	-
	Yes	12.32 (8.66-17.52)	<0.0001	14.22 (9.83-20.57)	<0.0001*
second-degree relatives with BC	No	1 (reference)	-	1 (reference)	-
	Yes	10.94 (9.03-13.25)	<0.0001	11.65 (9.57-14.18)	<0.0001*
history of benign breast disease	No	1 (reference)	-	1 (reference)	-
	Yes	14.45 (11.15-18.73)	<0.0001	11.96 (9.04-15.82)	<0.0001*
History of biopsy	No	1 (reference)	-	1 (reference)	-
	Yes	10.48 (6.65-16.50)	<0.0001	1.16 (0.63-2.12)	0.630
Previous BC surgery	No	1 (reference)	-	1 (reference)	-
	Yes	14.94 (9.38-23.18)	<0.0001	2.85 (1.58-5.00)	<0.0001*
History of chemotherapy	No	1 (reference)	-	1 (reference)	-
	Yes	12.71 (3.79-42.64)	<0.0001	1.81 (0.27-12.16)	0.539
History of doing pap-smear	No	1 (reference)	-	1 (reference)	-
	Yes	1.48 (1.35-1.62)	<0.0001	1.29 (1.16-1.43)	<0.0001*
Physical activity	No	1 (reference)	-	1 (reference)	-
	Yes	1.44 (1.35-1.54)	<0.0001	1.58 (1.47-1.69)	<0.0001*
History of smoking	No	1 (reference)	-	1 (reference)	-
	Yes	0.63 (0.44-0.89)	0.010	0.65 (0.45-0.95)	0.029*
	Formerly	0.29 (0.12-0.68)	0.005	0.21 (0.08-0.54)	0.001*
History of stress	No	1 (reference)	-	1 (reference)	-
	Yes	1.09 (0.98-1.22)	0.097	0.97 (0.85-1.10)	0.662

*0.05 level of statistical significant

relatives were more likely to have a breast screening, which was approved by a previous study.[1] Nevertheless, this correlation was not observed in the study conducted in Malaysia.[20] Furthermore, a review study conducted in Iran[9] reported different results regarding the relationship of family history of BC in the first- and second-degree relatives with BC screening. Probably, women with a positive family history in the first- and second-degree relatives may imagine themselves to be at higher risk of BC; therefore, they undergo BC screening more often.

Another finding in this study was the association between a history of performing a Pap smear test and doing breast screening (BSE and mammography). Consequently, women with a history of conducting Pap smear test were more likely to undergo breast screening, which is consistent with the results of a study by Naoum *et al.*[26] Given that, along with Pap smear test, BC screening is a standard checkup for women,[27] this association appears to be reasonable. On the other hand, it seems that women who had a history of Pap smear test may be interested in other preventive examinations, such as BC screening.

The present study had a large sample size and provided comprehensive information on the predictors of BC screening. Since our study examined the data recorded in 2012, this study can be considered as a basis for other studies in Iran, so that they can assess the development of BC screening in subsequent years. There are a few limitations in the present study, including the change in

screening behavior of women over time; lack of ability to make causal associations due to the cross-sectional nature of the study; and lack of access to information after performing BSE and mammography. Therefore, it is recommended to design and conduct a follow up study on the results of BC screening.

Conclusions

Our findings indicated that the status of doing BC screening was undesirable in Isfahan. Also, the frequency of BC screening behavior was higher among women with BC risk factors, such as women with a family history of BC in first- and second-degree relatives, and those with a history of benign breast disease, and HT. The results of the present study revealed that the health authorities should pay attention to educate women for different BC screening and detection methods.

Author contributions

FE analysis and writing manuscript; GY contributed in designing the study project, data management, data analysis, and writing, reviewing and revising the manuscript; NR provided access to the data in the University Health Chancellor.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Received: 09 Aug 20 **Accepted:** 20 Dec 20
Published: 20 Sep 22

References

1. Khalili AF, Shahnazi M. Clinical breast exam, and mammography in women referred to health centers in Tabriz, Iran. J Caring Sci 2012;1:37-45.
2. Akbari A, Razzaghi Z, Homaee F, Khayamzadeh M, Movahedi M, Akbari ME. Parity and breastfeeding are preventive measures against breast cancer in Iranian women. Breast Cancer 2011;18:51-5.
3. GLOBOCAN 2018. Cancer Today. 2019. Available from: http://gco.iarc.fr/today/. [Last accessed on 2019 Dec 14].
4. Abedi G, Janbabai G, Moosazadeh M, Farshidi F, Amiri M, Khosravi A. Survival rate of breast cancer in Iran: A meta-analysis. Asian Pac J Cancer Prev 2016;17:4615-21.
5. Fouladi N, Barahman M, Amani F, Bahadoram M, Eghbali S. Factors associated with delayed diagnosis of breast cancer; a study in North-West of Iran. Immunopathol Persa 2019;6:e02-e.
6. Naghibi A, Jamshidi P, Yazdani J, Rostami F. Identification of factors associated with breast cancer screening based on the PEN-3 model among female school teachers in Kermanshah. Iran J Health Educ Health Promot 2016;4:58-64.
7. Paul S, Solanki PP, Shahi UP, Srikrishna S. Epidemiological study on breast cancer associated risk factors and screening practices among women in the holy city of Varanasi, Uttar Pradesh, India. Asian Pac J Cancer Prev 2015;16:8163-71.
8. Alavijeh M, Mahboubi M, Jalilian F, Aghaei A, Jouybari T. Factors related to self-breast examination based on health belief model among Iranian women. Res J Med Sci 2015;9:105-8.
9. 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.
10. Yadegarfar Gh, Salami F, Mostajeran M, Ansari R, Rejali M, Aghdak P. Factors engaged with women performance in doing regular breast self-examination or referring to health centers for examination and mammography. Horizon of Medical Sciences. 2018;24:53-60. [In Persian].
11. Farhadifar F, Taymoori P, Berry T. Predicting mammography stage of adoption among Iranian women. J Educ Health Promot 2012;1:13.
12. Rejali M, Yadegarfar G, Mostajeran M, Aghdak P, Fadaei R, R. A. Evaluation of the status of breast cancer screening in women in Isfahan Province, Iran. J Health Syst Res 2018;13:415-21. [In Persian].
13. Bahrami M, Taymoori P, Bahrami A, Farazi E, Farhadifar F. The prevalence of breast and cervical cancer screening and related factors in women who refering to health centers of Sanandaj city in 2014. Zanko J Med Sci 2015;16:1-12. [In Persian].
14. Tavakolian L, Boniadi F, E. M. The investigation of factors associated with breast cancer screening among Kazeroon women aged 20-65 in 2013. Nurs Journal Vulnerable 2015;1:17-31. [In Persian].
15. Kardan-Souraki M, Moosazadeh M, Khani S, Hamzehgardeshi Z. Factors related to breast cancer screening in women in the northern part of Iran: A cross-sectional study. Open Access Maced J Med Sci 2019;7:637-42.
16. Naghibi S-A, Shojaizadeh D, Montazeri A, Yazdani-Cherati J. Evaluating the performance rate of breast cancer screening methods and its relationship with breast cancer risk factors in Mazandaran province, Iran. Journal of Mazandaran University of Medical Sciences 2014;23:118-23.
17. Dowling EC, Klabunde C, Patnick J, Ballard-Barbash R; International Cancer Screening Network (ICSN). Breast and cervical cancer screening programme implementation in 16 countries. J Med Screen 2010;17:139-46.
18. Buranello MC, Meirelles MCCC, Walsh IAP, Pereira GA, Castro SS. Breast cancer screening practice and associated factors: Women's Health Survey in Uberaba MG Brazil, 2014. Cien Saude Colet 2018;23:2661-70.
19. Sreedevi A, Quereshi MA, Kurian B, Kamalamma L. Screening for breast cancer in a low middle income country: Predictors in a rural area of Kerala, India. Asian Pac J Cancer Prev 2014;15:1919-24.
20. Parsa P, Kandiah M. Predictors of adherence to clinical breast examination and mammography screening among Malaysian women. Asian Pac J Cancer Prev 2010;11:681-8.
21. Matos J, Pelloso SM, Carvalho M. Factors associated with secondary breast cancer prevention in Maringa, Parana State, Brazil. Cad Saude Publica 2011;27:888-98.
22. Chlebowski RT, Anderson GL, Gass M, Lane DS, Aragaki AK, Kuller LH, *et al*. Estrogen plus progestin and breast cancer incidence and mortality in postmenopausal women. JAMA 2010;304:1684-92.
23. Venturelli F, Sampaolo L, Carrozzi G; PASSI Working Group, Zappa M, Giorgi Rossi P. Associations between cervical, breast and colorectal cancer screening uptake, chronic diseases and health-related behaviours: Data from the Italian PASSI nationwide surveillance. Prev Med 2019;120:60-70.
24. Friedenreich CM, Cust AE. Physical activity and breast cancer risk: Impact of timing, type and dose of activity and population

subgroup effects. Br J Sports Med 2008;42:636-47.
25. Al-Sakkaf KA, Basaleem HO. Breast cancer knowledge, perception and breast self-examination practices among Yemeni Women: An application of the health belief model. Asian Pac J Cancer Prev 2016;17:1463-7.
26. Naoum P, Skroumpelos A, Athanasakis K, Kyriopoulos J. Factors associated with the utilization of mammographic screening in Greece. Eur J Cancer Prev 2018;27:13-9.
27. An S, Choi YJ, Lee HY, Yoon YJ, Platt M. Predictors of breast cancer screening among Korean American women: Is having an annual checkup critical? Asian Pac J Cancer Prev 2018;19:1281-6.