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# Factors Related to Breast Cancer Screening in Women in the Northern Part of Iran: A Cross-Sectional Study

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## Abstract

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**Keywords:** Women; Breast Cancer; Screening; Early Detection of Cancer

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**BACKGROUND:** Breast cancer is the most common type of cancer in women and affects many women around the world each year. Breast cancer screening is one of the best strategies that can be used to reduce the death rate from the disease. Different factors influence the breast cancer screening rate.

**AIM:** This study aimed to investigate the factors that affect the screening of women for breast cancer in the northern part of Iran.

**MATERIAL AND METHODS:** This cross-sectional study was conducted in the Mazandaran Province of Iran in 2016 on 1,165 women who participate in breast cancer screening programs, using a cluster-sampling method. A valid and reliable researcher-made questionnaire was used to collect the data. The collected data were analysed using descriptive and inferential statistics via SPSS 21.

**RESULTS:** In this study, 62% of the women had a history of breast self-examinations, 41.1% had breast examinations by healthcare staff, and 21.7% received mammography. The woman's age, age at first marriage, age at onset of sexual intercourse, occupation, spouse's occupation, household income, health status, history of infertility, smoking, and decision-maker on issues of sexual and reproductive health (SRH) were the best predictors of participation in screening for breast cancer ( $P < 0.05$ ).

**CONCLUSION:** To encourage participation in breast cancer screening programs, women should be encouraged to seek preventive care. Also, factors that affect screening should be considered an appropriate educational method should be provided.

## Introduction

Breast cancer is the most common type of cancer in women in developed and developing countries [1]. It affects 1.5 million women every year and has the highest death rate for all cancers in women [2]. According to the World Health Organization, 570,000 women died of breast cancer in 2015, which was equivalent to 15% of all cancer deaths in women (2 In Iran, the prevalence and death rate from breast cancer in 2014 was 9,795 and 14.2% respectively [3]. Globally, the incidence of breast cancer in developing countries is rising due to the increase in life expectancy, urban growth, and the acceptance of the Western lifestyle [4]. The goals of

the Healthy People 2020 program by the US Office of Disease Prevention and Health Promotion include reducing the breast cancer death rate, reducing the number of people with late-stage cancer, and increasing the participation of women in breast cancer screening [5].

Breast cancer screening is the best strategy to reduce the death rate through early diagnosis, control, and treatment of the disease [1], [6], [7], [8], which improves patient survival and quality of life [4], [9]. Different methods, such as breast self-examination, physical examination by physicians or healthcare staffs, and mammography, are used to screen and diagnose breast cancer in early stages [2]. However, the detection of breast cancer in women in

developing countries, such as Iran, is often delayed until there is no hope of treating the disease [9]. The reasons for this delay include the lack of awareness of breast cancer screening methods, the lack of a widespread screening program in Iran, the lack of awareness of breast cancer symptoms at early stages, and the poor prognosis of the disease at the late stage. Promoting women's awareness of screening methods can play a major role in the early detection of breast cancer [4], [10].

Studies in various parts of Iran, such as Kerman [9], [11], Mazandaran [12], Gorgan [13], and Ilam [7], have shown that the breast cancer screening rate is not optimal. Different demographic, economic, social, and cultural factors, including age [1], [7], [13], [14], level of education [1], [7], [11], [14], status of occupation [7], [14], [15], and economic situation [11], can influence the participation of women in breast cancer screening programs.

Because of the high incidence of breast cancer in Iran and its occurrence in young Iranian women, an early diagnosis is important. Thus, this study aimed to investigate the participation rate of women in breast screening programs and its associated factors in women in the northern part of Iran.

## Methods

This descriptive cross-sectional study was approved by the Research Council and Ethics Committee of the Mazandaran University of Medical Sciences, Sari, Iran. The study was conducted on 1,165 women in Mazandaran Province in 2016. The sample size was based on a study by Naghibi et al., in which 48.1% of women had a history of breast self-examination [1], and was calculated to be 1,200 women with a 95% confidence level and an error of 0.04 as follows:  $n = [Z^2_{1-\alpha/2} * P(1 - P)] / d^2 = 599 * 2$  (effect size) = 1198  $\cong$  1200

Cluster sampling was used to organise the women into 60 clusters with 20 women in each cluster. The women had an equal chance to be selected from various urban and rural areas. The first household from each cluster was randomly selected based on a 10-digit postal code. The investigation began with the first household in each cluster and proceeded by moving from the right side. The remaining households were questioned by the investigation team until a sample population of 20 women was reached. Follow-ups were made if the eligible woman from the household in the sample was not present. If the researcher was not successful in reaching the woman after two visits, she was removed from the cluster and replaced by a woman from the next household. If more than one person in a

household qualified for the study, the person whose birth date was closest to the date of the survey was included.

To collect the data about breast cancer screening and factors related to women's participation in breast cancer screening, in a deductive approach, an extensive literature review, opinions of 10 experts from various disciplines that included reproductive health PhD, sociologist, community nurse, gynecologists, midwives and surgeons (breast surgery fellowship) and 15 women referring to healthcare centers were used. A questionnaire with 33 questions (6 questions in breast cancer screening and 27 questions in related factors) was developed. Face and content validity and reliability of the instrument were assessed. The quantitative face validity of this questionnaire showed an impact source above 1.5 for all items. In the qualitative content validity process, 5 questions were revised and corrected. Also, 2 questions achieved a CVR less than 0.62, and 1 question had a CVI less than 0.79. The Cronbach's alpha and ICC of the questionnaire were 0.895 and 0.945, respectively. A dichotomous variable was used and a score of one was given for women who performed regular breast self-examinations, received breast examinations by a healthcare staffs, or were referred for mammography based on indications (every 1-2 years for women 40-74 years of age); a score of zero was given to women who don't participate in breast cancer screening. For the statistical analysis, descriptive and inferential statistics via SPSS version 21 (IBM Corp., Armonk, NY) were used. The absolute and relative frequency, mean and standard deviation (SD), tables and graphs, chi-square, analysis of variance (ANOVA), student's t-test, and multivariable logistic regression were used. The level of significance was set at  $P < 0.05$ .

## Results

In this study, 1,165 women were investigated (35 questionnaires were not filled in completely). The mean age of the women was  $37.15 \pm 8.84$  years. In terms of education, 519 women (44.5%) had not earned their high school diploma. In terms of breast examination, 722 women (62%) performed breast self-examinations, 479 (41.1%) received breast examinations by healthcare staffs, and 253 (21.7%) had received mammography. Of the women who performed breast self-examinations, 624 women (86.4%) had normal breasts, 88 women (12.2%) felt a mass, and 10 women (1.4%) observed nipple secretions. For women who received breast examinations by healthcare staffs, 421 women (87.9%) had normal breasts, and a mass was felt in 58 women (12.1%). The mammograms were normal in 204 women (80.6%), while 40 women (15.8%) had

a benign cystic mass, 8 (3.2%) had a benign solid mass, and 1 woman (0.4%) had calcification. The Student's t-test and chi-square test showed that women with a history of breast self-examination compared with women without a history of breast self-examination had a higher mean age at the onset of sexual intercourse (21.12 years and 20.23 years); a higher frequency of proper decision-maker on issues of SRH (63.8% and 56.2%); and a higher number of pregnancies ( $2.10 \pm 1.16$  and  $1.93 \pm 1.25$ ). Women who received breast examinations by a healthcare staffs had a higher mean age (39.36 years), mean age of spouse (38.15 years), and frequency of infertility (49.6%) healthcare staffs than women who did not receive breast examinations by a healthcare staffs: 35.61 years, 36.52 years, and 40%, respectively. Women who had a history of mammography had a higher body mass index (BMI) (27.91), a mean number of pregnancies (2.36), and frequency of healthy health status (28.7%) than women without a history of mammography: 26.97, 1.95, and 18.9%, respectively.

The following variables were associated with a history of breast self-examination and had a  $P < 0.1$  in the single-variable test and were entered into the multivariable logistic regression model: woman's age ( $P < 0.0001$ ), age at onset of sexual intercourse ( $P < 0.001$ ), age at first marriage ( $P < 0.008$ ), occupation ( $P < 0.004$ ), health status ( $P < 0.062$ ), household income ( $P < 0.030$ ), the decision-maker on SRH ( $P < 0.021$ ), number of pregnancies ( $P < 0.026$ ) and having genital unclear or colored vaginal discharge ( $P < 0.010$ ). Multivariable logistic regression showed that age, age at onset of sexual intercourse, occupation, and health status had significant statistical relationships with a history of breast self-examinations. The probability of performing breast self-examination increased 1.08 times for every year increase in age at the onset of sexual intercourse. The probability of a housekeeper performing breast self-examination was 32% less than the probability of employed women doing breast self-examination (Table 1).

**Table 1: Multivariate logistic regression to determine the factors related to breast self-examination**

Variable	Multivariate test			
	OR <sup>1</sup>	CI <sup>2</sup>	P-value	
Age (year)	1.02	1.00-1.04	0.007 <sup>3</sup>	
Age (year) at onset of sexual intercourse	1.08	1.01-1.15	0.022 <sup>3</sup>	
Occupation	Housekeeper (unemployed)	0.68	0.46-0.99	0.04 <sup>3</sup>
	Employed			
Health status	Healthy	0.71	0.54-0.93	0.015 <sup>3</sup>
	Ill			
Ultimate decision-maker on issues of sexual and reproductive Health <sup>4</sup>	Desirable	1.14	0.85-1.52	0.36
	Undesirable			

<sup>1</sup> $P < 0.05$ ; <sup>2</sup>Odds Ratio; <sup>3</sup>Confidence Interval; <sup>4</sup>The desirable decision-maker for issues of sexual and reproductive Health was the woman alone or with her husband; the undesirable decision-maker was the husband alone.

The following variables were associated variables with a history of receiving breast examinations by a healthcare staffs and had a  $P < 0.1$  in the single-variable test and were entered into the

multivariable logistic regression model: woman's age ( $P < 0.0001$ ), husband's age ( $P < 0.009$ ), BMI ( $P < 0.001$ ), age at first marriage ( $P < 0.026$ ), number of pregnancies ( $P < 0.0001$ ), health status ( $P < 0.095$ ), household income ( $P < 0.030$ ), decision-maker for self-care ( $P < 0.022$ ) and issues of SRH ( $P < 0.001$ ), polygamy ( $P < 0.75$ ), and a history of infertility ( $P < 0.030$ ). According to the results of the model, age, age at first marriage, household income, decision-maker on issues related to SRH, and history of infertility had significant statistical relationships with a history of receiving breast examinations by healthcare staffs. The probability of having a breast examination by a healthcare staffs in a household with an income below 5 million Iranian Rials (120 US dollars) was 40% less than the probability of a woman from a household with an income greater than 15 million Rials (360 dollars) having a breast examination by a healthcare staffs. Furthermore, the probability of having a breast examination by a healthcare staffs in a household with an income of 5-10 million Rials (120-240 dollars) or 10-15 million Rials (240-360 dollars) was 35% less and 31% less, respectively, than the probability in households with incomes over 15 million Rials (360 dollars) (Table 2).

**Table 2: Multivariate logistic regression to determine the factors related to breast examination by a medical team**

Variable	Multivariate test			
	OR <sup>1</sup>	CI <sup>2</sup>	P-value	
Age (year)	1.06	1.04-1.08	0.000	
Husband's age (year)	0.99	0.97-1.00	0.185	
BMI <sup>3</sup>	1.02	0.99-1.05	0.199	
Age (year) at first marriage	0.95	0.92-0.98	0.001 <sup>3</sup>	
Number of pregnancies	0.936	0.826-1.06	0.299	
Health status	Healthy	1.04	0.789-1.37	0.766
	Ill			
Income (million Iranian Rials)	< 5	0.60	0.39-0.93	0.018 <sup>3</sup>
	5-10	0.64	0.46-0.92	0.010 <sup>3</sup>
	10-15	0.68	0.48-0.96	0.026 <sup>3</sup>
	> 15			
Ultimate decision-maker in the level of self-care <sup>4</sup>	Desirable	1.07	0.81-1.41	0.62
	Undesirable			
Ultimate decision-maker on issues of sexual and reproductive health <sup>4</sup>	Desirable	1.67	1.22-2.29	0.001 <sup>3</sup>
	Undesirable			
polygamy	Yes	0.62	0.29-1.32	0.22
	No			
Infertility	Yes	0.62	0.43-0.90	0.014 <sup>3</sup>
	No			

<sup>1</sup> $P < 0.05$ ; <sup>2</sup>Odds Ratio; <sup>3</sup>Confidence Interval; <sup>4</sup>Body Mass Index; <sup>5</sup>The desirable decision-maker for self-care, issues of sexual and reproductive Health was the woman alone or with her husband; the undesirable decision-maker was the husband alone.

The following variables were associated factors with a history of receiving mammography and had a  $P < 0.1$  in the single-variable test and were entered into the multivariable logistic regression model: woman's age ( $P < 0.0001$ ), husband's age ( $P < 0.0001$ ), BMI ( $P < 0.003$ ), number of pregnancies ( $P < 0.0001$ ), education level ( $P < 0.018$ ), husband's occupation ( $P < 0.0001$ ), smoking ( $P < 0.068$ ), health status ( $P < 0.0001$ ), decision-maker for self-care ( $P < 0.001$ ), buying home needs ( $P < 0.1$ ), and SRH ( $P < 0.001$ ), unclear or colored vaginal discharge ( $P < 0.002$ ) and genital ulcers in the last 12 months ( $P < 0.041$ ), and the use of a contraceptive method ( $P < 0.067$ ). The Multivariate regression showed that age, husband's occupation, smoking, and decision-maker

on issues of SRH had statistically significant relationships with a history of receiving mammography. The probability of a nonsmoker receiving mammography was 83% less than the probability of a smoker receiving mammography. As each year of age increases, the probability of mammography increases by 7%. Furthermore, women with unemployed husbands received mammography 3.2 times more than those with self-employed husbands. If the decision maker is appropriate for SRH, 76% will increase the probability of mammography (Table 3).

**Table 3: Multivariate logistic regression to determine the factor related to mammography**

Variable	Multivariate test			
	OR <sup>1</sup>	CI <sup>2</sup>	P-value	
Age (year)	1.07	1.05-1.10	0.000	
Husband's age (year)	0.99	0.97-1.00	0.189	
BMI <sup>3</sup>	1.01	0.97-1.05	0.429	
Number of pregnancies	0.989	0.85-1.14	0.882	
Educational level	Did not earn diploma	0.96	0.60-1.53	0.882
	Diploma and associate degree	0.92	0.59-1.44	0.735
Husband's occupation	Bachelor degree and higher			
	Unemployed	3.20	1.58-6.48	0.001
	Government employee	1.11	0.74-1.65	0.604
	Worker	1.12	0.75-1.67	0.561
Smoking	Self-employed			
	Yes	0.171	0.03-0.81	0.027
Health status	No			
	Healthy	1.36	0.98-1.89	0.059
Ultimate decision-maker for self-care <sup>4</sup>	Ill			
	Desirable	1.44	0.99-2.08	0.054
Ultimate decision-maker for buying home needs <sup>4</sup>	Undesirable			
	Desirable	0.94	0.68-1.29	0.717
Ultimate decision-maker on issues of sexual and reproductive Health <sup>4</sup>	Undesirable			
	Desirable	1.76	1.15-2.70	0.009
Vaginal discharge in the last 12 months	Undesirable			
	Yes	0.8	0.57-1.13	0.215
Genital ulcers in the last 12 months	No			
	Yes	0.53	0.27-1.02	0.061
Use of a contraceptive method	No			
	Yes	2.97	0.0	0.999

<sup>1</sup>OR: Odds Ratio; <sup>2</sup>CI: (Confidence Interval); <sup>3</sup>BMI: Body Mass Index; <sup>4</sup>The desirable decision-maker for self-care, issues of sexual and Reproductive Health, and buying home needs was the woman alone or with her husband; the undesirable decision-maker was the husband alone.

## Discussion

This study aimed to investigate the factors related to breast cancer screening in women from the northern part of Iran. According to the findings, 62% of women had a history of breast self-examinations, 41.1% had breast examinations by healthcare staffs, and 21.7% received mammography. The results showed that there was a higher rate of breast cancer screening than the rates reported by studies conducted in Nigeria [17] and in other places in Iran, such as Kermanshah, Kerman, Gorgan, Tabriz, and Mazandaran [1], [9], [11], [13], [14], [16]. However, Klug et al., in Germany showed that 82.8% of women had a history of breast examinations by healthcare staffs and 55.5% had a history of receiving mammography [18]. A comparison of the results of this study with the results by Kellogg et al. Indicating that Iran is not in good condition compared to the

developed countries. Therefore, there is a need for more efforts to improve women's knowledge about breast screening methods and the importance of screening about an early diagnosis of breast cancer.

The results of this study showed that the predictors of participation in breast cancer screening were age, age at first marriage, age at onset of sexual intercourse, occupation, the occupation of spouse, household income, health status, history of infertility, smoking, and decision-maker on issues of SRH. Age was a predictor of women performing breast self-examinations, having a clinical examination by healthcare staff, and receiving mammography. For each year increase in age, breast screenings increased 1.02, 1.06, and 1.07 times, respectively. The results of this study were consistent with studies by Avci [19], Berdi-Ghourchaei et al. [13], and Nourizadeh et al. [16]. However, studies by Ahmadian et al., [15], Lee et al., [20], and Godazandeh [14] were inconsistent with the results of this study. Considering the direct relationship between age and onset of breast cancer, as women age they consider themselves to be more at risk of developing cancer. Therefore, the rate of screening increases with age.

Occupation was another predictor of breast cancer screening. The probability that a housekeeper would perform breast self-examination was 32% less than the probability that an employed woman would do breast self-examination. The results of studies by Soltanahmadi et al., [11], Bozorgi et al., [7], Godazandeh et al., [14], and Kim et al., [21] are consistent with the findings of this study. Employed women tend to have higher social relationships and higher levels of education than housekeepers and, thus, have an increased level of knowledge and increased participation rate in breast screening programs [11]. The relationship between job status and participate in a breast screening program indicates that, in addition to contributing to the household income, being employed presents more opportunities to use healthcare and social services [21].

The results of this study showed that household income was also related to breast cancer screening. Women with high household incomes had a high rate of screening. This finding was consistent with the findings by Soltanahmadi et al., [11]. One reason for this association could be the misconception by some women who think that a clinical breast examination must be performed by physicians, whereas clinical examinations are performed by midwives in healthcare centres for free [11]. However, a study by Lee et al., in Korea showed that household income did not influence the screening rate. The Korean government provides free screening services to low-income people, which might reduce the effect of household income on participation in screening programs [20].

Smoking was another factor that influenced breast cancer screening behaviours. In comparison with a nonsmoker, a smoker was 83% less likely to receive mammography. Rakowski et al. found that “the rate of mammography for current smokers was 16% lower than for never smokers for the past-year interval. Their interpretation was that “smoking is not a direct cause of reduced screening, but rather an indicator that a high-risk group of women receives less screening” [22]. One study reported that there was a significant difference between the psychological variables of smokers and nonsmokers, which influenced self-care behaviors and decision-making behavior about healthcare issues [20].

The decision-maker on issues of SRH was a predictor of participation in breast cancer screening. If the decision-maker was the woman alone or together with her husband, the probability of participating in screening by clinical examination or mammography was 1.67 times and 1.76 times, respectively, than when the decision-maker was the husband alone. Some reasons for this result could relate to having independence in making decisions about health and the financial dependence of 75% of the women in this study. Therefore, a lack of sense of control on resources and financial dependence on another person could influence a woman's decision-making about her health [23].

In women with a history of infertility, the rate of breast cancer screening by a healthcare staff was 38% less than in women without a history of infertility. The effect of infertility on the mental health of women can lead to high rates of depression, anxiety, and disappointment with life. Depression and other psychological problems in infertile women are barriers to seeking medical counselling, while disappointment with life can lead to reduced screening behaviours [24], [25].

There was a statistically significant relationship between the health status of women and breast self-examination screening. Women with underlying diseases, such as diabetes, high blood pressure, and thyroiditis, had a rate of performing breast self-examinations that were 29% lower than women who had no underlying diseases. Different studies have shown that the prevalence of depression and mood disorders was high in women with diabetes, high blood pressure, hypothyroidism, and hyperthyroidism [26], [27], [28], [29]. Given that depression and mood disorders are considered barriers to self-care behaviours [30], the results of this study were noticeable, and the rate of performing breast self-examination for women with a history of underlying diseases was lower than the rate for healthy women. It is recommended that breast examination and mammography be included in the routine care for women with underlying diseases. There was a significant statistical relationship between breast cancer screening and the age of onset of sexual intercourse and age at first marriage.

Therefore, for each unit increase in age at onset of sexual intercourse and at first marriage, the probability of performing breast self-examination and receiving an examination by a healthcare staff increased 1.08 times and 0.95 times, respectively.

The husband's occupation was another predictor of participating in breast cancer screening. This study showed that the probability of receiving mammography in women whose husbands were unemployed was 3.2 times greater than in women whose husbands were self-employed. Women with unemployed husbands were probably the main income provider for their families. Therefore, women's financial independence from their husbands could be a factor in their decision-making about their health.

In conclusion, in this study, 62% of women had a history of breast self-examinations, 41.1% had a history of receiving breast examinations by healthcare staffs, and 21.7% of them had a history of receiving mammography. Also, it has been revealed that the woman's age, age at first marriage, age at onset of sexual intercourse, occupation, spouse's occupation, household income, health status, history of infertility, smoking, and decision-maker on issues of sexual and reproductive health were the best predictors of participation in screening for breast cancer. To reduce the total burden of disease of breast cancer, factors that are related to performing screening tests should be considered an appropriate educational method should be provided by healthcare providers.

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## Reference

1. Naghibi SA, Jamshidi P, 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(1):58-64. <https://doi.org/10.18869/acadpub.ihepsaj.4.1.58>
2. Torre LA1, Islami F, Siegel RL, Ward EM, Jemal A. Global Cancer in Women: Burden and Trends. Cancer Epidemiol Biomarkers Prev. 2017; 26(4):444-457. <https://doi.org/10.1158/1055-9965.EPI-16-0858> PMID:28223433
3. da Costa Vieira RA, Biller G, Uemura G, Ruiz CA, Curado MP. Breast cancer screening in developing countries. Clinics (Sao



- Paulo). 2017; 72(4):244-253.  
[https://doi.org/10.6061/clinics/2017\(04\)09](https://doi.org/10.6061/clinics/2017(04)09)
4. Tazhibi M, Feizi A. Awareness levels about breast cancer risk factors, early warning signs, and screening and therapeutic approaches among Iranian adult women: a large population based study using latent class analysis. *Biomed Res Int*. 2014; 2014:306352. <https://doi.org/10.1155/2014/306352> PMID:25295257 PMCid:PMC4180890
  5. Masoudiyekta L, Dashtbozorgi B, Gheibizadeh M, Malehi AS, Moradi M. Applying the health belief model in predicting breast cancer screening behavior of women. *Jundishapur J Chronic Dis Care*. 2015; 4(4):e30234. <https://doi.org/10.17795/jicdc-30234>
  6. Monticciolo DL, Newell MS, Moy L, Niell B, Monsees B, Sickles EA. Breast Cancer Screening in Women at Higher-Than-Average Risk: Recommendations From the ACR. *J Am Coll Radiol*. 2018; 15(3PA): 408-414. <https://doi.org/10.1016/j.jacr.2017.11.034> PMID:29371086
  7. Bozorgi N, Khani S, Elyasi F, Moosazadeh M, Janbabaei G, Shojaee L. A Review of Strategies to Promote Breast Cancer Screening Behaviors in Women. *J Mazandaran Univ Med Sci*. 2018; 28(165):243-55.
  8. Shetty MK. Screening for Breast Cancer with Mammography: Current Status and An Overview. *Indian J Surg Oncol*. 2010;1(3):218-23. <https://doi.org/10.1007/s13193-010-0014-x> PMID:22693368 PMCid:PMC3244246
  9. Khanjani N, Noori A, Rostami F. The knowledge and practice of breast cancer screening among women in Kerman, Iran. *Al Ameen J Med Sci*. 2012; 5(2):221-6.
  10. Majidi A, Majidi S, Salimzadeh S, Khazaee-Pool M, Sadjadi A, Salimzadeh H, et al. Cancer Screening Awareness and Practice in a Middle Income Country; A Systematic Review from Iran. *Asian Pac J Cancer Prev*. 2017; 18(12):3187-94. PMID:29281865 PMCid:PMC5980869
  11. Soltanahmadi Z, Abbaszadeh A, Tirgari B. A Survey on the Rate and Causes of Women's Participation or Nonparticipation in Breast and Cervical Cancers Screening Programs. *The Iranian Journal of Obstetrics, Gynecology and Infertility*. 2010; 13(3):37-46.
  12. 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. *J Mazandaran Uni Med Sci*. 2014; 23(110):118-23.
  13. Berdi Ghourchaei A, Charkazi A, RazaqNejad N. Knowledge, practice and perceived threat toward breast cancer in the women living in Gorgan, Iran. *J Research Development in Nursing and Midwifery*. 2013; 10(1):25-32.
  14. Godazandeh G, Khani H, Khalilian A, Atarod Z, Firozjaee M, Partovi A, et al. Knowledge and practice of above 15 years old females towards breast cancer prevention in Sari township, 2004. *J Mazandaran Uni Med Sci*. 2006; 16(52):64-76.
  15. Ahmadian M, Samah AA, Redzuan M, Emby Z. Predictors of mammography screening among Iranian women attending outpatient clinics in Tehran, Iran. *Asian Pacific Journal of Cancer Prevention*. 2012; 13(3):969-74. <https://doi.org/10.7314/APJCP.2012.13.3.969> PMID:22631681
  16. Nourizadeh R, Bakhtari Aghdam Fatemeh, Vali Vand A H, Sahebi L. Knowledge, health beliefs and breast cancer screening behaviors of women referring to health centers of Tabriz, 2010. *Iranian Quarterly Journal of Breast Diseases*. 2010; 3(3):43-51.
  17. Amoran OE, Toyobo OO. Predictors of breast self-examination as cancer prevention practice among women of reproductive age-group in a rural town in Nigeria. *Niger Med J*. 2015; 56(3):185-9. <https://doi.org/10.4103/0300-1652.160362> PMID:26229226 PMCid:PMC4518334
  18. Klug SJ, Hetzer M, Blettner M. Screening for breast and cervical cancer in a large German city: participation, motivation and knowledge of risk factors. *Eur J Public Health*. 2005; 15(1):70-7. <https://doi.org/10.1093/eurpub/cki118> PMID:15788807
  19. Avci IA, Kumcagiz H, Altinel B, Caloglu A. Turkish female academician self-esteem and health beliefs for breast cancer screening. *Asian Pac J Cancer Prev*. 2014; 15(1):155-60. <https://doi.org/10.7314/APJCP.2014.15.1.155> PMID:24528018
  20. Lee K, Lim HT, Park SM. Factors associated with use of breast cancer screening services by women aged ≥ 40 years in Korea: The Third Korea National Health and Nutrition Examination Survey 2005 (KNHANES III). *BMC Cancer*. 2010; 10(1):144. <https://doi.org/10.1186/1471-2407-10-144> PMID:20398358 PMCid:PMC2873386
  21. Kim J, Lee SK, Lee J, Choi M-Y, Jung SP, Kim MK, et al. Breast cancer screening knowledge and perceived health beliefs among immigrant women in Korea. *Journal of breast cancer*. 2014; 17(3):279-86. <https://doi.org/10.4048/jbc.2014.17.3.279> PMID:25320627 PMCid:PMC4197359
  22. Rakowski W, Clark MA, Truchil R, Schneider K, Meersman S. Smoking status and mammography among women aged 50–75 in the 2002 behavioral risk factor surveillance system. *Women Health*. 2005; 41(4):1-21. [https://doi.org/10.1300/J013v41n04\\_01](https://doi.org/10.1300/J013v41n04_01) PMID:16260411
  23. Hajizade-Valokolaei M, Khani S, Fooladi E, Peivandi S, Habibi F, Rahmani Z. Investigating Sexual and Reproductive Health and Its Related Factors in Infertile Women. *J Mazandaran Uni Med Sci*. 2018; 27(158):154-65.
  24. Herbert DL, Lucke JC, Dobson AJ. Depression: an emotional obstacle to seeking medical advice for infertility. *Fertil Steril*. 2010; 94(5):1817-21. <https://doi.org/10.1016/j.fertnstert.2009.10.062> PMID:20047740
  25. Emami Zeydi A, Sharafkhani M, Armat MR, Gould KA, Soleimani A, Hosseini SJ. Women's Sexual Issues After Myocardial Infarction: A Literature Review. *Dimens Crit Care Nurs*. 2016; 35(4):195-203. <https://doi.org/10.1097/DCC.000000000000187> PMID: 27258956
  26. Lee I-T, Sheu WH-H, Liao Y-J, Lin S-Y, Lee W-J, Lin C-C. Relationship of stressful life events, anxiety and depression to hyperthyroidism in an asian population. *Horm Res*. 2003; 60(5):247-51. PMID:14614230
  27. Li Z, Li Y, Chen L, Chen P, Hu Y. Prevalence of depression in patients with hypertension: a systematic review and meta-analysis. *Medicine (Baltimore)*. 2015; 94(31):1-6.
  28. Purewal R, Fisher PL. The contribution of illness perceptions and metacognitive beliefs to anxiety and depression in adults with diabetes. *Diabetes Res Clin Pract*. 2018; 136:16-22. <https://doi.org/10.1016/j.diabres.2017.11.029> PMID:29203257
  29. Tavalaei Zavareh A, Jomhour R, Bejestani HS, Arshad M, Daneshmand M, Ziaei H, et al. Depression and Hypothyroidism in a Population-Based Study of Iranian Women. *Rom J Intern Med*. 2016; 54(4):217-21. <https://doi.org/10.1515/rjim-2016-0033> PMID:28002033
  30. Karimi Moonaghi H, Emami Zeydi A, Mirhaghi A. Patient education among nurses: bringing evidence into clinical applicability in Iran. *Invest Educ Enferm*. 2016; 34(1):137-151. PMID:28569983