

Investigation of breast cancer screening among the women of Khorramabad (west of Iran): a cross-sectional study

Khatereh Anbari⁽¹⁾, *Seyyed Amir Yasin Ahmadi*⁽²⁾, *Parastoo Baharvand*⁽³⁾, *Naser Sahraei*⁽⁴⁾

(1) Social Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran

(2) Research Office for the History of Persian Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran

(3) Department of Community Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran

(4) General Practitioner, Lorestan University of Medical Sciences, Khorramabad, Iran.

CORRESPONDING AUTHOR: Dr. Naser Sahraei, General Practitioner, Lorestan University of Medical Sciences, Khorramabad, Iran. Email: dr.anbari@gmail.com

DOI: 10.2427/12099

Accepted on January 10, 2017

ABSTRACT

Background: Cancer of breast is the most common women's cancer that more than 90% of its patients can be treated or even cured through early diagnosis. So we intend to assay the status of breast cancer screening in Khorramabad, a city in the west of Iran.

Methods: In the present cross-sectional study, the study population included 457 women of 20 to 65 year old whom had been referred to the health centers of Khorramabad during the second half of 2015 to receive health care services. The sampling method was multistage random-cluster. A multi-part questionnaire was used. Fisher exact test, chi-square and independent t tests were used to analyze the data.

Results: The regular self-breast exam (SBE) had been carried out by 12.3% of the women, visiting doctors for regular clinical breast exam (CBE) had been done by 6% of the respondents and regular mammography every one to two years had been performed by 2.4% of the women. A statistically significant relationship was seen between occupation ($P = 0.001$), regular consumption of contraceptive pills ($P = 0.032$), history of breastfeeding, history of breast cancer in the first degree relatives ($P = 0.001$), and a history of cancer in the second degree relatives ($P = 0.005$), and the regular SBE.

Conclusion: Planning to enhance the women's awareness about breast cancer and the methods of early diagnosis and designing educational programs can be an important step to reduce deaths and disabilities caused by this disease among women in such deprived cities.

Key words: breast cancer, women, breast self-examination, mammography, Iran

INTRODUCTION

Improvement of health care is a goal of both developed and developing countries. Cancers are of the

monies taking issues for governments [1]. Breast cancer is known as the most common cancer among women and all ages are susceptible in both developed and developing countries, and also is the most common malignancy in

women [2-4]. However, most of the mortalities caused by breast cancer (about 88%) occur in developing countries [5]. This, can be justified with the lower levels of awareness and education in such countries. More than 90% of the patients can be treated or even cured through early diagnosis [6, 7]. Nevertheless, there is not enough attention to its hygienic and economic consequences for societies in developing countries [8].

The most effective way to prevent breast cancer is preemptive screening at the early stages. Both clinical breast examination (CBE) and the self-breast examination (SBE) and also mammography are used to screen breast cancer at the early stages [9]. SBE is a test that is performed monthly at day 7 of the menstruation cycle and all the eminent parts of the breasts should be investigated for the warning signs (painless lump, the retraction of nipple, and bloody discharges [10]). Mammography is a method of screening supposed to be done usually in over 35 year old women [11] which performs its function based on breast density with software analysis [12]. Meta-analyses show that mammography resulted in 25% reduction of mortality based on the incidence-based mortality studies and a 31% of mortality reduction based on the case-control studies [13].

Also recently some molecular screening methods have been discovered. The cancerous antigens (CA) such as CA 15-3 and CA 27.29 are being used as biomarkers to detect and monitor the disease. However, they are not detectable enough at the early stages. The study of Lee et al, suggests that the ratio of serum proteoglycan 4 to protease C1 inhibitor might be used to screen the breast cancer at the early stages. Moreover, this requires further investigations to be validated in more representative populations [14].

There are some protective and risk factors for this disease. For example, pregnancy could be protective [15] due to protective effect of human chorionic gonadotropin [16, 17]. The risk factors are genetic and epigenetic factors [18], familial history, age, the ages of menopause and menarche, the age of the first pregnancy, geographical and anthropological variations, previous benign disease, radiation, hormone replacement therapies, the oral contraceptives and life style [19]. The treatment of breast cancer could be through hormone-replacement therapy [20], exemestane (in advanced cases, in the early stage of estrogen receptor positive patients, or in postmenopausal women who have already been treated with tamoxifen for 2-3 years) [5], the platinum compounds affecting cell cycle [21], radiation therapy [22] or immunoradiotherapy as a technic based on monoclonal antibodies [23].

Several genes are considered to be relevant to the susceptibility to breast cancer [24]. For instance, TP53 which is a tumor suppressor gene playing role in cell cycle, is mutated in about 30% of the patients of this cancer. There are three deleterious coding non-synonymous single nucleotide polymorphisms in TP53 as follows rs17849781 (P278A), rs11540654 (R110P) and rs28934874 (P151T)

that are known more as a mutation rather than polymorphism. Researchers hope to provide insights about this gene for screening and even therapeutic approaches in breast cancer [25]. As well *BRCA1* and *BRCA2* are the other tumor suppressor genes involved in breast cancer if mutated [26]. Other than the tumor suppressor genes, proto-oncogenes such as *ERBB2* are also involved in breast cancer. *ERBB2* is over-expressed in 25-30% of the breast cancer patients and cause resistance to the endocrine and chemotherapy. These patients can be treated by the monoclonal antibodies even in malignant conditions [23, 27]. In addition to the cell cycle related genes, genetic diversity of the genes like *human leukocyte antigens (HLA)* and *killer-cell immunoglobulin-like receptors (KIR)* which are highly polymorphic, can be effective on susceptibility to or resistance against this cancer [28, 29].

Breast cancer patients can experience some chronic side effects after treatment that result in decrease of life quality. Cancer-related fatigue is one of these sequels. Complementary therapies such as using herbal medicines, vitamins, dietary supplements, and so on can relieve these symptoms [30, 31].

In the review paper of Asadzadeh et al. it has been mentioned that the increasing trend of breast cancer incidence in the developing and undeveloped countries has made it a health issue. Financial constraints for screening with mammography in such countries, persuaded women to the use of less accurate alternative ways of screening such as CBE and SBE. The main challenges of starting a program for the breast cancer screening in such countries seems to be related to country's income, capacity and quality of health service and their community awareness. They believe that the Iran government should establish a tailor-made strategy for screening in order to reduce the number of advanced stages of the disease [32]. Babu et al believe that the combination method of SBE, CBE and mammography should be advertised through the mass media with government support emphasized on mammography [33], because the mass media and information technology can help the advertising and education of people [34]. Effects of education on screening behaviors in high risk women with a family history (mother, sister, or daughter) of breast cancer have been investigated by Hajian et al. They believe that for the breast cancer screening, the health education centers should be extended among the populations in the developing countries, based on psychological theories [35].

Autier et al. believe that factors other than screening could be involved in the reduction of breast cancer deaths. Such factors are mainly better management of the patients with breast cancer as well as the underreporting of breast cancer as an important cause of death [36]. Of course it is obvious that the screening can help both better management of the affected patients and the reduction of the underreporting.

Because of the mentioned importance, we took it upon ourselves to investigate the status of breast cancer screening in Khorramabad, a city in west of Iran, with a

review of the literature about the mentioned condition in Iran in the time range of 2013-2016 (the recent four years as an epidemiologic time period).

METHODS

In the present cross-sectional study, the study population included 457 healthy women (cancer-wise) of 20 to 65 year old who have been referred to the health centers of Khorramabad during the second half of 2015 to receive health care services. The sampling method was multistage random-cluster. The including criteria was being in the age of 20-65, living in Khorramabad and having oral consents from the participating individuals. The study was approved by the ethic committee of Lorestan University of Medical Sciences.

Data collection tools in this study included a multi-part researcher-designed questionnaire which had been validated for its content through referring to a number of faculty members and its reliability was calculated by Cronbach's alpha as 0.78 through test retest, because for each screening method we had time period and time interval. The first part of the questionnaire included questions about socio-demographic characteristics of the women in the study and the second part included questions regarding breast cancer screening procedures including whether the participants undergo a variety ways of screening procedures regularly or not, the screening interval, and the source of the recommendation for screening separately for each relevant procedure. Fisher exact test, chi-square and independent t tests were used to analyze the data through SPSS software, version 17 for windows. The t test was used to compare ages of the

patients who performed CBE with those who did not. The significance level for P value was considered as 0.05.

RESULTS

In the present study, the total number of 457 individuals was studied. Their average age was 35.9 ± 9.7 years old. The youngest one was 20 and the oldest one was a 64 year old women. The educational, occupational and marriage status of the participants are given in table 1. The clinical histories of the participants are also given in table 2. The average number of children per women was 3 and the highest number was 10. The average of the primagravidae age was 24 that the least and the most primagravidae ages were respectively 14 and 40. The mean of the first menstruation was 13.5 ± 1.3 that the minimum and the maximum ages of the first menstruation were respectively 10 and 18. Also the mean menopause age was 50.1 ± 6.4 and the minimum and the maximum menopause ages were respectively 29 and 56.

The regular SBE had been carried out by 10.3% of the women, visiting doctors for regular CBE had been done by 6% of the respondents and regular mammography every one to two years had been performed by 2.4% of the women (table 3). A statistically significant relationship was seen between occupation ($P = 0.001$) (table 1), the regular use of contraceptive pills ($P = 0.032$), the history of breastfeeding ($P = 0.021$), the history of breast cancer in the first degree relatives ($P = 0.001$), and the history of cancer in second degree relatives ($P = 0.005$), and the regular SBE (table 2). No significant differences were observed between age, education, marriage and the history of infertility, and performing regular SBE.

TABLE 1. Demographic distribution of the participants and the distribution of performing SBE among demographic features

DEMOGRAPHIC FEATURES		HISTORY OF USING SBE		P value*
Feature	Frequency (%)	Yes	No	
Age				0.802
Less than 30	176 (38.5)	16 (9.1)	160 (90.9)	
30-44	208 (45.5)	23 (11.1)	185 (88.9)	
More than 45	73 (16)	8 (11)	65 (89)	
Marriage				0.425
Married	339 (74.2)	37 (10.9)	302 (89.1)	
Single	118 (25.8)	10 (8.5)	108 (91.5)	
Education				0.395
Uneducated	77 (16.8)	9 (11.7)	68 (88.3)	
Guidance school and lower	84 (18.4)	8 (9.5)	76 (90.5)	
High school and Diploma	121 (26.5)	8 (6.6)	113 (93.4)	
University graduated	175 (38.3)	22 (12.6)	153 (87.4)	
Occupation				0.001***
House wife	337 (73.3)	27 (8)	310 (92)	
Clerk	47 (10.3)	6 (12.8)	41 (87.2)	
Self-employment	14 (3.1)	6 (42.9)	8 (57.1)	
Student	57 (12.5)	8 (14)	49 (86)	

* P value is based on chi square test (df=1 for marriage and df>1 for the other features) at significance level 0.05.

TABLE 2. Distribution of performing SBE decided for clinical history

DEMOGRAPHIC FEATURES		HISTORY OF USING SBE		P value*
Feature	Frequency (%)	Yes	No	
Breast feeding history				0.021 *
Yes	311 (95.9)	32 (10.3)	279 (89.7)	
No	13 (4.1)	4 (30.8)	9 (69.2)	
Infertility history				0.552
Yes	40 (9)	3 (7.5)	37 (93.5)	
No	400 (91)	43 (10.8)	357 (89.2)	
Using contraceptive pills history				0.032*
Yes	224 (49)	30 (13.4)	194 (86.6)	
No	233 (51)	17 (7.3)	216 (92.7)	
First-degree relative history of breast cancer				0.001***
Yes	6 (1.3)	5 (83.3)	1 (16.7)	
No	451 (98.7)	43 (9.3)	408 (90.7)	
Second-degree relative history of breast cancer				0.005**
Yes	8 (1.7)	4 (50)	4 (50)	
No	449 (98.3)	43 (9.6)	406 (90.4)	

* P value is based on chi square test (df=1) at significance level 0.05.

TABLE 3. Frequency distribution of the screening methods for the 457 participants

Method	Frequency Number (%)
SBE	47 (10.3)
CBE	15 (3.3)
Mammography	11 (2.4)
SBE + CBE	3 (0.7)
SBE + Mammography	1 (0.2)
CBE + Mammography	4 (0.9)
All the three methods	5 (1.1)
No screen	371 (81.2)

DISCUSSION

Unfortunately in the present study the rate of using screening methods among the participants was not satisfactory, because 81.2% of them used no screening method. The results suggest that breast-feeding is the only clinical history related to the increased use of SBE that is elective; because the history of breast cancer in the first or second degree relatives is inevitable. Of course, maybe the history of breast cancer in the family, may increase their awareness. As we found in table 2, performing SBE was significantly more common in patients with first and second degree family history of breast cancer. This finding shows that history of breast cancer in families can increase awareness of these women. It is fortunate that at least this group of women is more alert about breast cancer.

In the study of Fouladi et al in Iran a number of 380 women aged 30 and more who have been referred to the health care centers were assessed whether they use

the screening methods over the past year or not, through a modified health belief model questionnaire. As a result, 27% of the women performed SBE in their past year (higher in comparison to our result, 10.3%), but only 6.8% of them used mammography (the combination of these two methods in our study was 0.2%). The mentioned study implied that self-efficacy can support performance of SBE and we must educate women [6].

Nojomi et al believe that early diagnosis through the screening methods is the best way to reduce mortality of breast cancer. In their cross-sectional study in Tehran, more than 1000 women were studied through a self-administered survey questionnaire. Women with more screening efficacy and facing fewer performance barriers were more likely to carry out CBE in future. The women who had been reported higher CBE self-efficacy, mammography self-efficacy, screening efficacy, family influence and those who faced fewer screening performance barriers were more likely to perform mammography in future. About 75.8% and 72.1% indicated that they would like perform CBE and mammography in future respectively. About 65% of the women in their study reported they intend to perform both [37].

A recent study by Hajian and Auladi in the north of Iran indicates that the low level of the awareness of breast cancer screening is one of the most important barrier for the on-time detection of this disease. This cross-sectional study was performed on 500 representative women. Their results indicated that only 14.8% of participants had enough knowledge for breast cancer risk factors. The level of awareness was significantly higher in women with higher ages and also with higher educational level. The prevalence of performing SBE and CBE were respectively 10.2 and 8.4%, the first result is similar to our study

(10.3%) but unfortunately the second one is very low in Khorramabad (3.3%). The percentage of using SBE in that study was significantly associated with age [38] in contrast to our study ($P = 0.802$).

Another study in Kerman on more than 15000 participants aged from 35 to 69 years old showed that the rates for mammography test in rural and urban regions were respectively 34.95% and 8.75% [11]. As in our study, using mammography in Khorramabad city (2.4%) is very low in comparison to the urban areas of Kerman (8.75%). After a year (2016), another study was performed in the urban areas of Kerman by Ahmadipour and Sheikhzade [39]. The difference of this study with the previous one was that the age range was from 18 to 64 and was performed on 240 women who were selected using a multistage sampling method. There was no statistically significant difference in the frequency of SBE based on education and employment while our study found a significant difference between occupation and SBE ($P = 0.001$).

A breast cancer project has started in Yazd (center of Iran) from 2008 that its brief report was published in 2015. Based on this 10 year project from 2008 to 2018, the effect of performing both SBE and annual CBE on the reduction of breast cancer morbidity and mortality will be investigated [40]. Recently, a study has been performed on a random sample of 561 Iranian Kurdish women (2016) aged 40 years and older without the history of breast cancer. The participation rate in the mammography program was 16.8% which is much better than our results (2.4%) [41].

In addition to the studies performed in Iran, a study in Nigeria shows that 61.7% of women extremely agreed that SBE is a method of screening for breast cancer (it doesn't mean that all of them had performed it) [42]. In the Arab population living in the United Arab Emirates, 44.8% of women have never had a CBE and 44.1% of them have never had a mammography due to the lack of knowledge about the existence of screening methods and technics [43]. Their result is better than ours, in Khorramabad 81.2% have never had any screening test. A study on Thai women shows that SBE is only performed in 25% of them regularly (better than our result 10.3%) [44]. In Mexico, mortality rate of breast cancer has recently increased. The higher mortality was in girls who had elementary school than of those who had more education [45].

CONCLUSION

Using screening tests of breast cancer in this city is very low, because 81.2% of the women do not use any screening test. Using SBE has a significantly relationship with women's occupation; it seems that the self-employments are more alert. Breast-feeding history, history of using contraceptive pills and family history of

breast cancer make the women more alert.

Other than the statistical conclusions, two conclusions could stem from our study and the review of the literature. The more obvious one is that Iran is a big country and has a variety of ethnicities having biological and cultural variations through the lens of medical anthropology; nevertheless, we are suffering from our poor information bank in spite of the suggestions and policies of our government about a national registration bank of cancer cases. As stated in the discussion, only a few cities of Iran have been studied for breast cancer. The second conclusion is that the frequency of using screening methods in Khorramabad is very low in comparison to the other studies and populations of Iran.

Planning to enhance the women's awareness about breast cancer and the methods of early diagnosis and designing educational programs can be an important step to reduce deaths and disabilities caused by this disease among the women in such deprived cities.

Acknowledgements

The present study is supported by Lorestan University of Medical Sciences.

References

1. Saini S. US Presidential Election 2016 Impact on the Health Care. *Crescent J Med Biol Sci.* 2017;4(1):1-2.
2. Atashkhouei S, Fakhari S. Management of Breast Cancer Related Lymphoedema. *Crescent J Med Biol Sci.* 2016;3(4):111-2.
3. Asghari E, Nahamin M, Khoshtarash M, et al. The Relationship Between Health Belief and Breast Self-examination Among Iranian University Students. *International Journal of Womens Health and Reproduction Sciences.* 2016;4(3):110-3.
4. Shafaie FS, Nagizadeh S, Valizadeh S. Breast Cancer Screening Tests in Tabriz Behbood Hospital. *International Journal of Womens Health and Reproduction Sciences.* 2016;4(3):134-40.
5. Hashemi-Meshkini A, Keshavarz K, Gharibnaseri Z, et al. Cost-effectiveness analysis review of exemestane in the treatment of primary and advanced breast cancer. *Arch Med Sci.* 2013;9(3):472-8.
6. Fouladi N, Pourfarzi F, Mazaheri E, 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 Pacific journal of cancer prevention : APJCP.* 2013;14(11):6857-62.
7. Vilaprinoy E, Forne C, Carles M, et al. Cost-effectiveness and harm-benefit analyses of risk-based screening strategies for breast cancer. *PLoS One.* 2014;9(2):e86858.
8. Zehtab N, Jafari M, Barooni M, Nakhaee N, Goudarzi R, Larry Zadeh MH. Cost-Effectiveness Analysis of Breast Cancer Screening in Rural Iran. *Asian Pacific journal of cancer prevention : APJCP.* 2016;17(2):609-14.
9. Cesario SK, Liu F, Gilroy H, Koci A, McFarlane J, Maddoux

- J. Preventative Health Screening Amongst Women Who Have Experienced Intimate Partner Violence. *international journal of women's health and reproduction sciences*. 2015;3(4):184-9.
10. Montazeri A, Vahdaninia M, Harirchi I, et al. Breast cancer in Iran: need for greater women awareness of warning signs and effective screening methods. *Asia Pacific family medicine*. 2008;7(1):6.
 11. Jafari M, Nakhaee N, Goudarzi R, Zehtab N, Barouni M. Participation of the Women Covered by Family Physicians in Breast Cancer Screening Program in Kerman, Iran. *Asian Pacific journal of cancer prevention : APJCP*. 2015;16(11):4555-61.
 12. van der Waal D, den Heeten GJ, Pijnappel RM, et al. Comparing visually assessed BI-RADS breast density and automated volumetric breast density software: a cross-sectional study in a breast cancer screening setting. *PLoS one*. 2015;10(9):e0136667.
 13. Nelson HD, Fu R, Cantor A, Pappas M, Daeges M, Humphrey L. Effectiveness of breast cancer screening: systematic review and meta-analysis to update the 2009 US Preventive Services Task Force recommendation. *Annals of internal medicine*. 2016;164(4):244-55.
 14. Lee C-S, Taib NAM, Ashrafzadeh A, et al. Unmasking Heavily O-Glycosylated Serum Proteins Using Perchloric Acid: Identification of Serum Proteoglycan 4 and Protease C1 Inhibitor as Molecular Indicators for Screening of Breast Cancer. *PLoS one*. 2016;11(2):e0149551.
 15. Gutierrez C, Mills D, Love S, Lakshmanaswamy R. Abstract P2-06-14: Utilizing Human Breast Tissue and Blood to Discern Novel Protective Properties of Early Pregnancy in Reducing Breast Cancer Risk. *Cancer Research*. 2010;70(24 Supplement):P2-06-14-P2-06-14.
 16. Janssens JP, Russo J, Russo I, et al. Human chorionic gonadotropin (hCG) and prevention of breast cancer. *Molecular and cellular endocrinology*. 2007;269(1):93-8.
 17. Boroujeni MB, Boroujeni NB, Salehnia M, Marandi E, Boroujeni MB. Ultrastructural changes of corpus luteum after ovarian stimulation at implantation period. *Iranian Biomedical Journal*. 2012;16(1):33-7.
 18. Goettler A, Haslberger A, Ambrosino E. The Relevance of Epigenetic Biomarkers for Breast Cancer and Obesity for Personalised Treatment in Public Healthcare: A Systematic Review. *Epidemiol Biostat Public Health*. 2016;13(2):6.
 19. McPherson K, Steel C, Dixon J. Breast cancer—epidemiology, risk factors, and genetics. *Bmj*. 2000;321(7261):624-8.
 20. Collaborators MWS. Breast cancer and hormone-replacement therapy in the Million Women Study. *The Lancet*. 2003;362(9382):419-27.
 21. Shahsavari F, Bozorgmehr M, Mirzadegan E, et al. A novel platinum-based compound with preferential cytotoxic activity against a panel of cancer cell lines. *Anti-Cancer Agents in Medicinal Chemistry*. 2016;16(3):393-403.
 22. Akan Z. Boron neutron capture therapy for breast cancer. *International Journal of Women's Health and Reproduction Sciences*. 2015;3(2):77.
 23. Smellie WJB, Dean CJ, Sacks NP, et al. Radioimmunotherapy of breast cancer xenografts with monoclonal antibody ICR12 against c-erbB2 p185: comparison of iodogen and N-succinimidyl 4-methyl-3-(tri-n-butylstannyl) benzoate radioiodination methods. *Cancer research*. 1995;55(23 Supplement):5842s-6s.
 24. Shimbo T, Takaku M, Wade PA. High-quality ChIP-seq analysis of MBD3 in human breast cancer cells. *Genomics Data*. 2016;7:173-4.
 25. Chitrala KN, Yeguvapalli S. Computational screening and molecular dynamic simulation of breast cancer associated deleterious non-synonymous single nucleotide polymorphisms in TP53 gene. *PLoS one*. 2014;9(8):e104242.
 26. Boccia S, Michelazzo MB, Tognetto A, Del Sole AM. The prevention of hereditary breast cancer in Italy: towards the implementation of the national prevention plan in the Italian regions. *Epidemiol Biostat Public Health*. 2016;13(2):2.
 27. Borcharding N, Bormann N, Kusner D, Kolb R, Zhang W. Transcriptome analysis of basal and luminal tumor-initiating cells in ErbB2-driven breast cancer. *Genomics Data*. 2015;4:119-22.
 28. Shayanrad B, Ahmadi SAY, Shahsavari F. Breast cancer is protected by the KIR gene 2DL1 and affected by 2DL2: A systematic review. *Der Pharmacia Lett*. 2016;8(15):22-5.
 29. Ghanadi K, Shayanrad B, Ahmadi SAY, Shahsavari F, Eliasy H. Colorectal cancer and the KIR genes in the human genome: A meta-analysis. *Genomics Data*. 2016;10:118-26.
 30. Roila F, Fumi G, Fatigoni S. Management of fatigue following breast cancer treatment. *Breast Cancer Management*. 2016;5(2):79-87.
 31. Roe K, Visovatti MK, Brooks T, Baydoun M, Clark P, Barton DL. Use of complementary therapies for side effect management in breast cancer: evidence and rationale. *Breast Cancer Management*. 2016(0).
 32. Asadzadeh VF, Broeders MJ, Kiemeneij LA, Verbeek AL. Opportunity for breast cancer screening in limited resource countries: a literature review and implications for Iran. *Asian Pacific journal of cancer prevention : APJCP*. 2011;12(10):2467-75.
 33. Babu GR, Samari G, Cohen SP, et al. Breast cancer screening among females in Iran and recommendations for improved practice: a review. *Asian Pacific journal of cancer prevention : APJCP*. 2011;12(7):1647-55.
 34. Ghanouni A, Meisel SF, Hersch J, Waller J, Wardle J, Renzi C. Information on 'Overdiagnosis' in Breast Cancer Screening on Prominent United Kingdom and Australia-Oriented Health Websites. *PLoS one*. 2016;11(3):e0152279.
 35. Hajian S, Vakilian K, Najabadi KM, Hosseini J, Mirzaei HR. Effects of education based on the health belief model on screening behavior in high risk women for breast cancer, Tehran, Iran. *Asian Pacific journal of cancer prevention : APJCP*. 2011;12(1):49-54.
 36. Autier P, Boniol M, Smans M, Sullivan R, Boyle P. Observed and Predicted Risk of Breast Cancer Death in Randomized Trials on Breast Cancer Screening. *PLoS one*. 2016;11(4):e0154113.
 37. Nojomi M, Namiranian N, Myers RE, Razavi-Ratki SK, Alborzi F. Factors Associated with Breast Cancer Screening Decision Stage among Women in Tehran, Iran. *International journal of preventive medicine*. 2014;5(2):196-202.
 38. Hajian Tilaki K, Auladi S. Awareness, Attitude, and Practice of Breast Cancer Screening Women, and the Associated Socio-Demographic Characteristics, in Northern Iran. *Iranian journal of cancer prevention*. 2015;8(4):e3429.
 39. Ahmadipour H, Sheikhezade S. Breast and Cervical Cancer Screening in Women Referred to Urban Healthcare Centers in Kerman, Iran, 2015. *Asian Pacific journal of cancer prevention : APJCP*. 2016;17 Spec No.:143-7.
 40. Miller AB, Harirchi I, Lofth MH, et al. Yazd breast cancer project profile; a community based trial for the evaluation of self-examination

- and physical examination of the breast cancer disease. *Iranian journal of medical sciences*. 2015;40(6):531.
41. Aminisani N, Fattahpour R, Dastgiri S, Asghari-Jafarabadi M, Allahverdipour H. Determinants of breast cancer screening uptake in Kurdish women of Iran. *Health promotion perspectives*. 2016;6(1):42-6.
 42. Oladimeji KE, Tsoka-Gwegweni JM, Igbodekwe FC, et al. Knowledge and Beliefs of Breast Self-Examination and Breast Cancer among Market Women in Ibadan, South West, Nigeria. *PloS one*. 2015;10(11):e0140904.
 43. Elobaid YE, Aw TC, Grivna M, Nagelkerke N. Breast cancer screening awareness, knowledge, and practice among Arab women in the United Arab Emirates: a cross-sectional survey. *PloS one*. 2014;9(9):e105783.
 44. Hossain SZ, Robinson L, Clarke J. Breast cancer knowledge and participation in breast screening practices among Southeast Asian women living in Sydney. *GSTF Journal of Nursing and Health Care (JNHC)*. 2016;3(2).
 45. Sanchez-Barriga JJ. Mortality trends and risk of dying from breast cancer in the 32 states and 7 socioeconomic regions of Mexico, 2002-2011. *Epidemiol Biostat Public Health*. 2015;12(1):12.

